Essays on Capital Structure and Investment of Non-Financial Firms: An International Comparison

Ahmed Usman

Centre for Finance, Credit and Macroeconomics,
School of Economics

Thesis submitted to
The University of Nottingham
for the degree of Doctor of Philosophy

Aug 2018

Abstract

This doctoral thesis investigates various capital structure and investment decisions of non-financial firms when (i) banks of the firms become riskier after the Global Financial Crisis (ii) firms operate in countries with heterogenous financial architecture i.e. bank-oriented and market-oriented countries and (iii) firms face increased macroeconomic uncertainty after the crisis. We also treat Global Financial Crisis of 2007 as an exogenous shock to the supply of capital and investigate the impact of the crisis on different financing and investment decisions of non-financial firms. We examine the cross section of the firms and investigate the differential behaviour of higher growth firms (as measured by Tobin's Q). The central finding of this thesis is that financial architecture is one of the most important determinants of capital structure and investment decisions of non-financial firms. When higher growth firms operating in market-oriented countries face an increase in the market riskiness of banks after the crisis, these firms do not suffer a decrease in overall leverage and the level of investment. These higher growth firms in market-oriented countries also have lower cost of debt and higher intensive and extensive margins of bond financing. Finally, the probability of bank loans and equity (bonds) issuance decrease (increase), after an increase in the downside macroeconomic uncertainty after the crisis. We carefully control firm's demand for credit using various proxies, therefore all our results point towards supply side effect of credit.

Acknowledgements

All my gratitude and thankfulness to Almighty ALLAH for always bestowing the best on me and providing me with immense opportunities in life.

First of all, I would like to thank my supervisors, Prof. Paul Mizen and Prof. Spiros Bougheas. This journey would not have been possible without their invaluable guidance, their patience about my mistakes and precious feedback which helped me improve my research. I owe a great deal to both my supervisors. I have greatly benefited from annual PhD conferences at the School of Economics and fruitful discussions with the faculty members at the School. I am also thankful to my examiners Prof. Serafeim Tsoukas and Prof. Sarah Bridges for their valuable time to read my thesis and providing useful insight. I highly acknowledge the funding from the Economic & Social Research Council (Award Ref: 1511991). Completing my PhD without ESRC funding would have been much harder. Their funding and support will go miles in my life.

How can I forget my parents, who gave me the best in life and supported me throughout my life. Their prayers and continuous support kept me going. I am short of words to thank my wife, Mrs. Ayesha Kaleem. She is the best partner I could ever wish for. I would never forget that she sacrificed her professional ambitions and relocated with me at Nottingham. I want to let her know that I will remember her support throughout my life. My daughter (Miss Khadija Usman) and my son (Master Ahmed Ibrahim) made this journey easier and more beautiful. Their smiles lightened the toughness of the journey. My sister (Mrs. Zainab Sheraz) is a continuous source of motivation for me and her love and support has always been invaluable.

I am also thankful to my cousin, Mr. Anas Athar, for helping me with data storage and providing precious IT support. Without his help, I would not have been able to manage the data and perform some part of my research. My friends at the School of Economics and my family and friends in the UK and Pakistan made me smile when it was needed the most. I am lucky to have them in my life.

I am solely responsible for all the remaining errors.

Table of Contents

List of Equations

List of Figures

List of Tables

Chapter 1

General Introduction

1.1 Introduction

Capital Structure is irrelevant in a Modigliani & Miller world, where there are no financial frictions, no transaction costs and no information asymmetries (Modigliani and Miller (1958), (1963)). In the real world, these factors exist and determinants of capital structure play an important role in shaping the external financing decisions of the firms (Rajan and Zingales (1995)). Most importantly, financial frictions play a very important role in selecting the source of the external finance. Fama and French (2005) also suggest that firms issue equity very frequently and therefore capital structure models should incorporate equity issuance behaviour of non-financial firms.

Capital structure and investment decisions of the non-financial firms depend on their existing financial constraints. Moreover, any shock to the capital markets and the banking sector may also be transmitted to the real sectors of the economy (see Kiyotaki and Moore (1997) and Bernanke et al. (1999)). Recently there has been a growing literature that augments the financing frictions faced by the lenders with those of the borrowers and acknowledges the joint importance of the balance sheet of both the lenders (banks) and the borrowers (firms) for the overall economy (see Holmstrom and Tirole (1997), Rampini and Viswanathan (2010) and Goel et al. (2014)). Almeida et al. (2012) provide strong empirical evidence that in case of a bank lending shock, debt maturity plays an important role and firms whose long term debt are maturing just after a crisis occurrence, reduce their investment more than their peers. Similarly, a greater reliance on interbank market (Iyer et al. (2014)), an increase in bank's CDS spreads (Balduzzi et al. (2017)) and a decline in the bank ratings (Adelino and Ferreira (2016)), cause a significant decrease in the funding available to the banking sector.

Leary (2009) provide strong empirical evidence that in an event of a shock to the supply of bank loans, firms which have access to bond markets do not suffer a decrease in their leverage ratios. This evidence points to the available opportunity of raising external finance by issuing bonds, instead of bank loans, if there is a shock to the

supply of bank credit. The opportunity of issuing bonds and making up for the decreased supply of credit from the banks is not homogenous for all firms. Those firms who have access to the bond markets do not suffer a decline in their total leverage as they are able to substitute the decrease in the bank lending with an increase in the bond financing.

In the context of the recent Global Financial Crisis of 2007, Adrian et al. (2013) provide strong empirical evidence that during the financial crisis, the reduction in the overall leverage overwhelmingly points to the reduction in the supply side of the credit instead of firm's demand for credit. Moreover, firms that had access to the bond markets during the crisis, made up for the lost supply of the bank credit by issuing bonds. Therefore, firms switched their financing mix from bank lending to the bond financing when faced by a reduced supply of bank credit after the crisis. The global financial crisis of 2007 changed the financial landscape for banks and non-financial firms. After the fall of Lehman Brothers, the volume of inter-bank lending and lending to the private sector fell. This shift to bond financing is attributed to various factors including but not limited to contraction in the bank-credit supply and an increase in the risk of the banking sector (Becker and Ivashina (2014)). This change in the mix of external financing is termed as "Second Phase of Global Liquidity" Shin (2014), where the bond markets played a central role in making up for the reduction in bank credit.

Empirically, there has been a divide in the literature about the efficacy of either bank-based or market-based financial architecture of any country and its impact on country's growth and capital structure of the firms. Bank-oreinted systems are characterized by a close relationship between lenders and borrowers, which involves higher scrutiny and monitoring (see Diamond (1984) and Holmstrom and Tirole (1997)). On the other hand, market-oriented economies are the ones where borrowers have greater options of alternate sources of financing, other than the banking sector. Moreover, when capital markets are more efficient, banks and traditional springs of finance tend to adhere less to arbitrage opportunities.

Research on the impact of financial architecture of any country (bank-oriented or market-oriented) on the overall growth/development of the country and performance of firms can be categorized into macro (country level) or micro (firm level) based

studies. Most of the studies using macro level data do not find any support about the impact of either bank or market-oriented economies on the overall growth and financial development of any country (see Beck and Levine (2000), (2002), Levine (2002), Demirgüç-Kunt and Maksimovic (2002) and Chakraborty and Ray (2006)). Similarly, using firm level data and collapsing it across countries, Demirgüç-Kunt and Maksimovic (2002) find that it is not the financial architecture but the overall legal system of the country which predicts access of private sector to external financing in any country.

On the other hand, various micro (firm) level studies find that financial architecture of the country matters for various firm level decisions. For example, Antoniou et al. (2006) find that the debt maturity profile of the firm depends on the financial architecture of the country and firms operating in bank-oriented countries have longer debt maturities as compared to the firms in market-oriented countries. Moreover, firms in market-oriented countries consider the market conditions (market timing theory) while deciding about the maturity profile of their external financing. Similarly, Anderson and Gupta (2009) suggest that the market values of the firms operating in market-oriented countries are higher than similar (and comparable) firms in bank-oriented countries. It is also pertinent to mention that using recent macro data (2000-2011), Demirgüç-Kunt et al. (2013) also provide empirical evidence that as economies grow, the financial services provided by capital markets become relatively more important for economic growth, as compared to the services offered by the banking sector. In another related study, Gambacorta et al. (2014) confirm that when recessions and crisis occur simultaneously, the impact on GDP in bank-oriented countries is three times severe than in market-oriented countries. Didier et al. (2015) is a recent firm level study confirming that firms issuing bonds and equity grow faster in market-oriented countries as compared to similar issuing firms in bank-oriented economies.

We can infer from the above discussion that most of the micro based studies and even macro based studies using the recent (21st century) cross-country data suggest that market-oriented countries are better suited for overall financial development of the country and firms perform better in terms of overall growth and market values. One of the possible reasons can be increased capital flows across equity and bond markets in recent year around the globe and a surge in foreign bonds and equity issuances in recent

times. Market-oriented countries have deep and liquid bond and equity markets whereas the banks are the main lenders in bank-oriented countries. In case of a shock to the supply of credit, firms operating in market-oriented countries have alternate sources of financing and therefore they should be able to offset a tightening in lending. On the other hand, firms are mainly dependent on banks for obtaining external finance in bank-oriented countries, hence there should be a decrease in overall lending after tightening of credit conditions in bank-oriented countries.

It is pertinent to mention that all tables starting with "A." correspond to the appendix of Chapter 2, "B." with appendix of Chapter 3 and "C." with Chapter 4. The following section provides abstract of Chapter 2, 3 and 4.

1.2 Abstract of Chapter 2

Market-oriented countries are characterized by greater availability of external finance options to the private sector including bond and equity markets, whereas banks are the main lenders in bank-oriented countries. Any increase in the riskiness of banks affects the capital structure and investment decision of non-financial firms because risky banks can cut back their lending or make marginal credit more expensive. Under such circumstances, firms in market-oriented countries should be able to annul any shock to the supply of credit. Moreover, higher growth firms should be less affected because investors recognize the future growth opportunities of these firms and are willing to lend to these firms, even during distress times. Using a novel dataset for 11,628 firms across 20 countries from 2006 to 2014, we find that after an increase in the Value of Risk (VaR – proxy for market risk) of the banks, firms face a decrease in their overall leverage and investment. Moreover, the effect of this shock is not homogenous for all kinds of firms and higher growth firms (as measured by Tobin's Q), are able to annul this bank lending shock and are less affected in terms of their overall leverage and the level of investment. The most important finding of this study is that an increase in VaR of the banks causes a decline in the overall financing and the level of investment of non-financial firms operating only in bank-oriented countries. Firms in market-oriented economies do not suffer a decrease in their overall leverage and investment, even though their banks become riskier. We attribute these results to greater opportunities of external finance available to firms operating in market-oriented countries. This provides strong empirical support that financial architecture of the country is one of the most important determinants of firm's leverage and investment, after controlling for the riskiness of lenders (banks) and borrowers (firms). We also provide sufficient evidence that our results are driven by the supply side effects of credit as we carefully control firm's demand for the credit and any productivity shocks.

1.3 Abstract of Chapter 3

There has been a remarkable shift in the financing mix of private sector after the Global Financial crisis. This shift, which is termed as "Second Phase of Global Liquidity" by Shin (2014), has seen the bond markets at the centre stage of external financing to non-financial firms. Financial intermediaries became riskier after the financial crisis as liquidity dried up and banks cut back on their lending. This decrease in the bank lending had severe consequences for non-financial firms across the globe. Firms that had access to bond markets compensated the decrease in the availability of bank lending, by raising more funds through issuing bonds. We construct a novel dataset which contains information about firm-bank linkages and the financial health of both lenders (banks) and borrowers (firms) and ask an important policy question. After controlling for the riskiness of the banks and the firms, can financial architecture of the country explain the bonds issuance decisions of non-financial firms? If yes, does higher growth firms (whose future growth opportunities are duly recognized by the investors) perform any better than their peers? Our findings suggest that with an increase in market risk of the banks of the firms after the crisis, higher growth firms face lower spreads and these firms issue larger volumes of bonds (an increase in intensive margins) and also issue higher number of bonds (an increase in extensive margins). Most importantly, we find that these higher growth firms have lower cost of debt and higher intensive and extensive margins only in market-oriented countries and not in bank-oriented economies. We make sure that our results are driven only by financial architecture of the country of the firm and not by other macroeconomic variables. Our results reflect the supply-side effects of the capital, as we carefully control firm's demand for credit and any shock to the firm's productivity as well. Our results provide strong empirical support that financial architecture of the country is one the most important determinants of capital structure of non-financial firms.

1.4 Abstract of Chapter 4

Does positive and negative macroeconomic uncertainty influence the security issuance decisions of non-financial firms in a similar fashion? To answer this question, we use Rossi and Sekhposyan (2015), (2017) macroeconomic uncertainty index and treat Global Financial Crisis (2007) as an exogenous shock to the bank lending. Rossi Index differentiates between downside (negative/bad) and upside (positive/good) macroeconomic uncertainty. We find that with an increase in the downside macroeconomic uncertainty after the financial crisis, the probability of bank loans and equity (bonds) decrease (increase). On the other hand, an increase in the upside uncertainty after the crisis, only increases the likelihood of equity issuance. Our findings also suggest that the impact of downside and upside macroeconomic uncertainty on the probability of bank loans (bonds and equity) issuance after the financial crisis is only observable in bank-oriented (market-oriented) countries. Finally, with an increase in the downside uncertainty after the crisis, foreign firms and those firms facing lower asymmetric information costs witness an increase in the propensity to issue bonds and equity securities (as compared to bank loans). We provide sufficient evidence that our results are driven by the supply side effects of the credit as we carefully control firm's demand for the credit.

Chapter 2

Capital Structure and Investment Decisions of Non-Financial Firms and the Role of Financial Architecture: An International Comparison

2.1 Introduction

Global Financial Crisis of 2007 is characterized by a supply side shock to the availability of the credit which affected the capital structure and investment decisions of non-financial firms (see Almeida et al. (2012) and Adrian et al. (2013)). Shortage of liquidity in the Interbank market further increased the uncertainty and banks responded by increasing the risk premia and cutting back on credit lines to the private sector. One of the most important reasons for the reduction in supply of credit by the banking sector is the increased riskiness of the banks. As shown in figure 2.1 below, average Value at Risk[1] (VaR is a measure of market riskiness) of the financial institutions, increased across different countries in the world after the financial crisis[2]. This increase in VaR made banks riskier after the financial crisis. An increase in riskiness of banks made availability of funding uncertain and banks decreased their overall lending and faced a reduction in their profitability and size of the balance sheets (Ritz and Walther (2015)). This shock to the banking sector translated into reduced leverage and investment cuts by the private sector (especially non-financial firms). Firms faced shortage of funds, marginal credit became expensive and therefore firms either cancelled or postponed investment projects.

Alongside impact of financial health of the banks, financial architecture of the country also plays a very important role in the financing and investment decisions of the private sector. Firms operating in market-oriented[3] countries have greater options of obtaining external financing from multiple sources (bonds and equity markets), as capital

[1] Value at Risk (VaR) is a market based measure of risk. We use VaR, as reported by the banks in their financial statements. These values of VaR take into account all investment and liability positions of the banks. For a detailed explanation of VaR, please refer to section 2.4.3.

[2] Please refer to Figure 2.4 & 2.5 in Appendix A, for average VaR of all the banks in our sample along with a breakdown of average VaR into different size classes.

[3] Countries in which banks are the major lenders are characterized as bank-oriented countries and countries where capital markets (bond and equity) provide greater opportunities of external financing are classified as market-oriented economies. For a detailed discussion about the classification of countries into either group in this study, please see section 2.2.3.

markets in these countries provide additional borrowing opportunities (other than the banking sector) to the non-financial firms. Whereas, banks remain the main source of lending for firms operating in bank-oriented countries. It is evident in figure 2.2 below,

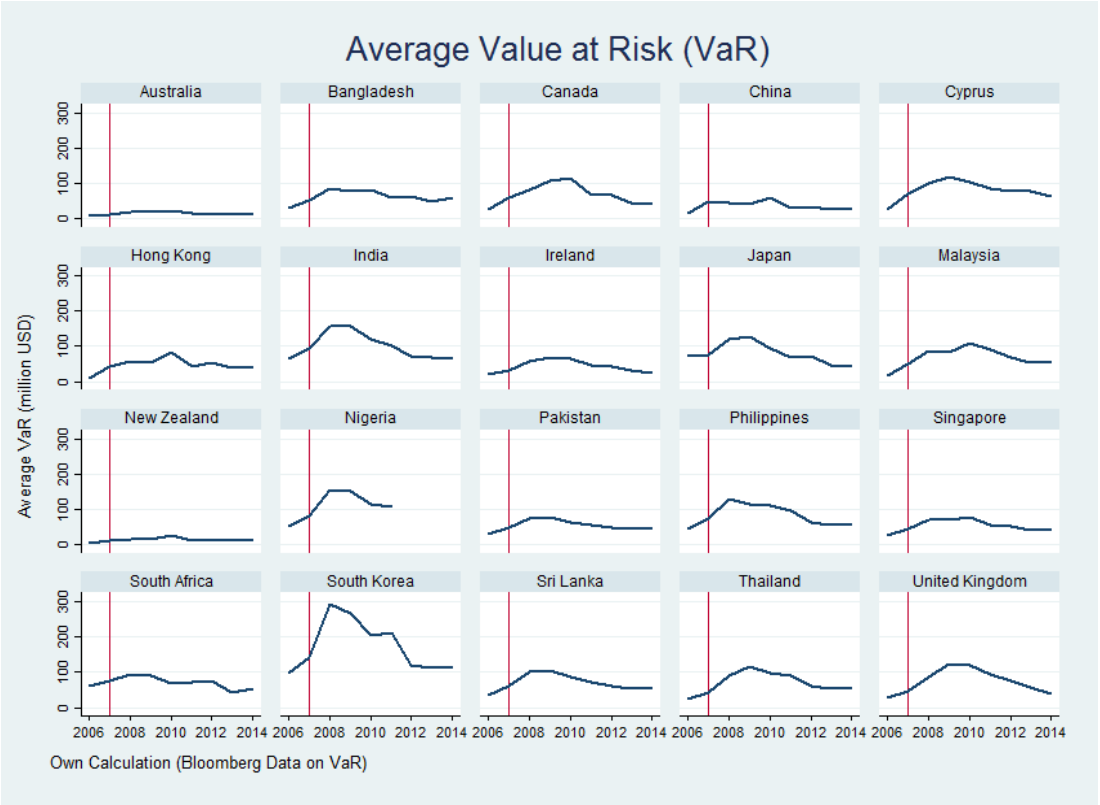

Figure 2.1: Average Value at Risk of Financial Institutions (across Countries). Source: Bloomberg

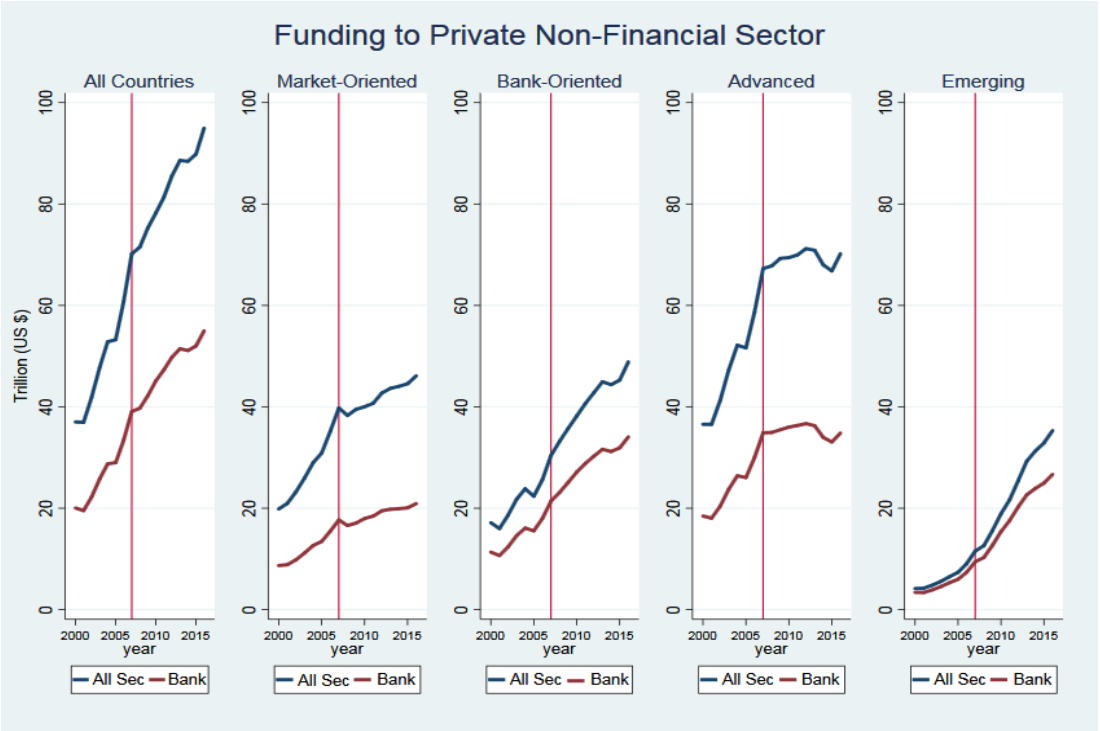

Figure 2.2: Funding to Private Non-Financial Sector from All Sectors and Banks. Source: BIS

which shows that after the financial crisis, overall lending increased but private sector in market-oriented (bank-oriented) and advanced (emerging) countries obtained more funding from non-banking (banking) sources. Moreover, in market-oriented and advanced countries, the gap between the bank and non-bank lending increased after the financial crisis.

There is enough evidence in the literature that firms in market-oriented economies perform better in terms of their leverage and investment decisions as documented by de Jong et al. (2008), Antoniou et al. (2008) and Fan et al. (2012). One potential problem of these and other related studies is that they do not distinguish between the role played by the financial health of the lenders and that of financial architecture of the country on capital structure and investment decisions of non-financial firms. The main contribution of our paper is that we investigate the impact of financial architecture of a country on the real decisions made by the firms (leverage and investment), when the banks of these firms face higher market risks (as measured by VaR of the banks).

We fill this gap by asking the following question: After controlling for the financial health of the lenders (banks) and borrowers (firms), can financial architecture of a country explain capital structure and investment decisions of non-financial firms? If yes, is this effect homogenous across the whole cross section of non-financial firms? An increase in the riskiness of the banks can impede the ability of the firms to raise external finance and hence a drag on investment. Therefore, we expect that firms in bank-oriented countries (where banks are main source of capital) will face a decrease in overall leverage and investment after an increase in the riskiness of the bank. On the other hand, market-oriented countries are characterized by deep and liquid capital markets and therefore firms in these countries have higher opportunities of obtaining external financing through sources other than the banking sector. Therefore, we expect that non-financial firms operating in market-oriented countries will not be affected in terms of their overall leverage and investment. Moreover, we expect higher growth firms (as measured by Tobin's Q) to be less affected in terms of overall leverage and investment decisions. These higher growth firms perform better along leverage and investment decisions because future growth opportunities of these firms are better

recognized by the investors and these firms are able to reduce the agency costs of debt and increase their leverage, even during distress times (see Lang et al. (1996) and Billett et al. (2007)).

We find that after an increase in VaR of the banks, non-financial firms reduce their overall leverage and investment. In the overall sample (both bank and market-oriented countries), firms with lowest growth opportunities suffer a decrease in their total leverage and investment whereas firms in the upper quartiles of growth opportunities do not experience any drop in both their leverage and investment. The most important finding of our paper is that lowest growth firms experience a decrease in total leverage and investment only in bank-oriented countries. In market-oriented countries, we do not find any evidence that an increase in VaR of the banks is associated with any reduction in the leverage and investment of the firms (for both lower and higher growth firms). These results suggest that non-financial firms in market-oriented countries can offset any impact of a bank lending shock on their overall financing and investment decisions because these firms have greater options of obtaining external financing through capital markets.

Any negative movements in the currency, equity or interest rate markets will increase VaR of the banks. Subsequently, these banks would need higher amounts of capital to offset any potential losses. Under such circumstances, an obvious response by these banks will be either to cut back on their existing credit lines to the borrowers (firms) or to make marginal borrowing more expensive (Ritz and Walther (2015) and Cingano et al. (2016)). In this paper, we explore this link by investigating the impact of an increase in VaR of the banks on the capital structure and investment decisions of non-financial firms. Our study also makes an advancement by using one of the most important market based risk measure of the banks i.e. VaR, instead of conventional book value based risk measures (see Balduzzi et al. (2017)[4]). In this study, we use VaR as a proxy of a bank lending shock which not only affects the financial health of the banks but also affects the real decisions of the borrower firms. It is also pertinent to mention that a lending shock to the financial health of the banks (due to an increase in

[4] Balduzzi et al. (2017) report that market based risk measure (CDS spread) dominates conventional book value based variables in almost all their regressions. A possible explanation of these findings is that balance sheets of the banks are marked to market more frequently and therefore market based variables dominate over the book value based variables.

VaR of the bank) is exogenous to the non-financial firms because information about the market riskiness of the banks arising from their lending and trading portfolio is not disseminated to the public very frequently by the banks and VaR captures this market riskiness of the banks.

We control firm's demand for credit to ensure that our results are not driven by the demand side effects. The decision to investigate either demand or supply side effects of the credit on the real decisions made by the firms, depends on the availability of the data. Jiménez et al. (2014b) is one of the very few papers who investigate the impact of firm's demand for credit on the lending decisions of the firms. These authors are only able to investigate the impact of the demand side of the credit using bank loan application level data. Acceptance or rejection of the firm's loan application, by the banks, enables a researcher to differentiate between supply and demand side effects of the credit. We face an obvious constraint of having no access to the loan application level data, hence firm's demand for credit is unobservable in our sample. Therefore, we control for the demand of credit by the firms by using fixed effects, country and industry level variables and dynamic panel data estimators. We are confident that the results of this study shed light on the supply side effects of a bank lending shock on the real decisions made by the non-financial firms. Dynamic estimator (system-GMM) allows us to control for the unobservable time invariant characteristics of the firms (firm's demand for credit and any productivity shocks to the firm). Most importantly, system-GMM also helps us in controlling the endogeneity arising from the simultaneity problems, where the independent variables are jointly determined with dependent variable. By using the internal lags of the independent and lagged dependent variables, system-GMM attempts to control the endogeneity caused by the simultaneity problem.

Our study differs in several ways from various other studies about the impact of market riskiness of banks and the role of financial architecture of a country, on the capital structure and investment decisions made by the non-financial firms. Most of the existing studies about the impact of riskiness of banks on firms, rely exclusively on the balance sheet indicators of banks' performance and its impact on the borrowing firms (see Berrospide and Edge (2010), Franklin et al. (2015) and Kalemli-Ozcan et al. (2018)), and erroneously omit market based risk measures. Managers in financial

institutions pay attention to both balance sheet and market based fundamentals but market based risk indicators tend to play a more important role. The most important reason is that financial statements of the banks are marked to market more frequently than the non-financial firms and therefore banks adjust their risk and profit appetite after taking into consideration the market outlook, as suggested by Balduzzi et al. (2017). These authors also report that market based measures of risk dominate book value based variables in almost all their estimations. Therefore, our core measure of bank lending shock is VaR of banks. VaR is the most commonly used market risk measure by financial institutions yet the empirical evidence on the impact of VaR on financing and investment decisions of borrower firms remains unexplored. Adrian and Shin (2010), (2014) is the first paper to document that VaR is an important determinant of the leverage of banks. We extend their work and document that VaR of the banks of the firm is also a very important determinant of the overall leverage and investment of non-financial firms.

Most of the existing studies about the impact of financial architecture of the country on the capital structure and investment of non-financial firms, do not control for any observable characteristics of the lenders and/or do not control firm's demand for credit and any productivity shocks to the firm (see de Jong et al. (2008), Antoniou et al. (2008) and Fan et al. (2012)). Controlling for these factors is very important otherwise the results can be driven either due to a supply side shock to the credit or a demand side fluctuation. Moreover, controlling for the financial health of the lenders, while investigating the impact of financial architecture of a country on the overall leverage and investment decisions by non-financial firms, provides assurance that the results are not driven by any observable characteristics of the banks. For example, lower capitalized and risky banks in a country can negatively affect the leverage and investment decisions of the borrowers. Not controlling for the bank's capital and riskiness may lead us to conclude that bank's capital and riskiness affects the capital structure and investment decisions of non-financial firms, instead of financial architecture of the country in which the firm operates. Therefore, we control for a host of observable characteristics of the lenders, so that we can identify the impact of financial architecture of a country on the leverage and investment decisions of non-financial firms.

We would like to mention here that at the time of writing this paper (April 2016), the data for this study spanned from 2006 to 2014. Global Financial Crisis of 2007 was a big shock to the supply of capital, which affected the capital structure and investment decisions of non-financial firms around the world (see Campello et al. (2010) for a detailed discussion). However, in this study, we could not investigate the impact of financial crisis on capital structure and investment decisions of non-financial firms because there were not enough number of years before crisis. For the third and fourth chapters of this thesis, we updated our firm and bank level data from 2006 to 2014 to 2004 to 2014, providing us sufficient number of years before the financial crisis. Therefore, we have re-estimated all the analysis in this study, by splitting our data before and after the financial crisis. Our findings suggest that with an increase in the riskiness of banks (an increase in VaR), overall leverage and investment of non-financial firms decrease, during only post crisis period (hypothesis 1). We also find that after the financial crisis, overall leverage and investment declines but only for lowest growth firms (hypothesis 2). Finally, our pre and post crisis results confirm that after the financial crisis, firms in market-oriented countries are not (less) affected in terms of overall leverage and investment of non-financial firms (hypothesis 3). We mention all the pre and post crisis results in Appendix A (Table A.6 to A.14) and section 2.5.3 discusses these results.

The rest of the paper is organized as follows. Section 2.2 reviews the relevant literature about the impact of bank lending shocks on the performance of non-financial firms and the impact of financial architecture of a country on the capital structure and investment decisions. We also develop all three hypotheses of this paper in this section. We discuss the estimation methodology in section 2.3 and construction of the dataset in section 2.4. Section 2.5 discusses the empirical results and section 2.6 concludes.

2.2 Relevant Literature and Hypothesis Development

This section discusses the closest and most relevant literature to this study and lays the foundation for all three hypotheses of this paper. We focus our discussion firstly on the impact of a bank lending shock to the capital structure decisions of non-financial firms (section 2.2.1; first hypothesis), then on the heterogenous impact of this bank lending shock on higher growth firms (section 2.2.2; second hypothesis) and finally on the impact of financial architecture of country on the capital structure and

investment decisions (section 2.2.3; third hypothesis). It is pertinent to mention that the most important contribution of our study is to investigate the impact of heterogenous financial architecture of the country on the capital structure and investment decisions of the firms i.e. our third hypothesis. First and second hypothesis are the preliminary hypothesis, paving way to our main contribution i.e. third hypothesis.

2.2.1 Impact of Bank Lending Shock

In a Modigliani & Miller world (Modigliani and Miller (1958); (1963)), capital structure is not relevant and all firms should undertake all positive NPV projects irrespective of any financing constraints. In the real world with financing frictions, transactional costs and differential tax treatments, capital structure does matter (Rajan and Zingales (1995)). Capital structure and investment decisions of the non-financial firms depend on their existing financial constraints. Moreover, any shock to the capital markets and the banking sector may also be transmitted to the real sectors of the economy (see Kiyotaki and Moore (1997) and Bernanke et al. (1999)). Recently there has been a growing literature which augments the financing frictions faced by the lenders with those of the borrowers and acknowledges the joint importance of the balance sheet of both the lenders (banks) and the borrowers (firms) for the overall economy (see Holmstrom and Tirole (1997), Rampini and Viswanathan (2010) and Goel et al. (2014)). Almeida et al. (2012) provide strong empirical evidence that in case of a bank lending shock, debt maturity plays an important role and firms whose long term debt are maturing just after a crisis occurrence, reduce their investment more than their peers. Similarly, a greater reliance on interbank market (Iyer et al. (2014)), an increase in bank's CDS spreads (Balduzzi et al. (2017)) and a decline in the bank ratings (Adelino and Ferreira (2016)), cause a significant decrease in the funding available to the banking sector.

Our paper is similar to Balduzzi et al. (2017) in terms of using market based measures of risks. These authors use transactional level data for the Italian banks and non-financial firms and find that an increase in Credit Default Swaps (CDS) and a decline in equity valuations of the banks cause a decrease in the firm's leverage and investment. They also document that market based measures of risk (CDS) dominate

the conventional book value based measures in almost all their regressions. Therefore, we also use a widely used risk measure of the banks i.e. VaR.

Regarding firm-bank linkages and investment decisions of the firms, our paper stands closest to Kalemli-Ozcan et al. (2018) who construct a similar database for European countries which includes private firms along with public listed firms. Their main finding is that short term debt creates a negative drag on the investment during the European sovereign debt crisis. Our data in this study is similar to theirs; the only difference is that our sample only includes listed firms. Moreover, we also investigate the impact of a bank lending shock on the investment (and leverage as well), but we do not explore the impact of debt overhang on the investment decisions of non-financial firms.

Adrian and Shin (2010), (2014) provide strong theoretical and empirical evidence that VaR is an important determinant of the leverage of financial institutions. During downturns, banks face increased risk from their lending and trading portfolios. This is evident from the spikes of VaR after Global Financial Crisis, as shown in Adrian and Shin (2014). These papers are the first ones to empirically document that VaR affects the leverage decisions of the banks. We extend their work and hypothesise that VaR of the banks is also an important determinant of the overall leverage and investment of the non-financial firms as well. The above discussion leads us to the first hypothesis of this paper;

Hypothesis 1:

"The overall leverage and the level of investment of non-financial firms decrease after an increase in the market riskiness of banks (an increase in VaR)."

2.2.2 Growth Opportunities, Capital Structure and Investment Decisions

We continue our discussion about the impact of VaR on the financing and investment decisions by non-financial firms but now focus our attention to any differential behaviour between higher and lower growth firms. We model growth opportunities of the firm with Tobin's Q, which is a widely used proxy for capturing the future growth opportunities of the firm by the investors, especially in capital markets. Firms with higher growth opportunities are expected to face less asymmetric costs. Lang et al.

(1996) find that negative relationship between growth and leverage holds only for firms with lower growth opportunities. For such firms, whose growth opportunities are identified by capital markets, leverage and growth do not exhibits a negative relationship. In another related paper, Billett et al. (2007) confirm that negative relationship between leverage and growth is significantly diminished for firms with higher growth opportunities. In the context of a bank lending shock, firms with higher growth opportunities have a competitive advantage over their peers as they are better positioned to switch to alternative forms of financing because their future growth opportunities are duly recognized by the investors.

Using loan level data for Pakistan, Khwaja and Mian (2008) provide strong empirical evidence that when banks are faced by liquidity constraints, they pass on this effect to their borrowers but large firms offset this bank lending shock by tapping alternative funding sources in the credit markets. This is similar to our findings as well; the only difference is that we focus on higher growth firms instead of large firms and find that when firms have higher growth opportunities, they can annul any negative impacts of a bank lending shock from their lenders (banks). As investors believe that these firms have higher future growth prospects as reflected in higher Tobin's Q of these firms, these investors are willing to extend lending to these higher growth firms, even in distress times. Moreover, in the event of a negative shock to the supply of credit, these firms are better positioned to take advantage of the bond and equity markets domestically or even internationally. Recently there has been an increasing evidence supporting the fact that firms that have the ability to tap additional funds, in an event of a shock to their existing creditors (see Adrian et al. (2013), Kahle and Stulz (2013), Buca and Vermeulen (2015)). Therefore, greater availability of the external finance remains an important advantage to the firms, especially during distress times. In line with the discussion mentioned above, we arrive at the second hypothesis of the study:

Hypothesis 2:

"The overall leverage and the level of investment of firms with higher growth opportunities will be less affected after an increase in the market riskiness of the banks (an increase in VaR)."

2.2.3 Financial Architecture, Capital Structure and Investment Decisions

Empirically, there has been a divide in the literature about the efficacy of either bank-based or market-based financial architecture of any country and its impact on country's growth and capital structure of the firms. Bank-oreinted systems are characterized by a close relationship between lenders and borrowers, which involves higher scrutiny and monitoring (see Diamond (1984) and Holmstrom and Tirole (1997)). On the other hand, market-oriented economies are the ones where borrowers have greater options of alternate sources of financing, other than the banking sector. Moreover, when capital markets are more efficient, banks and traditional springs of finance tend to adhere less to arbitrage opportunities.

Research on the impact of financial architecture of any country (bank-oriented or market-oriented) on the overall growth/development of the country and performance of firms can be categorized into macro (country level) or micro (firm level) based studies. Most of the studies using macro level data do not find any support about the impact of either bank or market-oriented economies on the overall growth and financial development of any country (see Beck and Levine (2000), (2002), Levine (2002), Demirgüç-Kunt and Maksimovic (2002) and Chakraborty and Ray (2006)). Similarly, using firm level data and collapsing it across countries, Demirgüç-Kunt and Maksimovic (2002) find that it is not the financial architecture but the overall legal system of the country which predicts access of private sector to external financing in any country.

On the other hand, various micro (firm) level studies find that financial architecture of the country does matter for various firm level decisions. For example, Antoniou et al. (2006) find that the debt maturity profile of the firm depends on the financial architecture of the country and firms operating in bank-oriented countries have longer debt maturities as compared to the firms in market-oriented countries. Moreover, firms in market-oriented countries consider the market conditions (market timing theory) while deciding about the maturity profile of their external financing. Similarly, Anderson and Gupta (2009) suggest that the market values of the firms operating in market-oriented countries are higher than similar (and comparable) firms in bank-oriented countries. It is also pertinent to mention that using recent macro data (2000-2011), Demirgüç-Kunt et al. (2013) also provide empirical evidence that as economies

grow, the financial services provided by capital markets become relatively more important for economic growth, as compared to the services offered by the banking sector. In another related study, Gambacorta et al. (2014) confirm that when recessions and crisis occur simultaneously, the impact on GDP in bank-oriented countries is three times severe than in market-oriented countries. Didier et al. (2015) is a recent firm level study confirming that firms issuing bonds and equity grow faster in market-oriented countries as compared to similar issuing firms in bank-oriented economies.

We can infer from the above discussion that most of the micro based studies and even macro based studies using the recent (21st century) cross-country data suggest that market-oriented countries are better suited for overall financial development of the country and firms perform better in terms of overall growth and market values. One of the possible reasons can be increased capital flows across equity and bond markets in recent year around the globe and a surge in foreign bonds and equity issuances in recent times. Market-oriented countries have deep and liquid bond and equity markets whereas the banks are the main lenders in bank-oriented countries. In case of a shock to the supply of credit, firms operating in market-oriented countries have alternate sources of financing and therefore they should be able to offset a tightening in lending. On the other hand, firms are mainly dependent on banks for obtaining external finance in bank-oriented countries, hence there should be a decrease in overall lending after tightening of credit conditions in bank-oriented countries. Availability of greater opportunities for obtaining external finance should not create a drag on investment as well and therefore firms operating in market-oriented countries should not curtail their level of investment in case of tightening of supply of credit.

Keeping in view the afore-mentioned arguments, we build our third hypothesis as follows, which tries to investigate any differential behaviour of the capital structure and investment decisions of non-financial firms in bank or market-oriented countries.

Hypothesis 3:

"Firms operating in market oriented economies will be less affected in terms of their overall leverage and level of investment, after an increase in the market riskiness of the banks (an increase in VaR)."

The most important objective of this study is to investigate the impact of financial architecture of the country on the capital structure and investment decisions of non-financial firms. Therefore, our third hypothesis is the most important contribution of this study. Nevertheless, earlier two hypotheses are also important, and they lay the foundations for our third hypothesis by connecting the capital structure and investment decisions of the firms and the role played by financial architecture of the country in these decisions.

Economic theory also suggests that services provided by the banks and the capital markets differ in their nature and effectiveness. Allen and Gale (1995), (2000) and Song and Thakor (2010) argue that the importance of banks and capital markets evolve as countries become more developed i.e. capital markets and banks provide different, sometimes complimentary services, over the course of economic development. As economies progress more, the relative importance of the services provided by capital market increases in comparison to the banks. The comparative advantage of markets over banks become more important for R&D intensive and young firms which rely more on intangible assets and informal contracts for which capital markets are better suited. Similarly, Demirgüç-Kunt et al. (2013) is an important paper which argue that as economies grow, the association between capital markets and economic activity increases and the correlation between bank development and economic activity decreases. These authors also emphasize that even though these results are not causal but still in line with a large body of theoretical literature.

Keeping in view above evidences, we also run robustness tests where we expect hypothesis 3 to be true only for those firms which are operating in developed countries, as compared to developing economies and we present these results in Appendix A, Table A.5. Richness of our data also allows us to disaggregate overall VaR into its various components. The overall VaR is a potential loss faced by the banks due to any extreme movements in the currency, equity and interest rate markets. We decompose cumulative VaR into VaR due to currency risk, equity risk and interest rate risk. Our goal in this additional analysis is not to test any specific hypothesis but we are interested to investigate the type of bank lending shocks (currency, equity or interest rate risk) which has a more profound impact on the capital structure and investment decisions of non-financial firms.

2.3 Estimation Methodology

In the real world, financing and investment policies of the firms are dynamic and firms continuously respond to the changing macroeconomic and sectoral conditions. These investment and financing decisions are highly persistent, as current values of leverage and investment depend a lot on their past values. Therefore, the literature of corporate finance has seen a recent shift from static to dynamic panel data models. These models are most suitable when the time dimension (T) is small and the cross sectional units (N) are relatively much larger than time (T), as in our case. These dynamic panel data models include lagged dependent variable as additional regressors, along with other explanatory variables. But OLS and FE estimates of such dynamic models are biased due to the correlation between the lagged dependent variable and fixed effects (see Nickell (1981), Baltagi (2008) and Flannery and Hankins (2013)). A common solution can be the first-differenced models but even these models suffer from endogeneity problems as the first differenced lagged dependent variable is correlated with the differenced error term. More importantly, there is a strong endogeneity between financing and investment decisions of the firms. For example firms may obtain financing to invest more in tangible assets but an increase in the tangible assets also increases the capacity of the firms to pledge those assets as collateral for obtaining additional loans as suggested by Campello and Hackbarth (2012). Therefore, typical capital structure and investment regressions suffer from endogeneity arising either due to simultaneity issues or inclusion of lagged dependent variables in dynamic panels data models.

One of the most popular methods to overcome typical endogeneity issues in a dynamic panel model is to first difference the model and then instrument the first lagged dependent variable on the right hand side with second or deeper lags of the dependent variable. This method uses internal instruments and is commonly known as difference-GMM. This method was proposed by Holtz-Eakin et al. (1988) and described by Arellano and Bond (1991). But even lagged values of dependent variable are often poor internal instruments if the autoregressive process of dependent variable is quite high i.e. a highly persistent dependent variable. In such circumstances, difference-GMM will suffer from weak instrumentation problem. Under the assumption that initial changes in the dependent variable are not correlated with firm fixed effects (akin

of saying that firm fixed effects are not correlated with first difference of dependent variables), Arellano and Bover (1995) and Blundell and Bond (1998) arrive at a new estimator called system-GMM. This estimator uses a system of two equations; one in levels and the other in differences. Lagged first differences are used as internal instruments in the level equation and lagged levels are used as instruments in the differenced equation. The relative advantage of system-GMM over difference-GMM is that the former allows introducing more internal instruments and improves the efficiency of the estimator. System-GMM also uses internal instruments (lagged values) for any endogenous or weakly exogenous regressors. Due to all the advantages mentioned above, we estimate all our regressions in this study using system-GMM. To improve efficiency, we use two-step system-GMM which makes sure that the estimates do not vary with the scale of the data or due to initial weighting matrix (see Hamilton (1994)).

We do not include country and industry dummies in our system-GMM regressions, mainly because of two reasons. Firstly, system-GMM is a system of two equations, one in levels and one in differences (for details see Roodman (2009). As firms do not change countries and industries (in our data), therefore differenced equation in system-GMM will eliminate the country and industry fixed effects. This also implies that system-GMM already includes (implicitly) country and industry fixed effects. Secondly, even if we include country and industry fixed effects, keeping in view the equation in levels, most of these country and industry fixed effects are absorbed because of collinearity (dropped from estimations). Therefore, we do not include country and industry fixed effects in all our regressions. Nevertheless, we confirm that in robustness tests, (please see Table A.15 to A.19), we include country and industry fixed effects in all our estimations. For the sake of brevity, we only report the marginal effects, which convey enough information for accepting or rejecting the hypotheses in this study. Main results of this paper i.e. hypothesis 2 (higher and lower growth firms) and hypothesis 3 (about bank-oriented and market-oriented countries) essentially remain the same and do not change quantitatively or qualitatively. The only difference is that we do not find evidence in support of Hypothesis 1.

2.3.1 Firm's Demand for Credit

While we want to investigate the impact of the bank lending shock on the capital structure and investment decisions of non-financial firms, it is very essential to control for the firm's demand for credit and any shock to the productivity of the firm. Firms can decrease their external financing or investment either because of the lack of credit demand or any productivity shock. The decision to either investigate the supply or demand side of the credit depends on the availability of the data. Jiménez et al. (2014b) is one of the very few papers who study the demand side of the credit on the financing decisions of the firm, but only by using loan application level data. This kind of data provides the author with the information about the total number of firms who applied for the credit and the proportions of the acceptances and rejections. In our transactional level data, we do not have any information about the proportion of acceptance and rejection of the firms and therefore demand of credit is unobservable in our (and for all) transactional level data. Therefore, it is essential to control for the firm's demand for credit and any shock to the firm's productivity as well, so that we are sure that we are observing the supply side effects of the credit on the capital structure and investment decisions of non-financial firms.

In case of firm-bank linkages data, demand for credit can be controlled by introducing two or four digit sector-country-year fixed effects as implemented by Kalemli-Ozcan et al. (2018). These fixed effects not only control for unobserved time invariant characteristics across firms but also for all time varying characteristics across these narrowly defined sector country year pairs. Using fixed effects at such a fine level is not recommended with system-GMM because of instrument proliferation problem. Therefore, we resort to another technique used by MacKay and Phillips (2005) to control for the firm's demand for credit and any shocks to the productivity of the firms. We use three variables to control firm' demand for credit and productivity shocks; one at country level and rest two at firm level.

We use GDP[5] growth rate of the main country of the firm (see Favara et al. (2017)) and we expect that the growth rate of GDP will capture any fluctuations in the overall

[5] We can include GDP along with time (year) dummies because time dummies control for overall time trends in the data, which vary, only over time. On the other hand, GDP of each country varies over country and time and therefore, will not be fully absorbed by time dummies. For a similar estimation, see Favara et al. (2017). Table 4 on page # 30 of this paper presents Debt Enforcement and Capital

credit's demand and productivity. To control for demand for credit and any productivity shocks at the firm level, we follow MacKay and Phillips (2005). These authors include median capital-labour ratio for industry year pairs (after excluding the firm itself) as additional regressors, while investigating the impact of industry on the capital structure decisions of non-financial firms. They use median capital-labour ratio to measure the technology in the given industry and argue that median capital-labour ratio will anchor a firm's position within a specific industry year pair. Any changes in the overall technology in the industry of the firm will affect the capital-labour ratio of all the peer firms as well. Therefore, this ratio will control for the time varying technological changes in the industry of the firms.

Using the same line of arguments, we use fixed assets and profits of the firm, relative to the fixed assets and profits of the peer firms operating in the same sector, country and year. Both these ratios will anchor the position of each firm in comparison to its peers in the same sector-country-year pairs. Any changes in the firm's demand for credit and any productivity shock to the firm will also affect its peer firms and therefore these industry peer ratios will capture these changes. Another criticism to such peer ratios is the simultaneity effect (profitability of the firm can influence peers' profitability or vice versa). To control for the simultaneity problems arising from these peer ratios, we include fixed assets and profitability of the firm as endogenous variables in the system-GMM estimator.

We define these ratios as mean assets and mean profits. Mean assets is the ratio of firm's fixed assets divided by the average of total fixed assets of all the firms operating in the same sector, country and year. Similarly mean profits is the ratio of firm's profitability divided by the average of total profitability of all the firms operating in the same sector, country and year. Our identification strategy to control firm's demand for credit does not impose any restrictions on productivity shocks to be similar or different across firms.

Investment regressions. Their data comprises of 18,602 firms from 41 countries and ranging from 2000 to 2010. Dependant variable is yearly investment. All regressions include year fixed effects along with GDP growth as a control variable.

We use firm fixed effects, country (GDP) and industry level variables (mean assets and mean profits of the firm, relative to the fixed assets and profits of the peer firms operating in the same sector, country and year), to control for firm's demand for credit. Another possible approach used in the literature is using firm fixed effects from a lending equation in spirit of Khwaja and Mian (2008) and further developed by Jiménez et al. (2014a). This methodology has also been used by Amiti and Weinstein (2011), Iyer et al. (2014) and Degryse et al. (2017). This methodology can disentangle the firm borrowing (demand side) and bank lending (supply side) effects, without the need of an exogenous shock to the banks. This identification strategy requires regressing loan growth for each firm bank pair on an economy wide trend, firm fixed effects, bank fixed effects and an idiosyncratic shock. The most important pre-requisite for this empirical estimation is the availability of the bank loan transaction level data. Information about each bank loan transaction (credit registry data) will enable the researcher to estimate the loan growth for each firm bank pair. The main assumption is that in an event of a shock, firms may substitute lending between various banks and therefore firms may borrow less from riskier banks and obtain more funding from safer banks.

Undoubtedly, the above mentioned approach i.e. firm fixed effects from a lending equation, would provide a direct control for firm's demand for credit but unfortunately, we do not have bank loan transaction data at hand. We only have information about total leverage (and capital investment) of the firm in a given year and we do not observe the proportion of total leverage originating from various banks of the firm. Moreover, the information about banks of the firm is a static information as obtained in May 2015 and we assume that same firm-bank linkages hold for the entire sample period. While extending a static information about banks of the firms (obtained in May 2015) for the entire sample period (2006-2014), we take support from the existing literature where Giannetti and Ongena (2012) and Kalemli-Ozcan et al. (2018) using the same database as ours, report that these firm-bank linkages remain sticky from 2005 to 2015. Because we do not have information about the share of the bank loans of the firms, from each bank in any given year, and we only observe the names of banks, therefore we are not able to control for the fact that some firms may switch banks. We admit that this is one of the limitations of this study as well, which originates from lack of access to bank loan transaction data.

2.3.2 Estimation Equations for Capital Structure and Investment

In this section, we discuss the equations to investigate the validity of all the hypotheses mentioned above. Definitions of all variables used in the below equations are discussed in detail in section 2.4 but we will briefly define the main variables in interest in this section as well. We estimate equations 2.1 and 2.2 to investigate the validity of our first hypothesis.

Equation 2.1:

$$\text{Tot Lev}_{ijkt} = \propto_1 + \propto_2 \text{Tot Lev}_{ijk(t-1)} + \propto_3 \text{X}_{ijkt} + \propto_4 \text{Tobin}'\text{sQ}_{ijkt} + \propto_5 \overline{\text{Y}}_{ikt} + \propto_6 \overline{\mathbf{VaR}}_{\mathbf{ikt}} + + \propto_7 \text{GDP}_{kt} + \propto_8 \text{peer assets}_{jkt} + \propto_9 \text{peer profits}_{jkt} + \gamma_t + \epsilon_{ijkt} \quad (1)$$

Equation 2.2:

$$\text{Inv}_{ijkt} = \propto_1 + \propto_2 \text{Inv}_{ijk(t-1)} + \propto_3 \text{X}_{ijkt} + \propto_4 \text{Tobin}'\text{sQ}_{ijkt} + \propto_5 \overline{\text{Y}}_{ikt} + \propto_6 \overline{\mathbf{VaR}}_{\mathbf{ikt}} + \propto_7 \text{GDP}_{kt} + \propto_8 \text{peer assets}_{ijkt} + \propto_9 \text{peer profits}_{ijkt} + \gamma_t + \epsilon_{ijkt} \quad (2)$$

In equations 2.1 and 2.2 above, the subscripts show a firm "i" in sector "j" and country "k" and year "t". In equation 2.1, the dependent variable is the overall leverage of the firm and in equation 2.2 the dependent variable is the gross investment of the firm (for a complete definition of all variables used in this study, please refer to section 2.4). Both the above equations also include lagged dependent variables for capturing the dynamic nature of the capital structure. X_{ijkt} include firm level and $\overline{Y}_{ikt}$ include bank level (averaged for multiple banks of each firm) control variables. $Tobin'sQ_{ijkt}$ measures the future growth opportunities of the firms. GDP_{kt}, $peer\ assets_{ijkt}$ and $peer\ profits_{ijkt}$ are proxies for controlling firm's demand for credit and γ_t are year fixed effects and ϵ_{ijkt} are idiosyncratic firm specific errors.

Our main interest in equation 2.1 and 2.2 above is $\overline{VaR}_{ikt}$. An increase in VaR of the banks indicates an increase in the market riskiness of the banks of the firms. Therefore, VaR is a proxy for a shock to the financial health of the banks and we are interested in estimating the impact of this shock on the financing and investment decisions of non-

financial firms. Specifically, we expect $\propto_6$ to be negative and significant in both equations 2.1 and 2.2, which will provide strong empirical support in favour of our first hypothesis *("The overall leverage and the level of investment of non-financial firms decrease after an increase in the market riskiness of banks (an increase in VaR).").*

For investigating the empirical validity of our second hypothesis, we use equations 2.3 and 2.4, which are mentioned below.

Equation 2.3:

$$\text{Tot Lev}_{ijkt} = \propto_1 + \propto_2 \text{Tot Lev}_{ijk(t-1)} + \propto_3 X_{ijkt} + \propto_4 Q_{ijkt} + \propto_5 \overline{Y}_{ikt} + \propto_6 \overline{\text{VaR}}_{ikt} + \propto_7 \mathbf{Q_{ijkt} * \overline{VaR}_{ikt}} + \propto_8 \text{GDP}_{kt} + \propto_9 \text{peer assets}_{ijkt} + \propto_{10} \text{peer profits}_{ijkt} + \gamma_t + \epsilon_{ijkt} \quad (3)$$

Equation 2.4:

$$\text{Inv}_{ijkt} = \propto_1 + \propto_2 \text{Inv}_{ijk(t-1)} + \propto_3 X_{ijkt} + \propto_4 Q_{ijkt} + \propto_5 \overline{Y}_{ikt} + \propto_6 \overline{\text{VaR}}_{ikt} + \propto_7 \mathbf{Q_{ijkt} * \overline{VaR}_{ikt}} + \propto_8 \text{GDP}_{kt} + \propto_9 \text{peer assets}_{ijkt} + \propto_{10} \text{peer profits}_{ijkt} + \gamma_t + \epsilon_{ijkt} \quad (4)$$

Equations 2.3 and 2.4 differ from equations 2.1 and 2.2 only in terms of replacing Tobin's Q of the firms in equations 2.1 and 2.2 with quartiles of Tobin's Q and the interaction of these quartiles with VaR of the banks in equations 2.3 and 2.4. Q_{ijkt} is a categorical variable which is equal to 1 if the firm is in the first quartile of Tobin's Q, 2 for second, 3 for third and 4 when firms are in the fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Our main variable of in equations 2.3 and 2.4 above is the interaction term; $Q_{ijkt} * \overline{VaR}_{ikt}$. This interaction term captures the differential impact of an increase in VaR of the banks on leverage and investment of the firms with different growth opportunities (firms in different quartiles of Tobin's Q). As the coefficients on the interaction term capture the differential slopes (for leverage in equation 2.3 and investment in equation 2.4) over and above the base category (lowest quartile of Tobin's Q), we also calculate average marginal effects which compute absolute slope measures for each category separately. These marginal effects will help us in understanding the overall impact of an increase in VaR of the banks (absolute

slope/change) on the leverage and investment of the firms, when these firms have higher and lower growth opportunities (firms in different quartiles of Tobin's Q). We expect $\propto_7$ in equations 2.3 and 2.4 to be negative and significant, but only for the firms in the lowest quartile of Tobin's Q. For all the firms in the upper quartiles of Tobin's Q, we expect $\propto_7$ to be statistically insignificant with a positive or a negative sign or statistically significant with a positive sign. We expect similar patterns for $\propto_7$ in case of average marginal effects as well. In either of these scenarios, we will obtain sufficient empirical support in favour of our second hypothesis *("The overall leverage and the level of investment of firms with higher growth opportunities will be less affected after an increase in the market riskiness of the banks (an increase in VaR).").*

We estimate equations 2.3 and 2.4 separately for bank-oriented and market-oriented countries (and also for developing and developed economies) to investigate the empirical validity of the third hypothesis of this study. We expect $\propto_7$ in both equations 2.3 and 2.4, to be statistically insignificant with either sign for the firms operating in market-oriented countries. At the same time, we also expect $\propto_7$ to be statistically significant and negative for lowest growth firms in bank-oriented economies. We expect similar patterns for $\propto_7$ in case of average marginal effects as well. These expected results will provide sufficient evidence in favour of the third hypothesis of this study *("Firms operating in market oriented economies will be less affected in terms of their overall leverage and level of investment, after an increase in the market riskiness of the banks (an increase in VaR).").*

2.4 Data and Statistics

This study combines firm, bank, sector and country level data from various sources. The following section will define different sources of data, data construction process and definitions of different variables used in the study.

2.4.1 Firm-Level Data

We use Osiris (by Bureau van Dijk – BvD) to obtain firm level information about all listed firms in 20 countries. Osiris is one of most comprehensive databases for listed companies across the globe, especially in emerging market economies. Another advantage of Osiris is the harmonization of balance sheet and income statement variables across different countries, when accounting rules differ across countries

(IFRS vs. local GAAP). We use online version of Osiris as on March 2015 and the coverage of non-financial firms before 2005 is not very good. Therefore, for this study, we draw our sample for the period 2006 to 2014. We select 20 countries depending on the availability of the information about the banks of the firms (see section 2.4). Due to different accounting standards in various countries, firms do not always disclose the names of their main banks. For example, firms in Italy and Norway do not report their main banks in their financial statement. Therefore, we do not include Italy and Norway in our sample. More discussion about banks of the firm will follow in the next section.

Seeking help from Rajan and Zingales (1995) and Fama and French (2002), we define total leverage – our dependent variable for capital structure regressions– as total short and long term debt divided by total assets. Similarly gross and net investments are major proxies used in the investment literature; for a brief discussion see Kalemli-Ozcan et al. (2018). These two measures do not differ substantially from each other. Therefore, we hinge our selection of the proxy of investment, on the availability of data in Osiris and define gross investment – dependent variable for investment regressions – as yearly change in fixed assets plus annual depreciation divided by the total fixed assets of the firm.

For capital structure estimations, we include natural log of gross sales as a proxy for firm's size whereas current ratio is used as a proxy for solvency of the firm. We define current ratio as total current assets of the firm divided by total current liabilities. Profitability of the firm is defined as Earnings before Interest and Taxes (EBIT) divided by total assets of the firm and will shed light over the explanatory power of pecking order theory (Myers and Majluf (1984). Tangibility is defined as total fixed assets divided by total asset of the firm. Tangibility will be help us in confirming the fact that whether firms follow trade-off theory while balancing costs and benefits of debt issuance (Myers (1984). Tobin's Q is undoubtedly the most frequently used regressor in the literature of corporate finance (Erickson and Whited (2012). The literature of dynamic models of investment uses marginal q or shadow price of capital as a proxy for higher growth opportunities but marginal q is almost always unobservable in the empirical data. However Hayashi (1982) and Abel and Eberly (1994) provide sufficient explanation for using average Tobin's Q (the ratio of equity and debt to the replacement value of capital) as an empirical proxy for marginal q.

Following Claessens and Laeven (2003), we define Tobin's Q as the sum of market value of equity plus the book value of total liabilities divided by the total assets. We use Tobin's Q to distinguish between higher and lower growth firms.

For the investment regressions, we again include natural log of gross sales as a proxy for the firm's size. Measuring financial constraints and its impact on the real decisions of the firms is a widely researched area. Choice of an appropriate variable is an unsettled issue in this literature and many different proxies have been suggested (see Bodnaruk et al. (2015)). Instead of using some common indices like Whited-Wu or KZ Index, we define financial flexibility as earnings before interest and taxes, depreciation and amortization divided by the total assets of the firm, known as cash flow in this study. An increase in cash flow indicates more amount of internal funds available to the firm after meeting all its operational expenses. Finally, total leverage is defined as total short and long term loans divided by the total assets, where long term leverage includes only long term loans divided by the total assets of the firm. Tobin's Q is defined in the similar manner, as described above. We trim all firm-level variables below 1% and above 99% to drop any outliers.

2.4.2 Matching Firm-Level Data with Banks

One of the most unique features of Osiris is that it contains a variable called "BANKER". This variable contains the names of all the major banks of the firms. Osiris obtains this "BANKER" information from another valuable database known as "KOMPASS". This database contains information about approximately four million companies in 66 countries. Among other information about these companies, Kompass contains information about the main banks of the firm, which is also provided by Osiris and other BvD products like ORBIS and AMADEUS. This information about the banks of the firms has already been used in the literature by Giannetti and Ongena (2012) and Kalemli-Ozcan et al. (2018). One of the contributions of this paper is to create one of the largest firm-bank linkages dataset for 11,628 listed firms in 20 developed and developing countries. Another such sample has also been created by Kalemli-Ozcan et al. (2018) which is larger than ours, as it includes private non-listed firms along with listed firms. However, their sample only covers European countries, whereas ours includes both developed and developing countries, around the world. As discussed earlier, accounting principles of all the countries do not require firms to

disclose their main banks. Therefore, selection of firms in 20 countries to be included in our sample is guided by the availability of the "BANKER" information in Osiris. Moreover, countries like Indonesia, Vietnam and Kenya, having less than 100 firm year observations were dropped from the sample.

For most of the firms in our sample, Osiris provides multiple relationship banks for each firm. Some of the previous studies have used these firm-bank linkages to investigate the impact of the financial health of the banks on the firms (Giannetti and Ongena (2012) and Kalemli-Ozcan et al. (2018)). A common approach by these studies and others is to take the first bank name in Osiris (or in Orbis or AMADEUS[6]) as the main bank of the firm. Instead, we include all banks for each firm, as given in Osiris. This approach helps us to control for the financial health of all the banks on the capital structure decisions of the firms. In case of multiple banks of any firm, we average the financial information of all banks of that firm (for each year) and call it average bank-level variables. We do not use any weighted averages because we do not have information about the share of lending from each bank. Accounting principles of all countries do not require firms to disclose their main banks, therefore, the matched sample between firms and the banks is constrained by the availability of the data which is the name of "BANKER" for each firm in Osiris.

Osiris only contains the names of the banks for each firm and does not provide any other information about these banks. To obtain the financial information about all the banks for all the firms, we use another BvD database known as Bankscope[7]. This is the largest database for listed and unlisted banks around the globe and contains information about 32,000 banks globally. The biggest hurdle is to match the names of the banks for all the firms in Osiris with the corresponding names of the banks in the Bankscope when the names are not unique across both the databases. To overcome

[6] Orbis is the Umbrella product of BvD which contains information for approximately 180 million companies around the world. These companies include listed and non-listed/private firms around the globe. The European subset of Orbis is AMADEUS which contains information for listed and non-listed/private firms across Europe. Osiris is the subset of Orbis and it contains information for almost 68,000 listed firms around the glove.

[7] At the time of writing this paper (June 2017), BvD has replaced Bankscope with Orbis Bank Focus. We downloaded all the financial information for all the banks of all the firms for this study in March 2015 when Bankscope was publicly available. Moreover, ownership information is not available in Orbis Bank Focus.

this problem, we hand-match[8] names of banks of the firms in Osiris with the corresponding names of banks in the Bankscope. We could only match almost 86.7% banks across both databases. Remaining unmatched banks are either very small or cooperative banks for which there is no information available in the Bankscope. Our first step is to match the names of the banks in Osiris with the corresponding banks in the Bankscope.

The second step is to capture the strength of internal capital markets of the financial institutions especially the links between parent firms and its subsidiaries. To accomplish this task, we identified the Global Ultimate Owner of each bank in the Bankscope because all banks in Bankscope are recorded as domestic entities. The Global Ultimate Owner (hereafter called GUO) of each bank is defined as a company/bank which owns more than 25% shares or is the highest quoted shareholder in that bank. Our main motivation to use financial statements of GUO instead of the individual bank itself is to capture any safety nets provided by the parent companies to its subsidiaries. Moreover, we do not have information about intrabank fund flows and we match each bank to its GUO to capture these intrabank flows. We use 25% cut off for identifying GUO, instead of 50%. We then assign the consolidated financial statements of GUO of the bank to each bank and finally match the financial statements of these GUOs with the firm-level data. For very few single location banks, GUO is defined as the bank itself. We use consolidated statements both for firm level and bank level data but only use unconsolidated accounts, for a very small fraction of firms and banks, when unconsolidated accounts are not available in OSIRIS and Bankscope.

The units of firm-level data are in local currencies of the main country of the firm, whereas the financial information of all banks is in USD. This does not give rise to any inconsistency because all the firm and bank level data are either used in ratios or natural log, which makes units irrelevant. Most importantly, we use a more cautious approach for averaging bank-level variables for each firm and this approach requires

[8] We used an add-in of Microsoft Excel called "Fuzzy Lookup" to match names of "BANKER" across Osiris and Bankscope. Fuzzy Lookup matches non-identical strings using a Fuzzy code, already built in the Microsoft Excel. This provides a Similarity Score which ranges from 0 to 1, where a score of 1 means an exact match. As our starting point, we use Fuzzy Lookup and then hand-match all those bank names who have Similarity Score greater than 0.75 and less than 1. Any Similarly Score less than 0.75 is not a match at all (an observation based on repeated experience).

bank information in a single currency i.e. USD. For example, to construct total equity to assets ratio for multiple banks of any single firm, we do not take the average of total equity to assets ratio of each bank. Instead, we sum total equity (in USD) for all the banks of that firms and sum total assets (in USD) as well. Finally, we take the ratio of the sum of the total equity of all banks (in USD) to the sum of total assets of all banks (in USD). We drop bank-level variables if total assets or total equity is missing and we trim all bank-level variables below 1% and above 99% to drop any outliers.

In capital structure regressions, we use banks' capital ratio defined as total equity divided by total loans, impairment ratio is calculated as reserves for non-performing loans divided by total loans, profitability is net interest income divided by total earning assets and interbank ratio is the money lent to other banks divided by the money borrowed from other banks. Capital ratio measures the equity cushion in case of any losses occurring from the trading or loan portfolio of the banks. Similarly, impairment ratio measures how much money the bank has kept aside for non-performing loans. Finally, the interbank ratio distinguishes net lenders from net borrowers in the interbank market. If the interbank ratio is greater than one, it indicates that the bank is a net lender and an interbank ratio less than one identifies that the bank is a net borrower in the interbank market. All these bank-level variables are averaged in case of multiple banks of any firm in each year.

2.4.3 Value at Risk (VaR) of the Banks

VaR of the banks of the firms is our main variable of interest in this study; both for the analysis of capital structure and investment. VaR is the expected loss from an adverse market movement with a specified probability (95% or 99%) over a given period of time. A 95% VaR of $100 million implies that there is 95% probability that the maximum loss will not be greater than $100 million. VaR is a probabilistic measure of risk and, as with any other measure of risk, there is always a small probability (5% in case of 95% VaR), that the loss can be greater than $100 million. It is also pertinent to mention that different banks use different loss functions to calculate VaR in their financial statements. Internal and external regulators and auditors review and approve these loss functions, used for calculating VaR. As shown by Adrian and Shin (2014), the fluctuations of VaR and other risk measures e.g. implied volatility of options on the shares of the banks, is similar over the business cycle. This suggests that VaR is a

comparable measure of market riskiness, as compared to any other measure of risk e.g. volatility of stock options or Credit Default Swaps (CDS). Therefore, potential candidates for measuring market risk of banks are VaR, volatility of stock options and CDS spreads etc. We chose VaR as our measure of market risk of the banks because of the following reasons.

i. Financial intermediaries manage their risk management practices in such a way that their VaR is not greater than their equity capital. In other words, VaR (as a measure of risk) fluctuates widely over the business cycles but VaR to equity ratio remains relatively stable at the same time (see Figure 2.3 below). This is an outcome of an effective risk management framework where banks adjust their equity capital, keeping in view their potential future losses (as calculated by VaR) and thus keeping VaR to equity ratio stable over time.

ii. Bank for International Settlement (BIS) introduced BASEL II (risk framework) in Jan 2004[9]. Under BASEL II framework, VaR was widely embraced as a tool for measuring market risk across interest rate, equity, currency and commodity markets. After the Global Financial Crisis 2007 and by the end of our sample period (2014), BASEL II was fully implemented and financial institutions were also adopting BASEL III framework. VaR was considered as one of the most important risk measurement took under BASEL II & III, therefore, we use VaR as compared to CDS spreads or equity volatility, as a measure of market risk of the banks.

iii. Adrian and Shin (2014) was the first paper to empirically demonstrate that VaR is a very important determinant of the leverage of financial institutions. One of the objectives of our paper is to establish that after controlling for firm's demand for credit and financial health of the banks of the firms, VaR of the banks of the firms is a very important determinant of the capital structure and investment decisions of non-financial firms.

[9] https://www.bis.org/bcbs/history.htm#basel_ii

iv. VaR data from Bloomberg provides a break-down of overall VaR into VaR arising from interest rate markets, VaR from equity markets and VaR from currency markets. Any other measure of risk would not provide such a rich break down. As demonstrated in section 2.5.2, we investigate the impact of VaR Equity, Var Currency and VaR Interest rate on capital structure and investment decisions of non-financial firms.

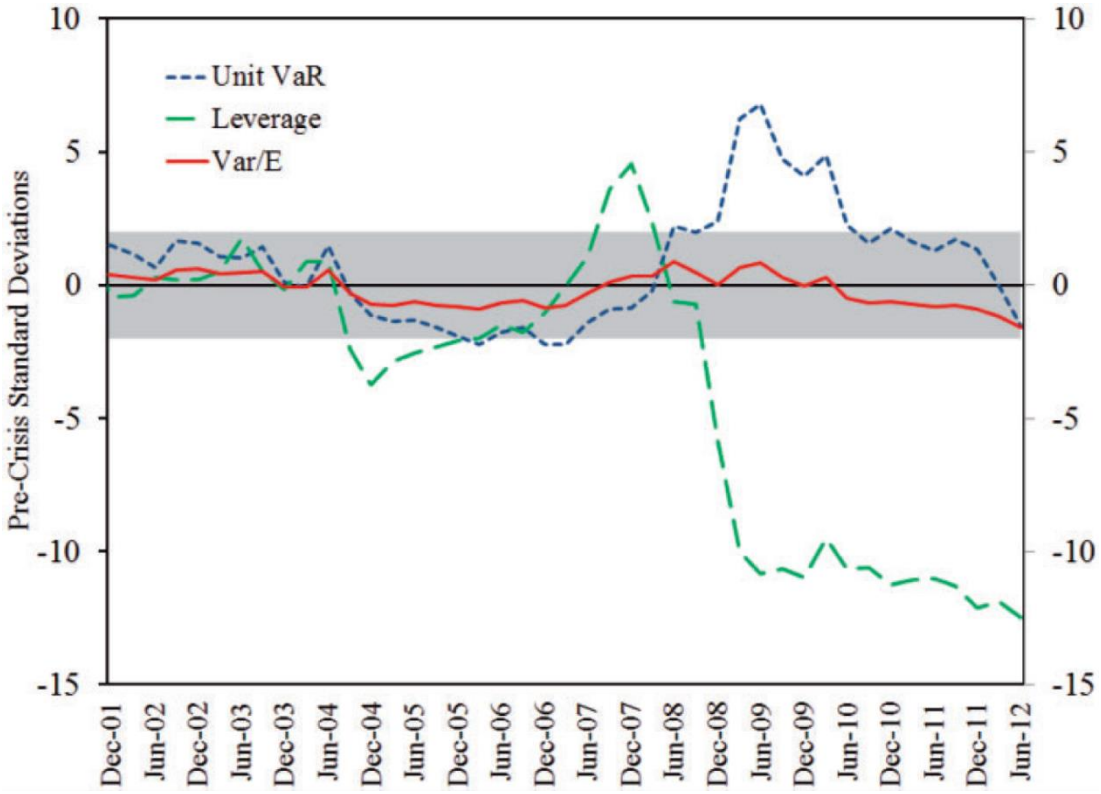

Figure 2.3: Value at Risk (VaR) and VaR to Equity of 8 largest banks in USA
Source: Adrian and Shin (2014)

We also considered using VaR (as compared to other risk measures such CDS) for the empirical analysis in Chapter 3 of this thesis as well. For Chapter 2, we created firm-bank linages data, using Osiris (firm level) and Bankscope (bank level). For Chapter 3, we merged this firm-bank linages data with bond transactions data from Bloomberg. After merging, total observations were 16,426. Out of these observations, 10,411 observations had missing data for VaR. This amounts to 63.38% of the total observations. Therefore, we obtained Credit Default Swap (CDS) spreads of the banks from Bloomberg which had only 5,745 missing observations out of 16,426 (34.98%). CDS spread is a financial instrument (typically a risk hedging instrument) in which the buyer of CDS (Mr. A) pays a premium to the seller of CDS (Mr. B), over the entire

maturity of the financial asset (a bond issued by XYZ Bank). In return, the seller (Mr. B) insures the buyer (Mr. A) against any possible default of XYZ Bank. Higher riskiness of XYZ Bank implies a higher CDS and vice versa. Due to a very higher number of missing observations of VaR, we decide to use CDS as a measure of market risk of the banks in Chapter 3.

Traditionally VaR is measured using parametric or non-parametric approaches or using Monte Carlo simulations. All these methods use historical data about stock price, currencies, commodities etc. and these measures serve as a proxy to the actual VaR of the banks. On the other hand, banks also report the actual value of VaR (calculated internally by the banks) in their annual accounts. These internally reported VaR figures take into account the actual investment of the bank in the equity, currency, commodity and interest rate markets (including all the derivative instruments as well) including the actual exposure of the bank due to any adverse movements in all these markets. Using values of VaR as reported by the banks, as compared to calculating VaR for each bank using various stock price movements is a very important distinction. The former approach makes sure that we do not commit any measurement errors whereas the latter can be thought of as an approximation to the actual VaR.

Therefore, instead of calculating VaR using stock prices of the banks, we use Bloomberg to obtain actual value of VaR as disclosed by the banks in their annual financial statements. We use ISIN (International Securities Identification Number) to match the banks across Bloomberg and Bankscope and we are able to match most of the banks across both these databases. Using these actual values of VaR instead of calculating them from the stock prices of the banks, keep our analysis as close to Adrian and Shin (2014) as possible, who also use VaR data from the Bloomberg. Even though all banks in the Bloomberg database do not disclose VaR in their annual accounts, which reduces our sample size, but we still prefer using actual VaR data from Bloomberg owing to reasons cited above. It is also important to mention that by using either method to calculate VaR (using stock prices or Bloomberg database), we can only compute VaR for listed banks in our sample. Using VaR data from the Bloomberg reduces our sample size but we prefer sample size reduction over committing a major measurement error in our study. We also average VaR values across all the banks in case of multiple banks of any firm and call it Bank_Avg_VAR.

We download the data for VaR in million USD, so that we can easily average VaR across different banks for a single firm.

VaR is defined as the sum of the individual VaR components arising from interest rate risks, equity risks, currency risks, commodities risks and other risks less the diversification benefits[10]. Therefore, the richness of our data also allows us to investigate the impact of overall VaR and also VaR arising from extreme interest rate, equity and currency movements. As discussed above, we use VaR of the banks as a supply side shock to the lenders of the firm which is exogenous to the firm itself.

We exclude financial firms from our analysis because their capital structure and investment determinant substantially differ from non-financial firms. We only retain active non-financial firms and our final sample consists of 11,628 firms with 77,543 firm-bank observations from 20 countries which include a mix of bank-oriented and market-oriented economies. To alleviate the concerns of outliers, all firm and bank level variables were trimmed at 1% and 99%. We trim only the leverage at 99% to help us retaining zero leverage firms which constitute around 17% of the data. We obtain GDP growth rate data from the Global Financial Development database of World Bank.

2.4.4 Bank-Oriented and Market-Oriented Countries

The main theme of this paper is to investigate the heterogenous impact of VaR of banks on the overall leverage and investment decisions of firms in bank-oriented and market-oriented countries. Therefore, in this section, we explain in detail about our methodology for dividing the countries into bank-oriented and market-oriented economies. There is no single matrix which can provide a unique solution to divide any set of countries into either bank-oriented or market-oriented groups. In bank-oriented countries, bank lending dominates the overall financing to all the sectors and capital market financing provides a major proportion of overall lending in market-oriented countries. We take help from two prominent papers who have already divided

[10] Overall VaR = VaR from interest rate risks + VaR from equity risks + VaR from currency risks + VaR from commodity risks + VaR from other risks – diversification benefits. VaR is reported in million USD in Bloomberg but we convert it into billion USD.

various countries into either of these groups. Methodology used by both these papers is complimentary, therefore we take help from both these papers simultaneously and carefully divide the countries in our sample into either bank-oriented or market-oriented category.

Our main source for the classification is Gambacorta et al. (2014). These authors, using comprehensive macro data from World Bank and BIS, plot the ratio of bank credit to the bank credit plus total bond and equity market capitalization from 1991-2000 and 2001-2011 separately. This comparison of ratios for two different periods of data helps to identify if countries have become more or less market-oriented over time. If the ratio of bank credit is higher (lower), then the country is considered as a bank-oriented (market-oriented) country. Authors do not use any cut-off of this ratio, but we select 50% as the cut off. All countries having the bank credit ratio above 50% are classified as bank-oriented countries and below 50% as market-oriented economies. It is also pertinent to mention that if any country has this ratio lower than 50%, but the country has become more bank-oriented from 1991-2000 to 2001-2011, we classify that country as bank-oriented. For example, bank credit ratio for United Kingdom for the period 1991-2000 (2001-2011) is 45% (53%). Malaysia also falls in this category and therefore, both United Kingdom and Malaysia are classified as bank-oriented countries. We confirm that our results do not change quantitatively or qualitatively, if we even classify Malaysia and United Kingdom as a market-oriented country following Didier et al. (2015).

We also verify our classification of the countries using Didier et al. (2015). These authors construct the average (from 2003 to 2011) of the total bank lending claims on private sector to equity market capitalization for almost 31 countries. If the average of this ratio for any country is above the sample median, authors classify that country as bank-oriented and if the ratio is below median sample, then they categorize the country as market-oriented. Our classification is in line with Didier et al. (2015) as well, other than United Kingdom, which is classified as market-oriented by these authors but we categorize United Kingdom as bank-oriented country (explanation given above). Finally, even though the bank credit ratio is 40% (2001-2011) for India, we classify India still as bank-oriented country following Didier and Schmukler (2013). These authors provide empirical evidence that external finance expansion to the private

sector in India is much more limited as it is usually suggested by the aggregate data. Secondly, they also confirm that in contrary to the general perception, that equity markets are well developed in India, the evidence suggests that firms in India do not obtain substantial amount of financing from capital markets.

We classify Cyprus, Pakistan, Philippines and Sri Lanka as bank-oriented country using the latter paper as the former does not contain any information about these countries. For all these four countries, the proportion of firms issuing either a bond or equity is 15.13%, 7.4%, 43.36% and 25.50% respectively. There is no information about Bangladesh and Nigeria in both the papers and we look at the bank lending, bonds and equity issuance data from Global Financial Development Database by World Bank and classify both these countries as bank-oriented. Our final sample includes Australia, Canada, Hong Kong, Singapore, South Africa and South Korea as market-oriented countries and Bangladesh, China, Cyprus, India, Ireland, Japan, Malaysia, New Zealand, Nigeria, Pakistan, Philippines, Sri Lanka, Thailand and United Kingdom as bank-oriented countries.

We also divide all countries in our sample as developing and developed countries. We use World Bank income classification as of 2014 to divide the countries into each group. If the income group of any country is “High Income OECD” or “High Income non-OECD”, we treat that country as developed and categorize all other countries as developing economies. We classify Australia, Canada, Cyprus, Hong Kong, Ireland, Japan, New Zealand, Singapore, South Korea and United Kingdom as developed countries and categorize Bangladesh, China, India, Malaysia, Nigeria, Pakistan, Philippines, South Africa, Sri Lanka and Thailand as developing countries.

2.5 Empirical Results

In this section, we present our results for all three hypotheses of this study. We use two-step system-GMM for all our estimations. To account for the finite sample bias, we use Windmeijer corrected standard errors as proposed in Windmeijer (2005). We also use small sample corrections as suggested by Roodman (2009). Estimation of system-GMM relies heavily on the assumption that internal instruments are exogenous (overidentifying restrictions). If we suspect nonsphericity in the errors, Sargan statistic becomes inconsistent (Roodman (2009)). Therefore, we carefully test the Hansen J

statistic (instead of Sargan statistic) which is a chi-square statistic with degrees of freedom equal to the number of instruments less the number of parameters. Using the Hansen J statistic, all the regressions in this study do not reject the null of exogenous instruments. Another crucial test for the validity of instrument in a dynamic model is Arellano–Bond autocorrelation test which is applied to the residuals in differences. To test for the first order serial correlation in levels, this test checks for the second order correlation in differences. Keeping in view the results of Arellano-Bond autocorrelation tests and high persistence found in the lagged dependent variables for capital structure and investment regressions; all the equations in this study use third and deeper lags for strictly endogenous variables and first and deeper lags for weakly exogenous/pre-determined variables. We call a variable as significant if it is significant at 5% or 1% and slightly significant if it is significant only at 10%.

Following sections present results for three main hypotheses of this study followed by a decomposition analysis based on VaR from currency, equity and interest rate risks.

2.5.1 Main Results

In all the capital structure regressions, we treat Tangibility, Tobin's Q, Profitability of the firms and VaR, Profitability, Capital and Imp ratio of the banks as endogenous variables. Natural log of Gross Sales and current ratio of the firms along with the Interbank ratio of the banks are treated as pre-determined variables. GDP and peer assets and peer profits are the exogenous variables. In all the investment regressions, we treat Total leverage, Long term leverage, Tobin's Q and Cash Flow ratio of the firm and VaR and Capital of the banks as endogenous variables. Interbank ratio of the banks is the only pre-determined variable in investment regressions. GDP and peer assets and peer profits are the exogenous variables.

Table 2.1 below presents the results for our first hypothesis which investigates the impact of an increase in the market risk of the banks (an increase in VaR) on the overall leverage and investment decisions of non-financial firms. Results in column 1 and 2 are estimated using equation 2.1 and 2.2 respectively.

Table 2.1: Impact of VaR of Banks on Financing and Investment Decisions of Non-Financial Firms (Hypothesis 1)

	Column 1	Column 2
	Hypothesis 1	**Hypothesis 1**
	Capital Structure	**Investment**
	All Countries	**All Countries**
Firm's Lev (first lag)	0.697†	
	(11.97)	
Firm's Inv (first lag)		0.470†
		(3.05)
Firm's TQ	0.003	-0.016
	(0.30)	(-0.44)
Bank Avg VAR	**-0.106****	**-0.123**
	(-1.97)	**(-0.84)**
Firm Level Control Variables		
Firm's Sales	0.018†	
	(3.85)	
Firm's Current Ratio	-0.006†	
	(-4.34)	
Firm's Profitability	-0.203†	
	(-2.73)	
Firm's Fixed Assets	-0.020	
	(-0.13)	
Firm's Cash Flows		0.576**
		(2.30)
Firm's Total Leverage		-0.049
		(-0.29)
Firm's Long Term Leverage		0.059
		(0.73)
Bank Level Control Variables		
Bank Avg Capital Ratio	-0.230**	-0.238
	(-2.14)	(-0.48)
Bank Avg Imp Ratio	-0.616*	
	(-1.67)	
Bank Avg Interbank Ratio	0.000	-0.000
	(0.52)	(-0.34)
Bank Avg Profitability	-0.043	
	(-0.54)	
Industry Level Control Variables		
Firm's mean Assets	0.027	-0.021
	(0.46)	(-1.56)
Firm's mean Profits	-0.000†	-0.000
	(-3.13)	(-0.81)

Country Level Control Variables		
GDP	-0.002	0.002
	(-1.05)	(1.00)
Constant	-0.272**	0.000
	(-2.54)	(.)
Observations	21,254	19,646
Number of id	4,303	4,178
Year FE	Yes	Yes
Country FE	No	No
Sector FE	No	No
AR1	0	0
AR2	0.317	0.109
Hansen p	0.168	0.303

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Column 1 is total leverage of the firms and in column 2, the dependent variable is gross investment. Column 1 presents capital structure regressions for hypothesis 1 and column 2 shows investment regressions for hypothesis 1. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Before we look at our main variables of interest in column 1 and 2 of Table 2.1, we discuss some of the most important firm and bank level control variables for capital structure and investment regressions. We find evidence that firms with higher sales (larger firms) have higher leverage, whereas firms with higher cash ratio have higher investment. On the other hand, we find support in favour of pecking order theory as more solvent (proxy for solvency is current ratio of the firm) and more profitable firms have lower leverage. Our results confirm the findings of Balduzzi et al. (2017), that after including the market based risk measure (VaR) of the banks, almost all the book value based control variables of the banks are not significant in both the columns of Table 2.1. The only significant variable is the capital of the banks of the firms which is negative (-0.230). This shows that an increase in the capital of the banks reduces the leverage of the firms. Intuitively, banks with higher capital are stronger banks and therefore should be able to lend more to their borrowers. Therefore, with an increase in the capital of the banks, we should expect to see an increase in the leverage of the firms. However, if the banks are forced to increase their capital by the regulators or because of a strategic decision to annul the impact of an increase in the risky assets,

these banks may cut back on lending despite an increase in their overall capital. We do not emphasize these results any further and move on to our main results.

In Table 2.1 above, column 1 and 2 present the results about the impact of VaR of banks on the overall leverage and investment of non-financial firms, respectively. Our main variables of interest in both the columns are the coefficients on VaR of the banks. We find a significant and negative coefficient in column 1 (0.106) which provides support in favour of our first hypothesis that an increase in VaR of the banks causes a decrease in the overall leverage of non-financial firms. On the other hand, we find that even though the coefficient in column 2 is negative but not significant at all (-0.123). This shows that we do not find any evidence that an increase in VaR of the banks affects the investment of non-financial firms. Therefore, these results provide support in favour of our first hypothesis but only for overall leverage and not for the investment of non-financial firms *("The overall leverage and the level of investment of non-financial firms decrease after an increase in the market riskiness of banks (an increase in VaR).").* One of the possible reasons is that these results represent the behaviour of an average firm in our sample and our second hypothesis tires to investigate any differential behaviour between higher and lower growth firms.

Now we present results for our second hypothesis in Table 2.2 below. Results in column 1 are 2 and estimated using equation 2.3 and 2.4 respectively.

Table 2.2: Impact of VaR of Banks on Financing and Investment Decisions of Higher Growth Non-Financial Firms (Hypothesis 2)

	Column 1	**Column 2**
	Hypothesis 2	**Hypothesis 2**
	Capital Structure	**Investment**
	All Countries	**All Countries**
Firm's Lev (first lag)	0.693†	
	(12.03)	
Firm's Inv (first lag)		0.399**
		(2.33)
Firm's TQ q2	0.063	0.261**
	(1.64)	(2.37)
Firm's TQ q3	0.022	0.162*
	(0.70)	(1.77)

Firm's TQ q4	0.061**	0.084
	(2.26)	(0.82)
Bank Avg VAR	**-0.452****	**-0.948****
	(-2.25)	**(-2.25)**
Firm's TQ q2 # Bank Avg VAR	0.673*	1.378*
	(1.81)	(1.92)
Firm's TQ q3 # Bank Avg VaR	0.249	0.868
	(0.82)	(1.39)
Firm's TQ q4 # Bank Avg VAR	0.512**	0.765
	(2.09)	(1.48)
Marginal Effects		
Firm's TQ q1 # Bank Avg VAR	**-0.452****	**-0.948****
	(-2.25)	**(-2.25)**
Firm's TQ q2 # Bank Avg VAR	0.22	0.43
	(0.91)	(0.83)
Firm's TQ q3 # Bank Avg VAR	-0.203	-0.079
	(-0.81)	(-0.15)
Firm's TQ q4 # Bank Avg VAR	0.06	-0.183
	(0.42)	(-0.62)
Firm Level Control Variables		
Firm's ln Sales	0.014†	
	(2.79)	
Firm's Current Ratio	-0.006†	
	(-4.83)	
Firm's Profitability	-0.141**	
	(-1.97)	
Firm's Fixed Assets	-0.132	
	(-1.03)	
Firm's Cash Flows		0.565**
		(2.33)
Firm's Total Leverage		-0.100
		(-0.52)
Firm's Long Term Leverage		0.109
		(1.39)
Bank Level Control Variables		
Bank Avg Capital Ratio	-0.291†	-0.568
	(-2.65)	(-1.11)
Bank Avg Imp Ratio	-0.388	
	(-1.20)	
Bank Avg Interbank Ratio	0.001	-0.001
	(0.71)	(-0.70)
Bank Avg Profitability	-0.015	
	(-0.23)	
Industry Level Control Variables		
Firm mean Assets	0.079	-0.021*
	(1.58)	(-1.95)

Firm mean Profits	-0.000† (-2.69)	-0.000 (-0.60)
Country Level Control Variables		
GDP	-0.001 (-0.48)	0.003 (1.51)
Constant	0.000 (.)	0.000 (.)
Observations	21,254	19,646
Number of id	4,303	4,178
Year FE	Yes	Yes
Country FE	No	No
Sector FE	No	No
AR1	0	0
AR2	0.214	0.327
Hansen p	0.378	0.116

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Column 1 is total leverage of the firms and in column 2, the dependent variable is gross investment. Column 1 presents capital structure regressions for hypothesis 2 and column 2 shows investment regressions for hypothesis 2. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Our main variables of interest in columns 1 and 2 above are the coefficients on VaR of the banks and its interaction with different quartiles of Tobin's Q, along with the marginal effects of these interactions as well. In columns 1 and 2, the coefficient of VaR for capital structure and investment regression respectively is negative and significant (-0.452 and -0.948). These negative coefficients show that after an increase in the market riskiness of the banks, lowest growth firms experience a decrease in their overall leverage and investment. The coefficients for various interactions between VaR and higher quartiles of the Tobin's Q of the firms are mostly insignificant other than very few quartiles. These coefficients on the interaction of VaR with higher growth firms (higher quartiles of Tobin's Q) are the differential impact of higher growth firms, over and above the base group, which is the lowest growth firms.

To measure the absolute impact of VaR on the capital structure and investment decisions of the lower and higher growth firms, we need to examine the average marginal effects for all these interactions. We observe that average marginal effects

(absolute slopes) of the all the interaction terms for capital structure (column 1) and investment (column 2) regressions are insignificant other than first quartile in both columns. These marginal effects are both negative and significant for capital structure and investment regressions (-0.452 and -0.948 in column 1 and 2 respectively). These findings suggest that when market riskiness of the banks of the firms increases, only lowest growth firms suffer a decrease in their overall leverage and investment, with higher growth firms remaining unaffected. Therefore, these results provide sufficient support in favour of our second hypothesis *("The overall leverage and the level of investment of firms with higher growth opportunities will be less affected after an increase in the market riskiness of the banks (an increase in VaR).")*. It is pertinent to mention that average marginal effects, instead of differential slopes of the interaction terms, are more relevant in evaluating the absolute impact of the market riskiness of the banks on the overall leverage and investment of lower and higher growth firms.

Now we present results for our third and final hypothesis of this study in Table 2.3 below. Results in columns 1 are 2 are estimated using equations 2.3 and 2.4 for bank-oriented countries and results in columns 3 and 4, by estimating equations 2.3 and 2.4 for market-oriented countries.

Table 2.3: Impact of VaR of Banks on Financing and Investment Decisions of Higher Growth Non-Financial Firms in Bank-Oriented and Market-Oriented Countries (Hypothesis 3)

	Column 1	Column 2	Column 3	Column 4
	Hypothesis 3	Hypothesis 3	Hypothesis 3	Hypothesis 3
	Capital Structure	Investment	Capital Structure	Investment
	Bank-Oriented Countries	Bank-Oriented Countries	Market-Oriented Countries	Market-Oriented Countries
Firm's Lev (first lag)	0.785†		0.583†	
	(10.85)		(5.77)	
Firm's Inv (first lag)		0.366**		0.314**
		(2.05)		(2.26)
Firm's TQ q2	0.021	0.392†	0.073	-0.080
	(0.47)	(2.89)	(0.84)	(-0.89)
Firm's TQ q3	0.030	0.255*	-0.001	0.001
	(0.86)	(1.94)	(-0.01)	(0.01)
Firm's TQ q4	0.060*	0.260*	0.021	0.072
	(1.69)	(1.94)	(0.48)	(1.07)
Bank Avg VAR	**-0.561****	**-1.731†**	**0.061**	**-0.112**
	(-2.36)	**(-2.85)**	**(0.12)**	**(-0.21)**
Firm's TQ q2 # Bank Avg VAR	0.628	2.132**	0.260	-0.634
	(1.55)	(2.40)	(0.31)	(-0.64)
Firm's TQ q3 # Bank Avg VAR	0.393	1.632*	-0.005	0.106
	(1.33)	(1.82)	(-0.00)	(0.11)
Firm's TQ q4 # Bank Avg VAR	0.626**	1.658**	-0.186	0.552
	(2.26)	(2.36)	(-0.27)	(0.89)
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR	**-0.561****	**-1.731†**	**0.061**	**-0.112**
	(-2.36)	**(-2.85)**	**0.12**	**(-0.21)**
Firm's TQ q2 # Bank Avg VAR	0.068	0.401	0.321	-0.746
	(0.28)	(0.66)	(0.67)	(-1.09)
Firm's TQ q3 # Bank Avg VAR	-0.168	-0.099	0.056	-0.006
	(-0.68)	(-0.15)	(0.07)	(-0.01)
Firm's TQ q4 # Bank Avg VAR	0.066	-0.073	-0.125	0.439
	(0.48)	(-0.23)	(-0.18)	(1.00)
Firm Level Control Variables				
Firm's ln Sales	0.014†		0.005	
	(2.97)		(0.52)	
Firm's Current Ratio	-0.003*		-0.008†	
	(-1.73)		(-4.38)	
Firm's Profitability	-0.294†		0.129	
	(-3.68)		(1.26)	
Firm's Fixed Assets	0.105		-0.327*	
	(0.58)		(-1.82)	

Firm's Cash Flows		0.782†		0.131
		(2.71)		(0.82)
Firm's Total Leverage		-0.127		-0.189*
		(-0.62)		(-1.65)
Firm's Long Term Leverage		0.230**		0.295
		(2.21)		(1.15)
Bank Level Control Variables				
Bank Avg Capital Ratio	-0.260**	-0.663	-0.800**	-0.358
	(-2.38)	(-1.52)	(-2.50)	(-1.26)
Bank Avg Imp Ratio	-0.316		0.161	
	(-0.92)		(0.12)	
Bank Avg Interbank Ratio	0.001	-0.004*	0.007	-0.000
	(1.42)	(-1.70)	(1.22)	(-0.06)
Bank Avg Profitability	0.074		-0.211	
	(1.02)		(-1.17)	
Industry Level Control Variables				
Firm's mean Assets	-0.023	-0.029**	0.154**	-0.050**
	(-0.31)	(-2.08)	(2.20)	(-2.35)
Firm's mean Profits	-0.000**	-0.000	0.000	-0.000*
	(-2.55)	(-0.68)	(0.95)	(-1.74)
Country Level Control Variables				
GDP	-0.001	0.004*	-0.001	0.008†
	(-0.48)	(1.71)	(-0.69)	(3.26)
Constant	0.000	-0.149	0.079	0.000
	(.)	(-1.17)	(0.45)	(.)
Observations	12,881	12,293	8,373	7,353
Number of id	2,605	2,534	1,698	1,644
Year FE	Yes	Yes	Yes	Yes
Country FE	No	No	No	No
Sector FE	No	No	No	No
AR1	0	0	0	0
AR2	0.389	0.741	0.162	0.608
Hansen p	0.253	0.416	0.144	0.273

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. Columns 1 and 2 present capital structure and investment regressions respectively for hypothesis 3 (in bank-oriented countries). Columns 3 and 4 present capital structure and investment regressions respectively for hypothesis 3 (in market-oriented countries). For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Our main variables of interest in the Table 2.3 above are the coefficients for VaR of the banks and its interactions with different quartiles of Tobin's Q along with the

marginal effects of all these interactions. We are interested in finding the empirical evidence that firms operating in market-oriented countries are not affected in terms of their overall leverage and investment, despite an increase in the market riskiness of their banks. We find that the coefficients for VaR of the banks in columns 1 and 2 (for leverage and investment regressions respectively in bank-oriented countries) are both negative and significant (-0.561 and -1.731), whereas in columns 3 and 4, these coefficients on VaR are positive and negative but both insignificant (0.061 and -0.112 for leverage and investment regressions respectively for market-oriented countries).

These results confirm that after an increase in the market riskiness of the banks, lowest growth firms experience a decline in their overall leverage and investment but only when they are operating in bank-oriented countries. There is no impact of the increased riskiness of the banks on the leverage and investment of lowest growth firms operating in market-oriented countries. For higher growth firms, the coefficients of the interaction between VaR and higher quartiles of the Tobin's Q are mostly insignificant in all the columns (for firms with higher growth in bank and market-oriented countries). Therefore, we now focus our attention on the average marginal effects of all these interactions. These marginal effects provide us the absolute impact of VaR of the banks on the leverage and investment decisions for lower and higher growth firms.

We find that the average marginal effects for all the interactions (in all the columns) are only negative and significant for lowest growth firms (lowest quartile) in bank-oriented (-0.561 for overall leverage in column 1 and -1.731 for investment in columns 2). For all the firms (lower and higher growth firms) in market-oriented countries, these average marginal effects are insignificant. These results show that there is no impact of an increase in the market riskiness of the banks on the overall leverage and investment of the firms in market-oriented countries, whereas, in bank-oriented countries, only firms with lowest growth opportunities experience a decline in their leverage and investment. These results provide sufficient evidence in favour of our third hypothesis *("Firms operating in market oriented economies will be less affected in terms of their overall leverage and level of investment, after an increase in the market riskiness of the banks (an increase in VaR).")*.

Table A.5 in Appendix A presents the robustness results for our third hypothesis, where we divide the sample in our countries into developed and developing countries, instead of bank and market-oriented countries. Columns 1 and (3 and 4) in Table A.5 present the capital structure and investment regressions respectively for firms operating in developing (developed) countries. For the sake of brevity, we only discuss results for average marginal effects here, which provide the main support (as earlier) in favour of our hypothesis. We find that average marginal effects are only negative and significant (-0.761 for capital structure in column 1 and -1.006 for investment regression in column 2) for lowest growth firms operating in developing countries. For higher growth firms in developing countries, there is no impact of an increase in the market riskiness of the banks on capital structure and investment decisions of the firms. Similarly, increased market riskiness of the banks has no impact on all kinds of firms (higher and lower growth) in developed countries. Therefore, we conclude that only lower growth firms and that too in developing countries face a decline in their overall leverage and investment, after an increase in the market riskiness of their banks.

2.5.2 Decomposition of VaR of Banks

As explained earlier, richness of our data allows us to decompose overall VaR of the banks into its various components which include VaR arising from currency risk, equity risk and interest rate risk. An increase in VaR is caused by an extreme movement in either of these markets and therefore it is interesting to investigate that which component of VaR causes a decline in the leverage and investment of non-financial firms. We present the results of these components of VaR in Table 2.4 below. We use equation 2.3 (2.4) to estimate the results in columns 1, 2 and 3 (4, 5 and 6) after replacing overall VaR in with VaR currency, VaR equity and VaR interest rate respectively. For the sake of brevity, we do not report firm, bank, industry and macro control variables in Table 2.4 but they are included in all the regressions reported in the below table. Moreover, we only report average marginal effects of all the interactions of VaR with different quartiles of Tobin's Q of the firms. For complete set of results, please refer to Table A.4 in Appendix A.

Table 2.4: Impact of Currency, Equity and Interest Rate Risk VaR of Banks on Financing and Investment Decisions of Non-Financial Firms

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
	VaR Currency	VaR Equity	VaR Interest Rate	VaR Currency	VaR Equity	VaR Interest Rate
	Capital Structure	Capital Structure	Capital Structure	Investment	Investment	Investment
	All Countries	All Countries	All Countries	All Countries	All Countries	All Countries
Marginal Effects	Var Currency	Var Equity	Var Interest	Var Currency	Var Equity	Var Interest
Firm_TQ_q1 # Bank_Avg_VAR	**-1.894****	**-1.194****	**-0.888****	**0.608**	**0.978**	**-0.158**
	(-2.12)	**(-2.23)**	**(-2.55)**	**(0.2)**	**(0.54)**	**(-0.35)**
Firm_TQ_q2 # Bank_Avg_VAR	1.128	0.083	-0.367	2.957	0.376	0.484
	(1.36)	(0.12)	(-1.28)	(0.95)	(0.12)	(0.65)
Firm_TQ_q3 # Bank_Avg_VAR	-0.762	0.24	0.042	-1.75	0.595	-0.796
	(-0.79)	(0.42)	(0.14)	(-0.42)	(0.35)	(-0.94)
Firm_TQ_q4 # Bank_Avg_VAR	0.217	-0.227	-0.193	0.113	-0.052	0.274
	(0.30)	(-0.52)	(-0.91)	(0.03)	(-0.02)	(0.46)
Constant	0.000	0.000	-0.315**	0.018	0.000	0.000
	(.)	(.)	(-2.55)	(0.21)	(.)	(.)
Observations	21,368	18,750	21,268	19,747	17,435	19,613
Number of id	4,332	3,794	4,328	4,201	3,762	4,179
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
AR1	0	0	0	0	0	0
AR2	0.310	0.538	0.313	0.160	0.607	0.302
Hansen p	0.252	0.281	0.374	0.880	0.770	0.826
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
Macro Controls	Yes	Yes	Yes	Yes	Yes	Yes

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1, 2 and 3 is total leverage of the firms and in columns 4, 5 and 6, the dependent variable is gross investment. Columns 1, 2 and 3 (4, 5 and 6) present the impact of VaR from currency risk, equity risk and interest rate risk, for capital structure (investment) regressions. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Our main variables of interest in Table 2.4 above are the coefficients on average marginal effects of all the interactions between VaR of the banks and different quartiles of Tobin's Q. We find that these marginal effects are only negative and significant (-1.894 for VaR from currency risk in column 1, -1.194 for VaR from equity risk in column 2 and -0.888 for VaR from interest rate risk in column 3) for lowest growth firms and only for capital structure regressions. Rest all the marginal effects (including those for the investment regressions) are insignificant. These results show that extreme movements in currency, equity and interest rate markets only cause a decrease in the overall leverage of lowest growth firms. There is no impact of an increase in these markets risks on the capital structure of higher growth firms. Moreover, we also find that an increase in VaR arising from either currency risk, equity risk or interest rate risk has no impact on the investment of the firms. As we have seen earlier in this study that overall VaR decreases both the leverage and investment of non-financial firms but these different components of the overall VaR only drag down the leverage of the firms, leaving investment unaffected. We do not emphasize these results any further because investigation of each of these VaR components demands another piece of research.

2.5.3 Global Financial Crisis, Capital Structure and Investment Decisions

In this section we will briefly discuss all the results of this study, after incorporating the effects of Global Financial Crisis. Appendix A (Table A.6 to A.14) contains all the results about the impact of financial crisis on the overall leverage and investment decisions of non-financial firms. We find in Table A.6, that with an increase in the riskiness of banks (increase in VaR), there is no impact on the leverage and level of investment of non-financial firms, including lower and higher growth firms in the overall sample (hypothesis 1). Table A.6 does not include any pre and post crisis analysis but shows the results about the impact of an increase in the risk of banks (increase in VaR) on the overall leverage and level of investment of non-financial firms, after we update our data from 2004-2014. In Table A.7, we divide our overall sample into before and after crisis periods. We define pre-crisis period from 2004 to 2008 and post-crisis from 2009 to 2014, hence allowing for a lag of one year for the effects of financial crisis to affect the capital structure and investment decision of non-financial firms. We find that after an increase in VaR of banks after the crisis, total leverage and investment decrease only for lowest growth firms. Firms with higher

growth opportunities are not affected by an increase in the riskiness of the banks (hypothesis 2).

In Table A.8, we only retain the pre-crisis sample and split our sample into bank-oriented and market-oriented countries (hypothesis 3). We find with an increase in VaR of banks before the crisis, there is no impact on the overall leverage and investment of non-financial firms (including those with lower and higher growth opportunities) either in bank-oriented or market-oriented countries. We then retain only the post-crisis sample and repeat the same analysis for bank-oriented and market-oriented countries in Table A.9 (hypothesis 3). We find strong empirical evidence that only lowest growth firms operating in bank-oriented countries suffer a decrease in leverage and investment, when market risk of the banks increases (increase in VaR) after the crisis. Our results also suggest that there is no change in the leverage and investment of lower and higher growth firms operating in market-oriented countries. These results validate the main findings (contribution) of this study i.e. financial architecture of the country is one of the most important determinants of capital structure and investment decisions of non-financial firms. In Table A.10 & A.11, we find similar results for developing and developed countries (hypothesis 3). Finally, Table A.12, A.13 & A.14 suggest that both VaR (equity risk) and VaR (interest rate risk) cause a decline in the overall leverage of lowest growth firms after the crisis and VaR (equity risk) causes a decline only in the investment of the firms.

2.6 Conclusion

This paper addresses a simple yet very important policy question; Does financial architecture of a country (bank-oriented and market-oriented countries) affect the capital structure and investment decisions of non-financial firms. Our most important contribution to the literature, while we investigate this question, is to control for the observable characteristics of the lenders (banks) and borrowers (firms) along with the firm's demand for credit and any productivity shocks as well. We construct a novel dataset set of 11,628 firms containing firm-bank linkages across 20 different countries. We proxy market riskiness of the banks using Value at Risk (VaR) of the banks of the firms. After controlling for the risk of banks and firms, along with the firm's demand for the credit and any shocks to the productivity of the firms as well, we find that an increase in the market riskiness of the banks causes a decline in the overall leverage

and investment of non-financial firms. Higher growth firms annul this bank lending shock because the future growth potential of these firms is duly recognized by the investors and therefore these higher growth firms enjoy a competitive edge over their peers for obtaining external finance at favourable terms, during distress.

Most importantly, we find that after an increase in the market riskiness of the banks of the firms, lowest growth firms suffer a negative shock to their leverage and investment only in bank-oriented countries. There is no impact of this increased market riskiness of the banks on the capital structure and investment of non-financial firms in market-oriented countries. We also find similar patterns for firms operating in developing and developed countries as well, where the behaviour of firms operating in bank-oriented economies is similar to the firms in developing countries. We make sure to control firm's demand for the credit and any shocks to the productivity of the firms therefore our result point to the supply side effects of the credit. We also extend the work of Adrian and Shin (2010), (2014) and provide strong empirical evidence for the first time that VaR of the banks is also a very important determinant of the capital structure and investment decisions of non-financial firms.

Appendix A:

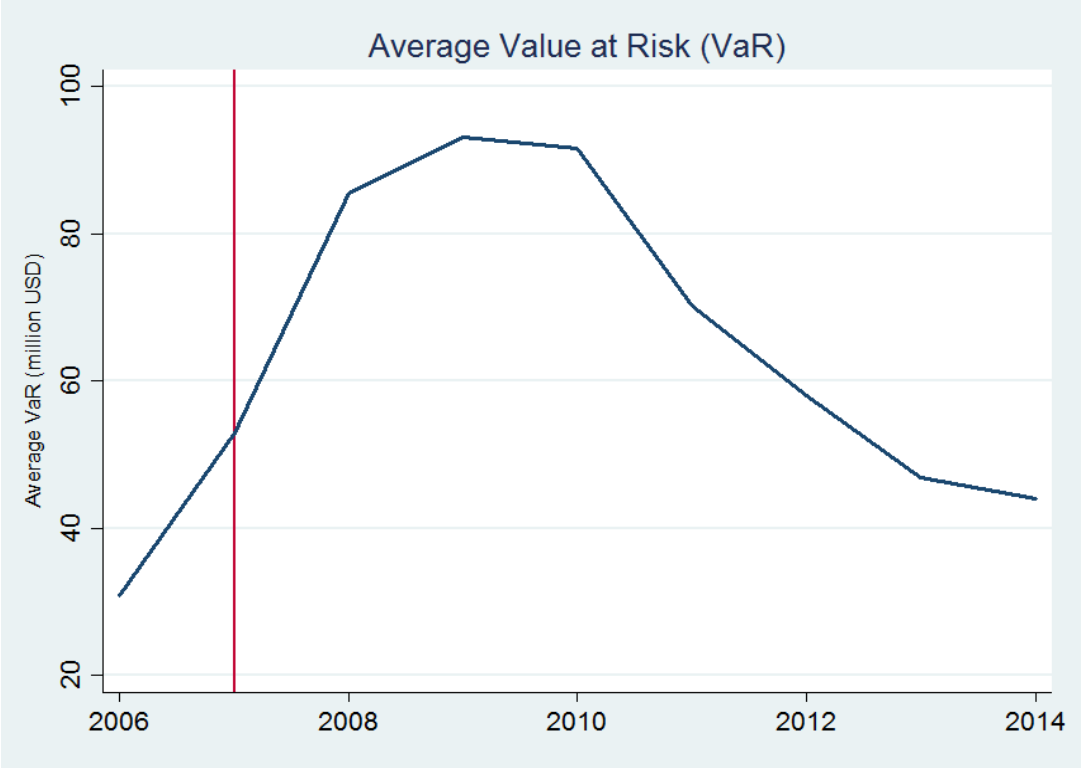

Figure 2.4: Average Value at Risk (VaR) of all Banks in the Sample.
Source: Author's Own Calculations

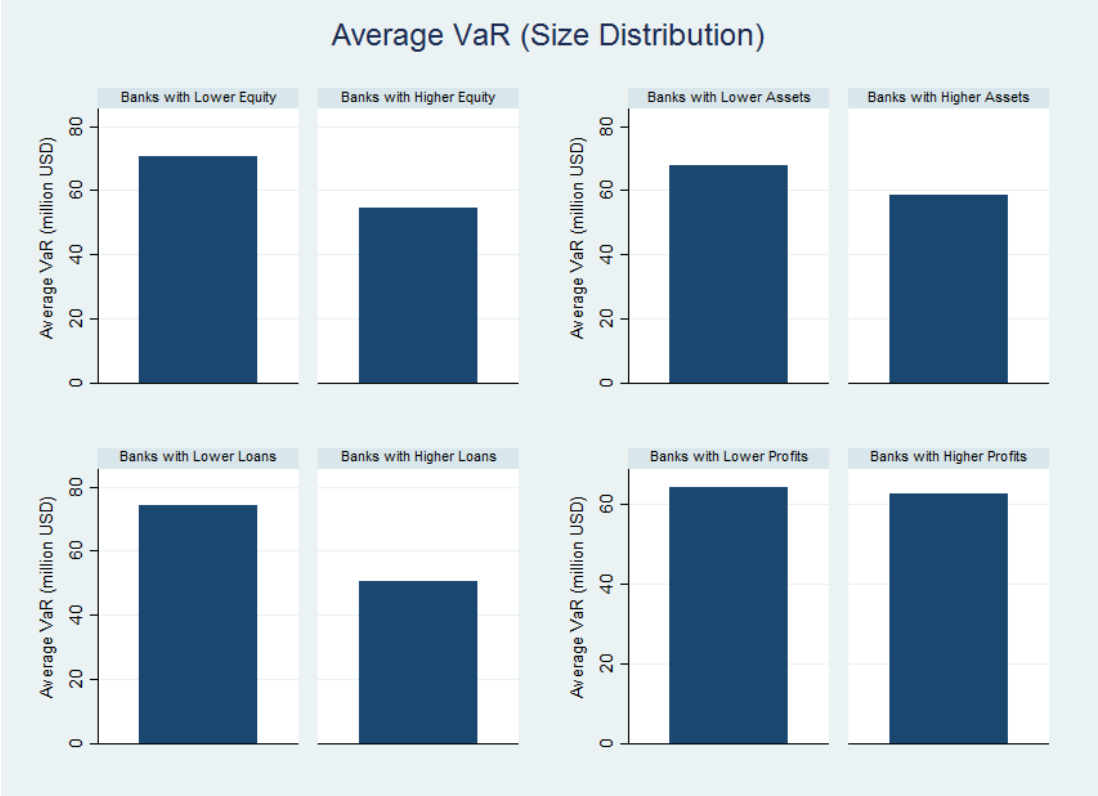

Figure 2.5: Size Distribution of Average Value at Risk (VaR) for all Banks in the Sample (cut-off = median). Source: Author's Own Calculations

The above mentioned figures (2.4 & 2.5) show average VaR (from 2006 to 2014) for all the banks in our sample, along with the size distribution of VaR as well. Figure 2.4 shows that average VaR starts increasing even before the Global Financial crisis 2007 and reaches its peak around 2009, where it remains (almost) constant until 2010 and then starts declining. By the end of 2014, average VaR is almost at the pre-crisis levels. We can safely attribute the increase in the average VaR of the banks to liquidity crunch in the interbank market (one of the main reasons for the financial crisis). Moreover, even though central bank policy rates decreased in most advanced economics around the world, but risk premia increased after the financial crisis, which is another reason for the increase in the VaR. On the other hand, the persistent decrease in the VaR after 2010 is an obvious outcome of the rigorous risk management frameworks introduced by many central banks around the world, along with the introduction of BASEL III framework in Nov 2010[11]. The core of BASEL III was sound principles for efficient liquidity risk management and supervision and special attention was paid to counterparty default and efficient risk hedging.

Figure 2.5 above shows the size distribution of VaR along various proxies of size and efficiency. We average VaR for different size classes over the entire time period. Panel A, B and C shows that average VaR is higher for banks with lower equity, assets and loans (loans extended to borrowers) as compared to banks with higher equity, assets and loans levels. This implies that banks which have lower equity capital, lower assets and lower loans (extended to borrowers) are riskier than the ones which have higher equity capital, higher assets and higher loans. Finally, panel D shows there is no difference in average VaR for banks with lower and higher profits. This suggests that banks with higher profits are not necessarily less risky than the banks with lower profits. We are, of course, do not draw conclusions from these figures as these graphs are showing only average values.

[11] https://www.bis.org/bcbs/history.htm#basel_iii

Table A.1: Sample Coverage

Country	Bank-Oriented	Market-Oriented	Total
Australia	0	5,928	5,928
Bangladesh	581	0	581
Canada	0	1,795	1,795
China	2,305	0	2,305
Cyprus	349	0	349
Hong Kong	0	7,753	7,753
India	23,589	0	23,589
Ireland	359	0	359
Japan	1,861	0	1,861
Malaysia	6,318	0	6,318
New Zealand	681	0	681
Nigeria	583	0	583
Pakistan	2,264	0	2,264
Philippines	622	0	622
Singapore	0	3,863	3,863
South Africa	0	1,466	1,466
South Korea	0	8,099	8,099
Sri Lanka	1,258	0	1,258
Thailand	277	0	277
United Kingdom	7,592	0	7,592
Total	**48,639**	**28,904**	**77,543**

Table A.2: Summary Statistics for Entire Sample, Bank-Oriented and Market-Oriented Countries

	All Countries			Bank-Oriented			Market-Oriented		
Variable	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Bank Avg VAR	37,155	-0.06	0.06	22,388	-0.08	0.06	14,767	-0.04	0.05
Bank Avg Capital Ratio	76,235	0.13	0.04	47,794	0.13	0.04	28,441	0.12	0.04
Bank Avg Imp Ratio	74,790	0.02	0.01	46,020	0.02	0.01	28,770	0.02	0.01
Bank Avg Profitability	75,359	0.11	0.06	47,566	0.11	0.06	27,793	0.12	0.05
Bank Avg Interbank Ratio	67,677	1.84	3.92	46,129	2.10	4.62	21,548	1.29	1.47
Bank Avg Loans to Deposit	75,849	0.95	0.29	47,835	0.87	0.20	28,014	1.07	0.37
Firm's Total Leverage	65,741	0.26	0.23	41,936	0.28	0.25	23,805	0.22	0.19
Firm's Long Term Leverage	57,450	0.16	0.19	37,822	0.19	0.21	19,628	0.12	0.14
Firm's ln Sales	73,449	20.41	3.34	46,336	20.07	2.92	27,113	20.99	3.90
Firm's Current Ratio	75,673	2.89	4.36	47,272	2.80	4.23	28,401	3.04	4.55
Firm's Tobin's Q	75,863	1.28	1.13	47,407	1.26	1.12	28,456	1.33	1.15
Firm's Profitability	75,714	0.03	0.17	47,630	0.04	0.15	28,084	0.00	0.20
Firm's Fixed Assets	75,751	0.49	0.24	47,374	0.49	0.23	28,377	0.48	0.24
Firm's mean Assets	77,365	1.00	0.47	48,481	1.00	0.47	28,884	1.00	0.47
Firm's mean Profits	77,536	1.00	65.24	48,632	1.00	56.07	28,904	1.00	78.27
GDP	75,646	4.82	3.05	47,190	5.71	3.11	28,456	3.33	2.28

Global Financial Development Database is developed and yearly updated by Martin et al. (2012)

Table A.3: Correlation Matrix

	Bank Avg VAR	Bank Avg Capital Ratio	Bank Avg Imp Ratio	Bank Avg Profitability	Bank Avg Interbank Ratio	Bank Avg Loans to Deposit	Firm's Total Leverage	Firm's Long Term Leverage
Bank Avg VAR	1.00							
Bank Avg Capital Ratio	-0.34	1.00						
Bank Avg Imp Ratio	-0.32	0.32	1.00					
Bank Avg Profitability	0.47	-0.24	-0.49	1.00				
Bank Avg Interbank Ratio	-0.29	0.20	0.03	-0.16	1.00			
Bank Avg Loans to Deposit	0.27	-0.65	-0.20	0.12	-0.18	1.00		
Firm's Total Leverage	-0.03	-0.03	-0.06	0.01	0.06	-0.08	1.00	
Firm's Long Term Leverage	-0.10	-0.08	-0.08	-0.01	0.06	0.00	0.78	1.00
Firm's ln Sales	-0.17	0.23	0.07	-0.05	0.09	-0.40	0.20	0.14
Firm's Current Ratio	-0.04	0.01	-0.04	0.03	0.03	-0.04	-0.17	-0.01
Firm's Tobin's Q	-0.03	0.02	-0.01	-0.01	0.00	0.06	-0.06	0.02
Firm's Profitability	-0.06	0.08	0.03	-0.01	0.04	-0.10	-0.09	-0.04
Firm's Fixed Assets	0.02	-0.07	-0.01	-0.03	-0.01	0.12	0.17	0.28
Firm's mean Assets	0.02	-0.04	-0.01	0.01	0.00	0.04	0.12	0.20
Firm's mean Profits	-0.01	0.00	0.00	-0.01	-0.01	0.00	-0.02	-0.01
GDP	-0.12	0.19	-0.11	0.18	0.20	-0.31	0.14	0.11

	Firm's ln Sales	Firm's Current Ratio	Firm's Tobin's Q	Firm's Profitability	Firm's Fixed Assets	Firm's mean Assets	Firm's mean Profits	GDP
Bank Avg VAR								
Bank Avg Capital Ratio								
Bank Avg Imp Ratio								
Bank Avg Profitability								
Bank Avg Interbank Ratio								
Bank Avg Loans to Deposit								
Firm's Total Leverage								
Firm's Long Term Leverage								
Firm's ln Sales	1.00							
Firm's Current Ratio	-0.15	1.00						
Firm's Tobin's Q	0.00	0.03	1.00					
Firm's Profitability	0.37	-0.02	0.00	1.00				
Firm's Fixed Assets	-0.06	-0.18	-0.08	-0.05	1.00			
Firm's mean Assets	-0.04	-0.15	-0.07	-0.05	0.78	1.00		
Firm's mean Profits	0.04	0.00	0.01	0.03	0.01	0.00	1.00	
GDP	0.37	0.02	0.04	0.16	-0.11	-0.03	0.01	1.00

Table A.4: Impact of Currency, Equity and Interest Rate Risk VaR of Banks on Financing and Investment Decisions of Non-Financial Firms

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
	VaR Currency	VaR Equity	VaR Interest	VaR Currency	VaR Equity	VaR Interest
	Capital Structure	Capital Structure	Capital Structure	Invest-ment	Invest-ment	Invest-ment
	All Sample	All Sample	All Sample	All Sample	All Sample	All Sample
Firm's Lev (first lag)	0.649†	0.731†	0.707†			
	(12.21)	(11.93)	(11.60)			
Firm's Inv (first lag)				0.588**	0.432	0.505*
				(2.28)	(1.17)	(1.87)
Firm's TQ q2	0.092**	0.028	0.052	0.020	-0.092	0.003
	(2.48)	(0.82)	(1.19)	(0.18)	(-0.87)	(0.05)
Firm's TQ q3	0.040	0.033	0.038	-0.065	-0.031	-0.045
	(1.34)	(1.36)	(1.10)	(-0.65)	(-0.44)	(-0.69)
Firm's TQ q4	0.065**	0.036	0.052*	-0.045	-0.067	0.001
	(2.37)	(1.37)	(1.82)	(-0.33)	(-0.43)	(0.02)
Bank_Avg_VAR_Curr	**-1.894****			**0.608**		
	(-2.12)			**(0.20)**		
Firm's TQ q2 # Bank Avg VAR Curr	3.022**			2.348		
	(2.08)			(0.51)		
Firm's TQ q3 # Bank Avg VAR Curr	1.132			-2.358		
	(0.89)			(-0.48)		
Firm's TQ q4 # Bank Avg VAR Curr	2.111*			-0.495		
	(1.92)			(-0.10)		
Bank Avg VAR Eq		**-1.194****			**0.978**	
		(-2.23)			**(0.54)**	
Firm's TQ q2 # Bank Avg VAR Eq		1.277			-0.602	
		(1.22)			(-0.15)	
Firm's TQ q3 # Bank Avg VAR Eq		1.434**			-0.383	
		(2.06)			(-0.19)	
Firm's TQ q4 # Bank Avg VAR Eq		0.967			-1.030	
		(1.38)			(-0.35)	
Bank Avg VAR Int			**-0.888****			**-0.158**
			(-2.55)			**(-0.35)**
Firm's TQ q2 # Bank Avg VAR Int			0.522			0.643
			(0.98)			(0.73)
Firm's TQ q3 # Bank Avg VAR Int			0.930**			-0.638
			(1.98)			(-0.69)
Firm's TQ q4 # Bank Avg VAR Int			0.695*			0.433
			(1.94)			(0.57)

Marginal Effects	**Var Currency**	**Var Equity**	**Var Interest**	**Var Currency**	**Var Equity**	**Var Interest**
Firm's TQ q1 # Bank Avg VAR	**-1.894****	**-1.194****	**-0.888****	**0.608**	**0.978**	**-0.158**
	(-2.12)	**(-2.23)**	**(-2.55)**	**(0.2)**	**(0.54)**	**(-0.35)**
Firm's TQ q2 # Bank Avg VAR	1.128	0.083	-0.367	2.957	0.376	0.484
	(1.36)	(0.12)	(-1.28)	(0.95)	(0.12)	(0.65)
Firm's TQ q3 # Bank Avg VAR	-0.762	0.24	0.042	-1.75	0.595	-0.796
	(-0.79)	(0.42)	(0.14)	(-0.42)	(0.35)	(-0.94)
Firm's TQ q4 # Bank Avg VAR	0.217	-0.227	-0.193	0.113	-0.052	0.274
	(0.30)	(-0.52)	(-0.91)	(0.03)	(-0.02)	(0.46)
Firm Level Control Variables						
Firm's ln Sales	0.015†	0.015†	0.016†			
	(3.18)	(2.77)	(2.61)			
Firm's Current Ratio	-0.006†	-0.006†	-0.005†			
	(-4.72)	(-3.70)	(-3.62)			
Firm's Profitability	-0.179†	-0.158**	-0.215†			
	(-2.79)	(-2.17)	(-2.59)			
Firm's Fixed Assets	-0.061	-0.114	0.132			
	(-0.54)	(-0.86)	(1.01)			
Firm's Cash Flows				0.546**	0.658**	0.524**
				(2.33)	(2.34)	(2.03)
Firm's Total Leverage				0.030	-0.030	-0.015
				(0.40)	(-0.38)	(-0.24)
Firm's Long Term Leverage				-0.005	-0.013	0.080
				(-0.03)	(-0.10)	(0.62)
Bank Level Control Variables						
Bank Avg Capital Ratio	-0.256**	-0.317**	-0.372†	0.063	-0.141	-0.131
	(-2.50)	(-2.50)	(-2.93)	(0.24)	(-0.43)	(-0.49)
Bank Avg Imp Ratio	-0.395	0.008	0.180			
	(-1.26)	(0.02)	(0.51)			
Bank Avg Interbank Ratio	0.001	0.001	0.001	0.001	0.002	-0.000
	(1.34)	(0.93)	(0.82)	(0.54)	(0.66)	(-0.13)
Bank Avg Profitability	-0.039	0.051	0.186†			
	(-0.64)	(0.66)	(2.72)			
Industry Level Control Variables						
Firm's mean Assets	0.056	0.072	-0.026	0.003	-0.001	-0.004
	(1.25)	(1.38)	(-0.49)	(0.30)	(-0.06)	(-0.42)
Firm's mean Profits	-0.000†	-0.000†	-0.000†	-0.000	-0.000	-0.000
	(-2.70)	(-3.04)	(-2.85)	(-0.39)	(-0.87)	(-0.99)
Country Level Control Variables						
GDP	-0.000	-0.001	-0.000	0.000	0.001	0.001
	(-0.02)	(-0.83)	(-0.20)	(0.13)	(0.49)	(0.27)
Constant	0.000	0.000	-0.315**	0.018	0.000	0.000
	(.)	(.)	(-2.55)	(0.21)	(.)	(.)

Observations	21,368	18,750	21,268	19,747	17,435	19,613
Number of id	4,332	3,794	4,328	4,201	3,762	4,179
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
AR1	0	0	0	0	0	0
AR2	0.310	0.538	0.313	0.160	0.607	0.302
Hansen p	0.252	0.281	0.374	0.880	0.770	0.826

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1, 2 and 3 is total leverage of the firms and in columns 4, 5 and 6, the dependent variable is gross investment. Columns 1, 2 and 3 (4, 5 and 6) present the impact of VaR from currency risk, equity risk and interest rate risk, for capital structure (investment) regressions. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.5: Impact of VaR of Banks on Financing and Investment Decisions of Higher Growth Non-Financial Firms in Developing and Developed Countries (Hypothesis 3)

	Column 1	Column 2	Column 3	Column 4
	Hypothesis 3	**Hypothesis 3**	**Hypothesis 3**	**Hypothesis 3**
	Capital Structure	**Investment**	**Capital Structure**	**Investment**
	Developing Countries	**Developing Countries**	**Developed Countries**	**Developed Countries**
Firm's Lev (first lag)	0.901†		0.524†	
	(18.10)		(6.86)	
Firm's Inv (first lag)		0.238		0.394†
		(1.62)		(2.73)
Firm's TQ q2	0.061	0.247**	0.066	-0.109
	(1.38)	(2.55)	(1.50)	(-1.33)
Firm's TQ q3	0.050	0.202	0.016	-0.003
	(1.39)	(1.63)	(0.44)	(-0.05)
Firm's TQ q4	0.100**	0.228**	0.041	0.008
	(2.50)	(1.99)	(1.49)	(0.15)
Bank Avg VAR	**-0.761†**	**-1.006****	**-0.122**	**0.008**
	(-3.08)	**(-2.10)**	**(-0.52)**	**(0.02)**
Firm's TQ q2 # Bank Avg VAR	0.955**	1.455*	0.328	-0.249
	(2.17)	(1.81)	(0.84)	(-0.31)
Firm's TQ q3 # Bank Avg VAR	0.444	0.799	0.049	-0.098
	(1.29)	(0.88)	(0.14)	(-0.13)
Firm's TQ q4 # Bank Avg VAR	0.957†	1.167*	0.050	0.358
	(2.93)	(1.76)	(0.19)	(0.74)
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR	**-0.761†**	**-1.006****	**-0.122**	**0.008**
	(-3.08)	**(-2.10)**	**(-0.52)**	**(0.02)**
Firm's TQ q2 # Bank Avg VAR	0.194	0.449	0.205	-0.241
	(0.72)	(0.77)	(0.83)	(-0.45)
Firm's TQ q3 # Bank Avg VAR	-0.317	-0.207	-0.074	-0.09
	(-1.04)	(-0.26)	(-0.28)	(-0.19)
Firm's TQ q4 # Bank Avg VAR	0.197	0.161	-0.072	0.366
	(0.97)	(0.38)	(-0.51)	(1.54)
Firm Level Control Variables				
Firm's ln Sales	0.005		0.012	
	(1.12)		(1.61)	
Firm's Current Ratio	-0.003†		-0.006†	
	(-2.95)		(-3.94)	
Firm's Profitability	-0.231†		-0.043	
	(-2.75)		(-0.62)	
Firm's Fixed Assets	0.055		0.008	
	(0.39)		(0.08)	
Firm's Cash Flows		0.690**		0.203
		(2.49)		(1.21)

Firm's Total Leverage		0.084		-0.211**
		(0.44)		(-1.98)
Firm's Long Term Leverage		0.082		0.330**
		(0.94)		(2.00)
Bank Level Control Variables				
Bank Avg Capital Ratio	-0.218**	0.177	-0.212	0.004
	(-2.08)	(0.78)	(-1.42)	(0.02)
Bank Avg Imp Ratio	-0.321		-0.129	
	(-0.92)		(-0.29)	
Bank Avg Interbank Ratio	0.001	-0.001	0.002	-0.003
	(0.88)	(-0.58)	(0.79)	(-0.66)
Bank Avg Profitability	0.079		0.028	
	(1.04)		(0.28)	
Industry Level Control Variables				
Firm's mean Assets	-0.011	0.001	0.029	-0.055†
	(-0.20)	(0.10)	(0.70)	(-3.45)
Firm's mean Profits	-0.000†	0.000	0.000	-0.000*
	(-2.80)	(0.61)	(0.06)	(-1.84)
Country Level Control Variables				
GDP	-0.001	0.002	-0.001	0.010†
	(-1.37)	(0.96)	(-0.54)	(3.93)
Constant	0.000	0.000	-0.180	0.167**
	(.)	(.)	(-1.19)	(2.34)
Observations	9,543	8,911	11,711	10,735
Number of id	1,724	1,656	2,579	2,522
Year FE	Yes	Yes	Yes	Yes
Country FE	No	No	No	No
Sector FE	No	No	No	No
AR1	0	0	0	0
AR2	0.102	0.822	0.594	0.170
Hansen p	0.158	0.225	0.519	0.420

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. Columns 1 and 2 present capital structure and investment regressions respectively for hypothesis 3 (in bank-oriented countries). Columns 3 and 4 present capital structure and investment regressions respectively for hypothesis 3 (in market-oriented countries). For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.6: Impact of VaR of Banks on Capital Structure and Investment Decisions (Average and Higher Growth Firms) – Hypothesis 1

	Column 1	Column 2	Column 3	Column 4
	Hypothesis 1	**Hypothesis 1**	**Hypothesis 1**	**Hypothesis 1**
	Capital Structure	**Investment**	**Capital Structure**	**Investment**
Bank Avg VAR	**-0.064**	**-0.101**	**-0.172**	**-0.494**
	(-0.89)	**(-0.98)**	**(-0.91)**	**(-1.56)**
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR			**-0.172**	**-0.494**
			(-0.91)	**(-1.56)**
Firm's TQ q2 # Bank Avg VAR			0.134	0.51
			(0.54)	(1.41)
Firm's TQ q3 # Bank Avg VAR			-0.234	0.017
			(-0.86)	(0.05)
Firm's TQ q4 # Bank Avg VAR			0.081	(0.012)
			(0.53)	(-0.06)
Constant	0.000	-0.205†	0.000	0.000
	(.)	(-2.79)	(.)	(.)
Observations	25,913	23,864	25,913	23,864
Number of id	4,600	4,459	4,600	4,459
Year FE	Yes	Yes	Yes	Yes
Firm Level Controls	Yes	Yes	Yes	Yes
Bank Level Controls	Yes	Yes	Yes	Yes
Industry Level Controls	Yes	Yes	Yes	Yes
Country Level Controls	Yes	Yes	Yes	Yes
AR1	0.000	0.000	0.000	0.000
AR2	0.543	0.647	0.425	0.12
Hansen p	0.122	0.11	0.118	0.268

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. We only present Average Marginal Effects in the table above. Columns 1 and 2 (3 and 4) present capital structure and investment regressions respectively for whole sample without (with) interactions of higher growth firms with VaR of banks (Hypothesis 1). For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.7: Impact of VaR of Banks on Capital Structure and Investment Decisions (Impact of Financial Crisis on Lower and Higher Growth Firms) – Hypothesis 2

	Column 1	Column 2	Column 3	Column 4
	Hypothesis 2	**Hypothesis 2**	**Hypothesis 2**	**Hypothesis 2**
	Capital Structure	**Investment**	**Capital Structure**	**Investment**
	Before Crisis	**Before Crisis**	**After Crisis**	**After Crisis**
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR	**1.107***	**0.772**	**-0.534****	**-0.940****
	(1.65)	**(0.88)**	**(-2.22)**	**(-2.26)**
Firm's TQ q2 # Bank Avg VAR	-0.04	0.16	0.39	-0.319
	(-0.06)	(0.29)	(1.47)	(-0.69)
Firm's TQ q3 # Bank Avg VAR	0.882	-1.24	-0.268	0.074
	(1.09)	(-1.31)	(-1.00)	(0.18)
Firm's TQ q4 # Bank Avg VAR	-0.543	-0.908	0.105	-0.057
	(-0.81)	(-0.82)	(0.71)	(-0.20)
Constant	-0.393**	0.000	-0.078	-0.122
	(-2.01)	(.)	(-0.79)	(-1.41)
Observations	9,909	9,501	16,004	14,363
Number of id	3,678	3,526	3,925	3,722
Year FE	Yes	Yes	Yes	Yes
Firm Level Controls	Yes	Yes	Yes	Yes
Bank Level Controls	Yes	Yes	Yes	Yes
Industry Level Controls	Yes	Yes	Yes	Yes
Country Level Controls	Yes	Yes	Yes	Yes
AR1	0.003	0.017	0.000	0.000
AR2	0.158	0.708	0.324	0.138
Hansen p	0.223	0.112	0.148	0.287

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. We only present Average Marginal Effects in the table above. Columns 1 and 2 (3 and 4) present capital structure and investment regressions respectively, for lower and higher growth firms before (after) the crisis (Hypothesis 2). For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.8: Impact of VaR of Banks on Capital Structure and Investment Decisions (Impact of Financial Crisis on Lower and Higher Growth Firms) - Bank-Oriented and Market-Oriented Countries – Hypothesis 3

	Column 1	Column 2	Column 3	Column 4
	Hypothesis 3	Hypothesis 3	Hypothesis 3	Hypothesis 3
	Capital Structure	Investment	Capital Structure	Investment
	Before Crisis	Before Crisis	Before Crisis	Before Crisis
	Bank-Oriented	Bank-Oriented	Market-Oriented	Market-Oriented
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR	**1.24**	**0.292**	**0.224**	**0.396**
	(1.20)	**(0.57)**	**(0.32)**	**(0.62)**
Firm's TQ q2 # Bank Avg VAR	-0.34	-0.678*	0.18	1.641
	(-0.48)	(-1.69)	(0.18)	(1.35)
Firm's TQ q3 # Bank Avg VAR	-0.022	-0.499	1.144	-0.218
	(-0.03)	(-0.96)	(0.91)	(-0.19)
Firm's TQ q4 # Bank Avg VAR	0.588	-0.477	-0.753	-1.786
	(0.52)	(-0.84)	(-0.54)	(-1.64)
Constant	0.000	0.117**	0.000	0.000
	(.)	(1.99)	(.)	(.)
Observations	6,163	6,150	3,746	3,351
Number of id	2,344	2,277	1,334	1,249
Year FE	Yes	Yes	Yes	Yes
Firm Level Controls	Yes	Yes	Yes	Yes
Bank Level Controls	Yes	Yes	Yes	Yes
Industry Level Controls	Yes	Yes	Yes	Yes
Country Level Controls	Yes	Yes	Yes	Yes
AR1	0.002	0.000	0.026	0.021
AR2	0.479	0.414	0.153	0.546
Hansen p	0.159	0.145	0.298	0.169

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. We only present Average Marginal Effects in the table above. Columns 1 and 2 (3 and 4) present capital structure (investment) regressions for lower and higher growth firms before the crisis (Hypothesis 3). Columns 1 and 2 (3 and 4) present results for bank-oriented (market-oriented) countries. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.9: Impact of VaR of Banks on Capital Structure and Investment Decisions (Impact of Financial Crisis on Lower and Higher Growth Firms) - Bank-Oriented and Market-Oriented Countries – Hypothesis 3

	Column 1	Column 2	Column 3	Column 4
	Hypothesis 3	Hypothesis 3	Hypothesis 3	Hypothesis 3
	Capital Structure	Investment	Capital Structure	Investment
	After Crisis	After Crisis	After Crisis	After Crisis
	Bank-Oriented	Bank-Oriented	Market-Oriented	Market-Oriented
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR	**-0.693†**	**-1.657†**	**0.111**	**-0.046**
	(-2.93)	**(-2.88)**	**(0.27)**	**(-0.07)**
Firm's TQ q2 # Bank Avg VAR	0.164	-0.136	0.178	-0.63
	(0.64)	(-0.23)	(0.45)	(-0.96)
Firm's TQ q3 # Bank Avg VAR	-0.156	0.046	-0.127	0.089
	(-0.65)	(0.09)	(-0.26)	(0.16)
Firm's TQ q4 # Bank Avg VAR	0.132	0.229	0.154	0.737*
	(0.94)	(0.70)	(0.40)	(1.87)
Constant	-0.204**	-0.321**	0.008	0.000
	(-2.29)	(-2.20)	(0.06)	(.)
Observations	9,714	8,906	6,290	5,457
Number of id	2,331	2,197	1,594	1,525
Year FE	Yes	Yes	Yes	Yes
Firm Level Controls	Yes	Yes	Yes	Yes
Bank Level Controls	Yes	Yes	Yes	Yes
Industry Level Controls	Yes	Yes	Yes	Yes
Country Level Controls	Yes	Yes	Yes	Yes
AR1	0.000	0.002	0.000	0.000
AR2	0.367	0.607	0.686	0.115
Hansen p	0.118	0.587	0.206	0.363

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. We only present Average Marginal Effects in the table above. Columns 1 and 2 (3 and 4) present capital structure (investment) regressions for lower and higher growth firms after the crisis (Hypothesis 3). Columns 1 and 2 (3 and 4) present results for bank-oriented (market-oriented) countries. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.10: Impact of VaR of Banks on Capital Structure and Investment Decisions (Impact of Financial Crisis on Lower and Higher Growth Firms) - Developing and Developed Countries – Hypothesis 3

	Column 1	Column 2	Column 3	Column 4
	Hypothesis 3	Hypothesis 3	Hypothesis 3	Hypothesis 3
	Capital Structure	Investment	Capital Structure	Investment
	Before Crisis	Before Crisis	Before Crisis	Before Crisis
	Developing	Developing	Developed	Developed
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR	**0.329**	**0.688**	**0.40**	**-0.672**
	(0.84)	**(1.08)**	**(0.50)**	**(-1.44)**
Firm's TQ q2 # Bank Avg VAR	-0.239	-0.381	1.266	1.235
	(-0.75)	(-0.94)	(1.21)	(1.64)
Firm's TQ q3 # Bank Avg VAR	-0.408	-0.737	1.614	-0.374
	(-0.83)	(-1.42)	(1.31)	(-0.65)
Firm's TQ q4 # Bank Avg VAR	0.155	-0.371	0.16	-0.414
	(0.38)	(-0.49)	(0.17)	(-0.71)
Constant	0.000	0.000	0.000	0.103*
	(.)	(.)	(.)	(1.87)
Observations	4,006	3,839	5,903	5,662
Number of id	1,439	1,380	2,239	2,146
Year FE	Yes	Yes	Yes	Yes
Firm Level Controls	Yes	Yes	Yes	Yes
Bank Level Controls	Yes	Yes	Yes	Yes
Industry Level Controls	Yes	Yes	Yes	Yes
Country Level Controls	Yes	Yes	Yes	Yes
AR1	0.000	0.000	0.077	0.000
AR2	0.365	0.557	0.174	0.373
Hansen p	0.129	0.254	0.115	0.338

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. We only present Average Marginal Effects in the table above. Columns 1 and 2 (3 and 4) present capital structure (investment) regressions for lower and higher growth firms before the crisis (Hypothesis 3). Columns 1 and 2 (3 and 4) present results for developing (developed) countries. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.11: Impact of VaR of Banks on Capital Structure and Investment Decisions (Impact of Financial Crisis on Lower and Higher Growth Firms) - Developing and Developed Countries – Hypothesis 3

	Col 1	Col 2	Col 3	Col 4
	Hypothesis 3	Hypothesis 3	Hypothesis 3	Hypothesis 3
	Capital Structure	Investment	Capital Structure	Investment
	After Crisis	After Crisis	After Crisis	After Crisis
	Developing	Developing	Developed	Developed
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR	**-0.878†**	**-1.640****	**-0.008**	**-0.215**
	(-3.41)	**(-2.42)**	**(-0.03)**	**(-0.34)**
Firm's TQ q2 # Bank Avg VAR	0.155	0.653	0.05	0.415
	(0.54)	(1.02)	(0.20)	(0.44)
Firm's TQ q3 # Bank Avg VAR	-0.092	-1.079	-0.063	-1.023
	(-0.30)	(-1.13)	(-0.23)	(-1.16)
Firm's TQ q4 # Bank Avg VAR	0.132	0.399	-0.044	0.548
	(0.58)	(0.71)	(-0.29)	(1.57)
Constant	0.000	-0.323	0.000	0.000
	(.)	(-1.60)	(.)	(.)
Observations	7,324	6,708	8,680	7,655
Number of id	1,637	1,553	2,288	2,169
Year FE	Yes	Yes	Yes	Yes
Firm Level Controls	Yes	Yes	Yes	Yes
Bank Level Controls	Yes	Yes	Yes	Yes
Industry Level Controls	Yes	Yes	Yes	Yes
Country Level Controls	Yes	Yes	Yes	Yes
AR1	0.000	0.003	0.000	0.000
AR2	0.112	0.951	0.889	0.281
Hansen p	0.197	0.858	0.181	0.231

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. We only present Average Marginal Effects in the table above. Columns 1 and 2 (3 and 4) present capital structure (investment) regressions for lower and higher growth firms after the crisis (Hypothesis 3). Columns 1 and 2 (3 and 4) present results for developing (developed) countries. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.12: Impact of VaR Currency of Banks on Capital Structure and Investment Decisions (Impact of Financial Crisis on Lower and Higher Growth Firms)

	Column 1	Column 2	Column 3	Column 4
	VaR Currency	VaR Currency	VaR Currency	VaR Currency
	Capital Structure	Investment	Capital Structure	Investment
	Before Crisis	Before Crisis	After Crisis	After Crisis
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR Curr	**-4.131**	**-0.094**	**-0.451**	**-1.232**
	(-0.92)	**(-0.03)**	**(-0.89)**	**(-0.53)**
Firm's TQ q2 # Bank Avg VAR Curr	3.062	3.526	-0.09	1.55
	(1.06)	(1.37)	(-0.18)	(0.59)
Firm's TQ q3 # Bank Avg VAR Curr	4.591	0.032	-0.389	-1.128
	(0.85)	(0.01)	(-0.67)	(-0.28)
Firm's TQ q4 # Bank Avg VAR Curr	-1.858	-0.956	0.255	-0.201
	(-0.43)	(-0.34)	(0.50)	(-0.08)
Constant	-0.656†	0.000	0.000	-0.002
	(-2.65)	(.)	(.)	(-0.03)
Observations	9,910	9,493	16,091	14,444
Number of id	3,684	3,528	3,951	3,744
Year FE	Yes	Yes	Yes	Yes
Firm Level Controls	Yes	Yes	Yes	Yes
Bank Level Controls	Yes	Yes	Yes	Yes
Industry Level Controls	Yes	Yes	Yes	Yes
Country Level Controls	Yes	Yes	Yes	Yes
AR1	0.000	0.000	0.000	0.000
AR2	0.654	0.345	0.622	0.419
Hansen p	0.12	0.111	0.102	0.237

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. We only present Average Marginal Effects in the table above. Columns 1 and 3 (2 and 4) present capital structure (investment) regressions for whole sample with interactions of higher growth firms with VaR Currency of banks. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.13: Impact of VaR Equity of Banks on Capital Structure and Investment Decisions (Impact of Financial Crisis on Lower and Higher Growth Firms)

	Column 1	Column 2	Column 3	Column 4
	VaR Equity	VaR Equity	VaR Equity	VaR Equity
	Capital Structure	Investment	Capital Structure	Investment
	Before Crisis	Before Crisis	After Crisis	After Crisis
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR Eq	**2.08**	**-0.626**	**-1.667****	**-1.753***
	(1.60)	**(-0.31)**	**(-2.48)**	**(-1.83)**
Firm's TQ q2 # Bank Avg VAR Eq	-1.112	-0.352	0.211	0.617
	(-0.96)	(-0.25)	(0.25)	(0.63)
Firm's TQ q3 # Bank Avg VAR Eq	0.476	0.073	-0.189	0.20
	(0.63)	(0.06)	(-0.28)	(0.16)
Firm's TQ q4 # Bank Avg VAR Eq	0.664	0.014	-0.234	0.215
	(0.91)	(0.02)	(-0.48)	(0.21)
Constant	0.000	0.111	0.000	0.000
	(.)	(0.93)	(.)	(.)
Observations	6,950	6,827	14,018	12,646
Number of id	3,031	2,996	3,458	3,281
Year FE	Yes	Yes	Yes	Yes
AR1	0.000	0.055	0.000	0.000
AR2	0.207	0.434	0.479	0.575
Hansen p	0.0962	0.11	0.188	0.102

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. We only present Average Marginal Effects in the table above. Columns 1 and 3 (2 and 4) present capital structure (investment) regressions for whole sample with interactions of higher growth firms with VaR Equity of banks. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.14: Impact of VaR Interest Rate of Banks on Capital Structure and Investment Decisions (Impact of Financial Crisis on Lower and Higher Growth Firms)

	Col 1	Col 2	Col 3	Col 4
	VaR Interest Rate	VaR Interest Rate	VaR Interest Rate	VaR Interest Rate
	Capital Structure	Investment	Capital Structure	Investment
	Before Crisis	Before Crisis	After Crisis	After Crisis
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR Int	**1.282***	**0.19**	**-1.181****	**-0.558**
	(1.74)	**(0.36)**	**(-2.37)**	**(-1.09)**
Firm's TQ q2 # Bank Avg VAR Int	-0.879	-0.338	0.259	0.117
	(-1.02)	(-0.76)	(0.40)	(0.20)
Firm's TQ q3 # Bank Avg VAR Int	0.75	0.044	-0.526	-0.164
	(1.00)	(0.06)	(-0.91)	(-0.22)
Firm's TQ q4 # Bank Avg VAR Int	-0.375	-0.717	0.01	-0.072
	(-0.48)	(-1.42)	(0.03)	(-0.13)
Constant	0.000	0.000	-0.144	-0.052
	(.)	(.)	(-1.36)	(-0.57)
Observations	9,989	9,574	15,977	14,298
Number of id	3,738	3,581	3,945	3,714
Year FE	Yes	Yes	Yes	Yes
AR1	0.000	0.003	0.000	0.000
AR2	0.135	0.304	0.399	0.121
Hansen p	0.112	0.114	0.116	0.133

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. We only present Average Marginal Effects in the table above. Columns 1 and 3 (2 and 4) present capital structure (investment) regressions for whole sample with interactions of higher growth firms with VaR Interest Rate of banks. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.15: Hypothesis 1 (with Country & Sector Fixed Effects)

	Column 1	Column 2
	Hypothesis 1	**Hypothesis 1**
	Capital Structure	**Investment**
	All Countries	**All Countries**
Firm's Lev (first lag)	0.700†	
	(12.23)	
Firm's Inv (first lag)		0.433†
		(3.05)
Firm's TQ	-0.001	0.013
	(-0.06)	(0.28)
Bank Avg VAR	**-0.067**	**-0.099**
	(-1.23)	**(-0.74)**
Constant	-0.113	0.000
	(-0.76)	(.)
Observations	21,841	20,200
Number of id	4,322	4,181
Year FE	Yes	Yes
Country FE	Yes	Yes
Industry FE	Yes	Yes
Firm, Bank, Industry and Country Level Control Variables	Yes	Yes
AR1	0	0
AR2	0.552	0.151
Hansen p	0.109	0.138

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Column 1 is total leverage of the firms and in column 2, the dependent variable is gross investment. Column 1 presents capital structure regressions for hypothesis 1 and column 2 shows investment regressions for hypothesis 1. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.16: Hypothesis 2 (with Country & Sector Fixed Effects)

	Column 1	Column 2
	Hypothesis 2	**Hypothesis 2**
	Capital Structure	**Investment**
	All Countries	**All Countries**
Marginal Effects		
Firm's TQ q1 # Bank Avg VAR	**-0.376***	**-0.914****
	(-1.85)	**(-2.41)**
Firm's TQ q2 # Bank Avg VAR	0.296	0.117
	.(1.22)	.(0.25)
Firm's TQ q3 # Bank Avg VAR	-0.218	0.243
	(-0.81)	.(0.53)
Firm's TQ q4 # Bank Avg VAR	0.06	-0.095
	.(0.42)	(-0.36)
Constant	0.000	-0.033
	(.)	(-0.37)
Observations	21,841	20,200
Number of id	4,322	4,181
Year FE	Yes	Yes
Country FE	Yes	Yes
Industry FE	Yes	Yes
Firm, Bank, Industry and Country Level Control Variables	Yes	Yes
AR1	0	0
AR2	0.261	0.746
Hansen p	0.497	0.393

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Column 1 is total leverage of the firms and in column 2, the dependent variable is gross investment. Column 1 presents capital structure regressions for hypothesis 2 and column 2 shows investment regressions for hypothesis 2. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.17: Hypothesis 3 (with Country & Sector Fixed Effects)

Bank-Oriented and Market-Oriented Countries

	Column 1	Column 2	Column 3	Column 4
	Hypothesis 3	Hypothesis 3	Hypothesis 3	Hypothesis 3
	Capital Structure	Investment	Capital Structure	Investment
	Bank-Oriented Countries	Bank-Oriented Countries	Market-Oriented Countries	Market-Oriented Countries
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR	**-0.495****	**-1.281****	**0.074**	**-0.169**
	(-2.14)	**(-2.48)**	**.(0.13)**	**(-0.33)**
Firm's TQ q2 # Bank Avg VAR	0.131	0.534	0.207	-0.546
	.(0.54)	.(1.05)	.(0.44)	(-0.87)
Firm's TQ q3 # Bank Avg VAR	-0.308	-0.447	0.192	-0.042
	(-1.16)	(-0.76)	.(0.21)	(-0.06)
Firm's TQ q4 # Bank Avg VAR	0.116	0.026	-0.004	0.587
	.(0.89)	.(0.09)	(-0.01)	.(1.41)
Constant	0.000	0.000	0.000	0.121*
	(.)	(.)	(.)	(1.72)
Observations	13,468	12,847	8,373	7,353
Number of id	2,624	2,537	1,698	1,644
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Firm, Bank, Industry and Country Level Control Variables	Yes	Yes	Yes	Yes
AR1	0	0	0	0
AR2	0.624	0.215	0.301	0.519
Hansen p	0.588	0.481	0.275	0.153

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. Columns 1 and 2 present capital structure and investment regressions respectively for hypothesis 3 (in bank-oriented countries). Columns 3 and 4 present capital structure and investment regressions respectively for hypothesis 3 (in market-oriented countries). For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.18: Hypothesis 3 (with Country & Sector Fixed Effects)

Developing and Developed Countries

	Column 1	Column 2	Column 3	Column 4
	Hypothesis 3	**Hypothesis 3**	**Hypothesis 3**	**Hypothesis 3**
	Capital Structure	**Investment**	**Capital Structure**	**Investment**
	Developing Countries	**Developing Countries**	**Developed Countries**	**Developed Countries**
Marginal Effects				
Firm's TQ q1 # Bank Avg VAR	**-0.685†**	**-1.034****	**-0.13**	**-0.337**
	(-2.83)	**(-2.28)**	**(-0.53)**	**(-0.79)**
Firm's TQ q2 # Bank Avg VAR	0.1	0.599	0.319	-0.4
	.(0.37)	.(0.99)	.(1.22)	(-0.82)
Firm's TQ q3 # Bank Avg VAR	-0.22	-0.32	-0.32	-0.046
	(-0.71)	(-0.40)	(-1.06)	(-0.10)
Firm's TQ q4 # Bank Avg VAR	0.167	0.112	-0.161	0.365*
	.(0.82)	.(0.26)	(-1.06)	.(1.69)
Constant	-0.001	-0.279**	-0.117	0.130**
	(-0.01)	(-2.33)	(-0.74)	(2.38)
Observations	9,543	8,911	12,298	11,289
Number of id	1,724	1,656	2,598	2,525
Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Firm, Bank, Industry and Country Level Control Variables	Yes	Yes	Yes	Yes
AR1	0	0	0	0
AR2	0.452	0.497	0.700	0.619
Hansen p	0.481	0.206	0.531	0.109

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1 and 3 is total leverage of the firms and in columns 2 and 4, the dependent variable is gross investment. Columns 1 and 2 present capital structure and investment regressions respectively for hypothesis 3 (in bank-oriented countries). Columns 3 and 4 present capital structure and investment regressions respectively for hypothesis 3 (in market-oriented countries). For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Table A.19: VaR Decomposition

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
	VaR Currency	VaR Equity	VaR Interest Rate	VaR Currency	VaR Equity	VaR Interest Rate
	Capital Structure	Capital Structure	Capital Structure	Investment	Investment	Investment
	All Countries	All Countries	All Countries	All Countries	All Countries	All Countries
Marginal Effects						
Firm's TQ q1 # Bank Avg VAR	**-1.393**	**-1.258****	**-0.827****	**0.332**	**0.672**	**-0.124**
	(-1.62)	**(-2.31)**	**(-2.40)**	**.(0.12)**	**.(0.36)**	**(-0.28)**
Firm's TQ q2 # Bank Avg VAR	1.013	0.22	-0.289	2.25	0.376	0.496
	.(1.22)	.(0.32)	(-1.02)	.(0.74)	.(0.12)	.(0.68)
Firm's TQ q3 # Bank Avg VAR	-0.297	0.252	0.158	-1.291	-0.011	-0.734
	(-0.29)	.(0.43)	.(0.51)	(-0.36)	(-0.01)	(-0.90)
Firm's TQ q4 # Bank Avg VAR	-0.016	-0.343	-0.195	1.173	0.212	0.305
	(-0.02)	(-0.72)	(-0.87)	.(0.32)	.(0.11)	.(0.49)
Constant	0.000	0.057	-0.121	0.000	0.000	0.000
	(.)	(0.38)	(-0.93)	(.)	(.)	(.)
Observations	21,954	19,326	21,852	20,300	17,979	20,165
Number of id	4,351	3,903	4,347	4,204	3,779	4,183
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Bank, Industry and Country Level Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
AR1	0	0	0	0.009	0.016	0.003
AR2	0.474	0.610	0.367	0.464	0.621	0.452
Hansen p	0.225	0.560	0.399	0.521	0.514	0.470

t-statistics in parentheses

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in Columns 1, 2 and 3 is total leverage of the firms and in columns 4, 5 and 6, the dependent variable is gross investment. Columns 1, 2 and 3 (4, 5 and 6) present the impact of VaR from currency risk, equity risk and interest rate risk, for capital structure (investment) regressions. For definition of all variables, please see section 2.4. All the equations include first lag of the dependent variable as well. All equations are estimated using two-step system-GMM with finite sample correction for standard errors. Instrument matrix is collapsed as described in Roodman (2009). TQ_q1 is a categorical variable which is equal to 1 for firms in first quartile of Tobin's Q, TQ_q2 for second, TQ_q3 for third and TQ_q4 when firms are in fourth quartile of Tobin's Q (Q1, Q2, Q3 & Q4). Standard errors are calculated using Windmeijer correction. t-statistics in parentheses and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1.

Chapter 3

Riskiness of Banks and Bonds Issuance by Non-Financial Firms: The Role of Financial Architecture

3.1 Introduction

The Global Financial Crisis of 2007 changed the financial landscape for banks and non-financial firms. After the fall of Lehman Brothers, the volume of inter-bank lending and lending to the private sector fell and counterparty risk increased (see BoE (2008), Campello et al. (2010) and Afonso et al. (2011) and ECB (2012)). These tightening credit conditions led to a decline in the bank borrowing and a simultaneous increase in bond financing (see Shin (2014)). This shift to bond financing is attributed to various factors including but not limited to contraction in the bank-credit supply and an increase in the risk of the banking sector (Becker and Ivashina (2014)) and also reaching for higher yield by the investors (Becker and Ivashina (2015)). The impact of the financial crisis and this change in the financing patterns is heterogeneous across countries, especially varying between bank-oriented and market-oriented[12] and advanced and emerging economies, as shown in Figure 3.1. This figure suggests that after the financial crisis, total amount of lending to private sector in bank-oriented countries is approximately equal to market-oriented countries but private sector in latter group obtain a greater proportion of lending, from non-bank modes of financing (the gap between lending from all sectors and bank lending is widening more in market-oriented countries). The red vertical line is the year of crisis (2007). On the other hand, the volume of overall lending in advanced countries after the crisis, as compared to emerging countries, is much larger but similar to market-oriented countries, a greater proportion of lending in advanced economies is coming from non-banking sector. This increase in lending after the financial crisis is attributed to greater availability of non-bank modes of financing in market-oriented and advanced economies as compared to bank-oriented and emerging countries.

[12] Countries in which banks are the major lenders are characterized as bank-oriented countries and countries where capital markets (bond and equity) provide greater opportunities of external financing are classified as market-oriented economies. For a detailed discussion about the classification of countries into either group in this study, please see section 3.3.5.

Adrian et al. (2013) provide strong empirical evidence that post crisis events are best explained by a supply side shock to the bank lending. Moreover, the impact of this credit supply shock is not homogenous for all types of firms. Those firms which had access to the bond markets made up for the decrease in the bank loans by substituting their financing mix towards bond financing. However, cost of credit and risk premia also increased after the crisis, which made banks riskier. This is clearly evident from Figure 3.2, which plots the Credit Default Swap (CDS) spread averaged for all the banks in each country of our sample[13]. The red vertical line is the year of crisis (2007). We can clearly see in figure 3.2 that average CDS spread has increased after the financial crisis, for all the banks in 13 countries. Subsequently, these risky banks cut back on their existing lending to the private sector and make marginal credit more expensive (Ritz and Walther (2015)).

Treating financial crisis as an exogenous shock to the supply of capital and opportunities available to the firms to raise external funding through capital markets, we investigate the impact of heterogenous financial architecture of the country on various capital structure decisions of non-financial firms after the financial crisis. Specifically, we study the impact of financial architecture of the country on the cost of debt and intensive and extensive margins of bond financing of non-financial firms. We proxy financial architecture of the country by the availability of external finance options in a country and divide our countries into bank-oriented and market-oriented countries. In other words, we ask a simple yet very important question. After controlling for the financial health of the firms (borrowers) and banks (lenders), does financial architecture of the country (bank-oriented or market-oriented) explain various capital structure decisions of non-financial firms? If yes, is this effect homogenous across the whole cross section of non-financial firms? Specifically, we expect higher growth firms (as measured by Tobin's Q) to perform better along cost of debt and intensive and extensive margins because future growth opportunities of these firms are duly recognized by their investors and therefore these firms are able to reduce the agency costs of debt and increase their leverage, even during distress times (see Lang et al. (1996) and Billett et al. (2007)).

[13] For Average CDS across different groups of economies employed in this paper, please refer to Appendix B.

The main contribution of this paper is to provide strong empirical evidence that financial architecture is one of the most important determinants of the capital structure of non-financial firms, after controlling for observable characteristics of firms (borrowers), banks (lenders) and also for firm's demand for credit.

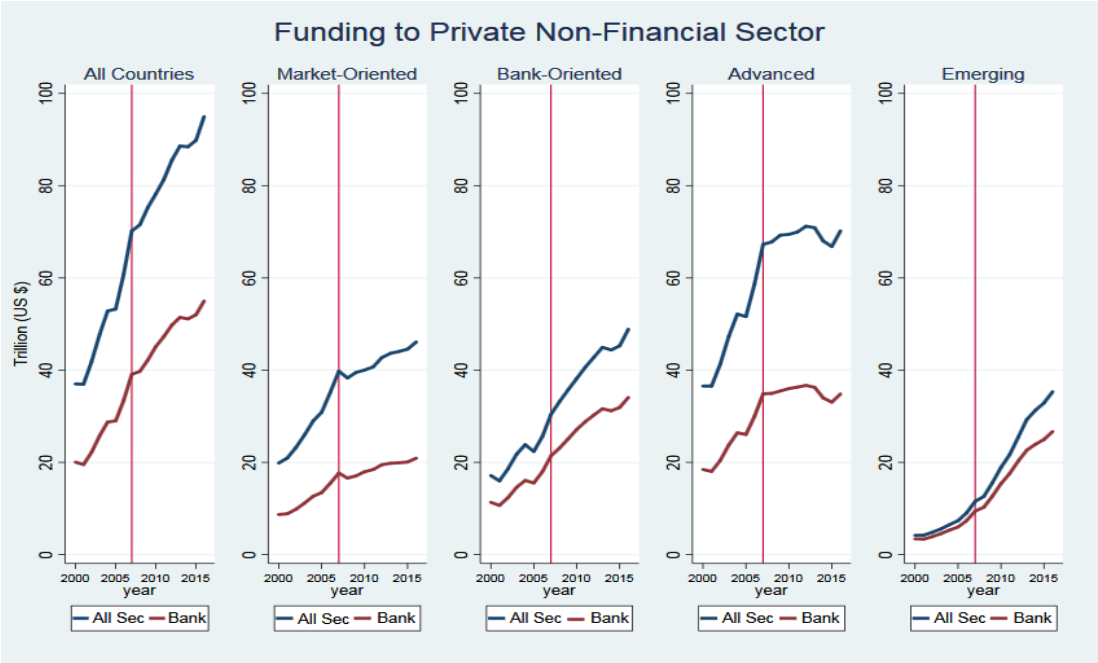

Figure 3.1: Funding to Private Non-Financial Sector from All Sectors and from Banks.

Source: BIS Statistics.

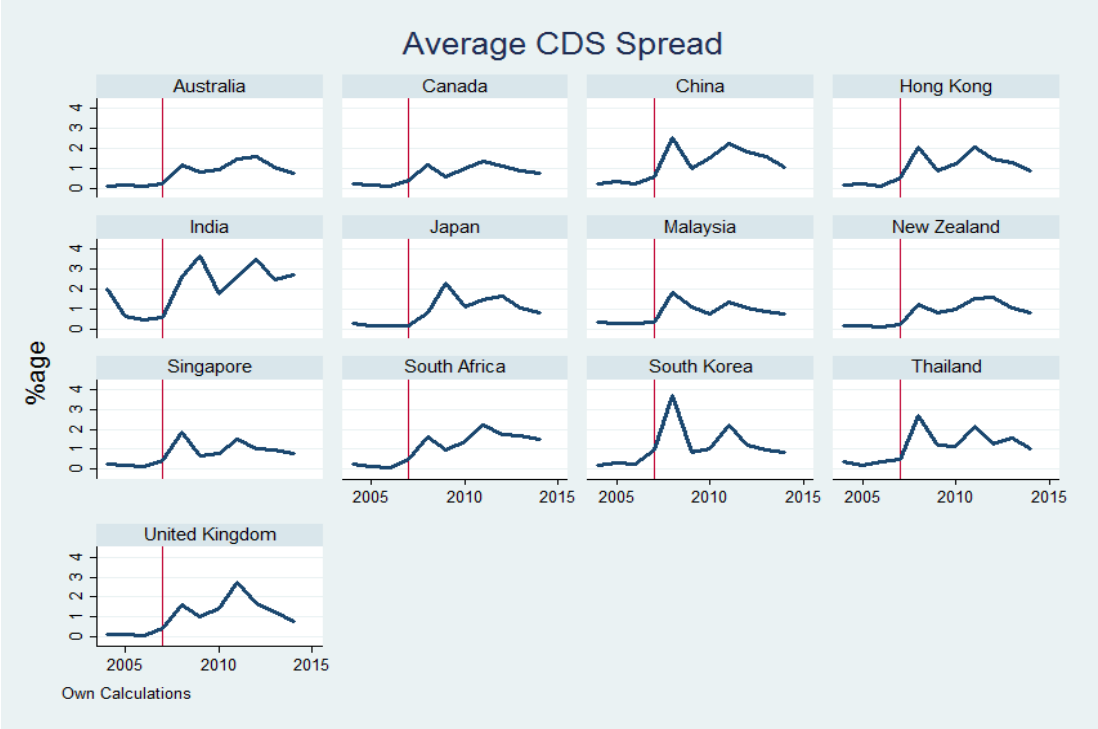

Figure 3.2: Average Credit Default Spread (%) of Financial Institutions (across Countries).

Source: Bloomberg

We define financial architecture of a country by the availability of bank and market modes of financing to the private sector (labelled from this point as bank-oriented and market-oriented countries). We fill this gap in the literature by using a rich cross-country firm level bond's transactions data which also contains information on firm-bank linkages and treating Global Financial crisis 2007 as a natural experiment for an exogenous shock to the supply of capital. Our study makes an advancement in the literature by controlling for the financial health of lenders and firms and also for the demand of credit by firms (along with productivity shocks), while investigating the impact of financial architecture on the bonds issuance decisions of non-financial firms. Most important finding of our paper suggests that higher growth firms after the financial crisis and operating only in market-oriented countries, have lower bonds spreads and these firms issue larger volumes of financing through bonds (an increase in intensive margins) and also issue more number of bonds (an increase in extensive margins).

Firms with average future growth opportunities face higher bonds spreads (cost of debt) after the crisis. We attribute this increase in the bond spreads to an increase in the market risk of the banks of the firms. The main assumption behind all the results of this paper is that after the financial crisis, market risk of the banks of the firms increases. Therefore, these firms face either expensive marginal credit (from banks) or a reduction in the supply of bank credit as lenders are now riskier (an increase in the market risk of the banks is a shock to the financial health of the banks). Hence, these firms have greater incentives to switch to alternate modes of financing and issue more bonds, as documented by Kahle and Stulz (2010) and Adrian et al. (2013) . Under such circumstances, an average firm after the financial crisis (especially with average future growth opportunities) faces higher spreads while issuing bonds in the capital markets. These firms still raise more funds through bonds (issue bonds with higher amounts) but do not issue higher number of bonds.

We also split our sample between Asian, Non-Asian, developed and developing countries[14]. We find strong (moderate) evidence that higher growth firms operating

[8] Asian countries underwent several policy changes regarding deepening domestic and foreign bond markets after the Asian Financial Crisis of 1997 (see Mizen and Tsoukas (2012)). These policy

only in Asian countries after the crisis, have lower spreads and higher intensive (extensive) margins of bond financing. We also find strong (moderate) evidence that higher growth firms operating only in developed countries after the crisis, face lower spreads and have higher intensive (extensive) margins. We do not find any evidence that these higher growth firms have lower spreads and higher intensive and extensive margins of bond financing in Non-Asian and developing countries. Our econometric methodology controls for other macroeconomic variables like enforcement of credit laws, corruption etc. This allows us to attribute the remaining effects to the influence of well-functioning and highly liquid bond markets in Asian and developed countries. It is also pertinent to mention that we only keep those firms in our sample which issue bonds during 2004-2014, therefore our results are indicative for only those firms that issued bonds and we do not generalize our results for both issuers and non-issuers. Using double and triple difference-in-difference framework along with sector-country-year fixed effects (high dimensional fixed effects), we control firm's demand for credit at one and/or two-digit sector level (for a detailed discussion about controlling firm's demand for credit, please see section 3.3.6).

This study involves construction of a novel dataset which not only contains information about financial health of borrower (firms) and lenders (banks) but also the transactional level information about bonds issuance by the firms. Richness of our data allows, not only to control for any observable characteristics of borrowers (firms), lenders (banks) and bond transactions by the firms, but also for firm's demand for credit and any demand shock to the productivity of the firms. After controlling for the financial health of the lenders and any demand for credit by the borrowers, we are confident that the results in this study are driven by the supply side effects of capital.

Our paper is closely related to Antoniou et al. (2006), (2008) and Becker and Ivashina (2014) and Didier et al. (2015). Antoniou et al. (2006), (2008) investigate the impact

initiatives increased bonds issuance by firms in Asian countries. For developed countries, Demirgüç-Kunt et al. (2013) provide evidence that as economies grow, the association between economic growth and capital market increases whereas the association between banking sector and economic growth decreases. This implies that with an increase in the economic growth of a country, capital markets become more important and performs (relatively) efficiently than the banking sector. Therefore, we believe that firms in Asian and developed countries (as compared to Non-Asian and developing countries) have higher access to external financing.

of the financial architecture of the country on the debt maturity and on various capital structure determinants in different European countries that were classified either as bank or market-oriented. They find that the debt maturity and the leverage ratio (and the behaviour of various capital structure determinants) largely varies across these European countries and mainly depend on the financial architecture (bank or market-oriented) of the country. Therefore, results obtained for the United Kingdom do not hold true for all other countries, a finding which we also emphasize strongly in our paper. It is pertinent to mention that these authors do not control for the firm's demand for credit and for the financial health of the banks of the firms (lenders).

In another closely related work, Becker and Ivashina (2014), explicitly investigated the switching behaviour of non-financial USA firms from bank loans to bonds issuance during 1990-2010. Their work focus on the cyclical nature of bank loans and bonds financing over different business cycles. Their results and empirical settings are very rigorous, but we differ from them in various aspects. Firstly, they do not investigate the impact of the financial health of the banks of the firms on the switching behaviour of the firms from bank loans to bonds. Instead, they use either macro or survey level data to infer the switching behaviour of the firms. In contrast, our main interest in this study is the market risk of the banks of the firm (lenders) and we investigate its impact on different capital structure decisions of non-financial firms (borrowers). Secondly, their analysis is only for non-financial US firms and they do not reflect on the impact of the financial architecture of the country on the propensity of switching. Our estimation sample includes 13 countries which are a mix of bank and market-oriented, Asian and Non-Asian and developed and developing countries. Moreover, their analysis mainly focuses on the probability of switching from bank loans to bond financing. In comparison, our paper investigates various channels through which higher growth firms perform better (in terms of bonds issuance decisions) after the crisis, as compared to lower growth firms before the crisis. An exhaustive investigation of these channels is another major contribution of this study.

Finally, Didier et al. (2015) is one of the most recent evidences on the impact of financial architecture of the country on the security issuance (capital structure) decisions of the firms. They provide very comprehensive and robust evidence that the growth of the firms which issue debt and equity (as compared to non-issuers) is faster

in market-oriented countries, as compared to bank-oriented countries. They measure growth using levels and growth rate of total assets or sales, as compared to our paper where we use Tobin's Q as a measure of growth opportunities of the firms. Most importantly, they do not control for any observable characteristics of the lenders.

Rest of the chapter is organised as follows. Section 3.2 reviews the relevant literature about the impact of risk of banks on bonds issuance of higher and lower growth firms and the importance of financial architecture of the country for various capital structure decisions. This section also builds up the main hypotheses of this paper. Section 3.3 describes the data construction for this study and also discusses the empirical estimation used in this paper. In section 3.4, we discuss the main results and additional insights about intensive and extensive margins of bond financing. Section 3.5 concludes.

3.2 Relevant Literature and Hypothesis Development

In this section, we discuss main theoretical and empirical motivations behind our study and we link main hypotheses of this paper with the most relevant literature. Section 3.2.1 (3.2.2) discusses the impact of increased riskiness of banks after the global financial crisis on bonds issuance decision of firms with average (higher) growth opportunities. These are our baseline expectations. Section 3.2.3 discusses all three hypotheses of this study, about the impact of financial architecture of the country (bank-oriented and market-oriented countries) on the cost of debt and intensive and extensive margins of bond financing for higher growth firms. Finally, section 3.2.4 (3.2.5) discusses the applicability of all three hypotheses in Asian (developed) countries. We also like to mention here that the baseline expectations help us in building the main hypotheses of this study. Therefore, we discuss our main hypotheses after stating our baseline expectations.

3.2.1 Bonds Issuance and Financial Crisis

The Global financial crisis of 2007 has renewed the interest of economists to understand the impact of any shock to the supply of capital and heterogeneous ability of the firms to switch to non-bank modes of financing. After the financial crisis, there is a surge in non-bank lending as shown in Figure 3.1. The gap between the two lines in this figure is the difference between overall lending (from all type of lenders) and

bank lending, to the private non-financial sector. The vertical line in each panel of this figure represents the year of the financial crisis (Dec 2007). We observe that in "All Countries", "Market-Oriented Countries" and "Advanced Countries", the gap between overall lending and bank lending increases after the financial crisis. On the other hand, this gap is marginal for "Bank-Oriented Countries" and Emerging Countries". This points out towards the global shift from bank lending to the bond financing, also termed as "Second Phase of Global Liquidity" by Shin (2014). Moreover, after the financial crisis, central banks in most western countries (and other countries around the world) lowered their policy interest rates which almost touched zero lower bound but credit spreads increased due to an increase in the risk premium of market participants (see ECB (2009), ECB (2010) and Zoli (2013)). Moreover, reaching for higher yield by investors in developed and market-oriented economies, as explained by (Becker and Ivashina (2015), can also explain this surge in bond financing after the financial crisis. Finally, in the context of the recent global financial crisis, Kahle and Stulz (2010) and Adrian et al. (2013) provide strong empirical evidence that financial crisis is characterized by a shock to the supply of bank lending instead of a drop in the firm's demand for credit. Moreover, firms that had access to the bond market during the crisis, made up for the lost supply of the bank credit from bond markets.

This discussion brings us to our baseline argument that an increase in the market riskiness of the banks (lenders) of the firms (borrowers) implies a shock to the financial health of the banks. As the banks of the firms become riskier, therefore, these firms may face a reduced supply of credit from these banks or may also face expensive marginal lending from these banks. Therefore, these firms have greater incentives to switch to bond financing after the financial crisis, but any capital market financing will be expensive for these firms, if banks of these firms are already riskier. Therefore, "W*ith an increase in the market risk of the banks after the financial crisis, we expect that firms with average growth opportunities will face greater cost of debt (bond spreads) and will also have higher intensive and extensive margins of bond financing".* We associate this increase in the cost of debt of the firms to an increase in the market riskiness of the banks (lenders) and not to an increase in the riskiness of firms (borrowers) or any change in the market valuation of the collateral of the firms (as we control firm's demand for credit along with a host of firm-level controls in all our

estimations). In other words, we associate an increase in the cost of debt of the firms to supply side effects of credit, after controlling for the demand side effects.

3.2.2 Bonds Issuance and Higher Growth Firms

All the above-mentioned arguments work well for firms with average growth opportunities whereas, firms which possess higher future growth opportunities (duly recognized by the investors) should have a competitive advantage over lower growth firms in terms of their overall leverage (see Lang et al. (1996) and Bolton et al. (2011)). We measure future growth opportunities with Tobin's Q which is equal to the ratio of market values of the assets of the firm to the book value of the assets. Marginal q, as measured by Tobin's Q, captures the fact that how much of the future growth opportunities of the firm are recognized by the investors, thus giving a high score of Tobin's Q to these firms. Any mismeasurement by financial markets in pricing financial assets will also be reflected in Tobin's Q (see Bond et al. (2004) and Gilchrist et al. (2005)), which makes results of our paper even stronger because it makes sure that our results are not driven by any measurement errors.

Lang et al. (1996) and Billett et al. (2007) among many others, confirm that a negative relationship between leverage and growth is significantly diminished for firms with higher growth opportunities. Moreover, the latter authors also provide strong empirical evidence that higher growth firms are able to reduce their agency costs of debt and therefore should be able to increase their leverage more than firms with lower growth opportunities. These higher growth firms are better positioned to tap alternative forms of financing at favourable terms (especially bond financing) during times of distress because investors duly recognize their future growth potential and are willing to lend to these firms. We exploit the higher growth potential of firms with higher Tobin's Q and expect them to have a competitive edge over their peers. Therefore, "W*ith an increase in the market risk of the banks after the financial crisis, we expect that firms with higher growth opportunities will have lower (higher) cost of debt (intensive and extensive margins of bond financing)".*

It is pertinent to mention that all our above-mentioned statements (baseline arguments in italics) do not formulate the main hypotheses (contribution) of our paper, rather provide support for building the hypotheses of this paper.

3.2.3 Bonds Issuance and Financial Architecture of the Country

Now we discuss the motivation for the main hypotheses (contribution) of this study. These hypotheses investigate the impact of financial architecture of a country (bank or market-oriented country) on various bonds issuance decisions of non-financial firms. We mention these hypotheses below, followed by a discussion about the most relevant literature which motivates us to build these hypotheses.

Hypothesis 1:

With an increase in the market risk of the banks after the financial crisis, we expect that higher growth firms operating only in market-oriented countries will have lower cost of debt (bond spreads).

For a discussion about dividing our sample into bank-oriented and market-oriented countries, please see section 3.3.5.

Hypothesis 2:

With an increase in the market risk of the banks after the financial crisis, we expect that higher growth firms operating only in market-oriented countries will have higher intensive margins of bond financing.

Hypothesis 3:

With an increase in the market risk of the banks after the financial crisis, we expect that higher growth firms operating only in market-oriented countries will have higher extensive margins of bond financing.

Our discussion in section 3.2.2 above discusses the most relevant literature about the heterogenous behaviour of higher growth firms and why we should expect that these higher growth firms have competitive advantage over their peers while issuing bonds. Our above mentioned hypotheses extend our baseline expectations in section 3.2.2 (about higher growth firms) and argue that financial architecture of the country is the most important determinant of the capital structure (bonds issuance) decisions of non-financial firms. Baseline expectations in section 3.2.2 suggests that higher growth firms after the crisis should have lower cost of debt and higher intensive and extensive

margins of bond financing. All the hypotheses mentioned above extend our baseline arguments and suggest that we should expect higher growth firms operating only in market-oriented countries (and not in bank-oriented countries) to have lower cost of debt and higher intensive and extensive margins. In other words, after controlling for the financial health of lenders (banks) and borrowers (firms), controlling for firm's demand for credit and productivity shocks, using sector-country-year fixed effects (which control for all time-variant variables e.g. all macroeconomic variables) and splitting our sample into bank oriented and market-oriented countries, we expect that higher growth firms operating only in market-oriented countries will have lower cost of debt and higher intensive and extensive margins of bond financing. Therefore, in the following paragraphs, we discuss the most relevant literature about the financial architecture of the country, which motivated us to construct the above mentioned hypotheses.

Empirically, there has been a divide in the literature about the efficacy of either bank-based or market-based financial architecture of any country and its impact on country's growth and capital structure of the firms. Bank-oreinted systems are characterized by a close relationship between lenders and borrowers, which involves higher scrutiny and monitoring (see Diamond (1984) and Holmstrom and Tirole (1997)). On the other hand, market-oriented economies are the ones where borrowers have greater options of alternate sources of financing, other than the banking sector. Moreover, when capital markets are more efficient, banks and traditional springs of finance tend to adhere less to arbitrage opportunities.

Research on the impact of financial architecture of any country (bank-oriented or market-oriented) on the overall growth/development of the country and performance of firms can be categorized into macro (country level) or micro (firm level) based studies. Most of the studies using macro level data do not find any support about the impact of either bank or market-oriented economies on the overall growth and financial development of any country (see Beck and Levine (2000), (2002), Levine (2002), Demirgüç-Kunt and Maksimovic (2002) and Chakraborty and Ray (2006)). Similarly, using firm level data and collapsing it across countries, Demirgüç-Kunt and Maksimovic (2002) find that it is not the financial architecture but the overall legal

system of the country which predicts access of private sector to external financing in any country.

On the other hand, various micro (firm) level studies find that financial architecture of the country does matter for various firm level decisions. For example, Antoniou et al. (2006) find that the debt maturity profile of the firm depends on the financial architecture of the country and firms operating in bank-oriented countries have longer debt maturities as compared to the firms in market-oriented countries. Moreover, firms in market-oriented countries consider the market conditions (market timing theory) while deciding about the maturity profile of their external financing. Similarly, Anderson and Gupta (2009) suggest that the market values of the firms operating in market-oriented countries are higher than similar (and comparable) firms in bank-oriented countries. It is also pertinent to mention that using recent macro data (2000-2011), Demirgüç-Kunt et al. (2013) also provide empirical evidence that as economies grow, the financial services provided by capital markets become relatively more important for economic growth, as compared to the services offered by the banking sector. In another related study, Gambacorta et al. (2014) confirm that when recessions and crisis occur simultaneously, the impact on GDP in bank-oriented countries is three times severe than in market-oriented countries. Didier et al. (2015) is a recent firm level study confirming that firms issuing bonds and equity grow faster in market-oriented countries as compared to similar issuing firms in bank-oriented economies.

We can infer from the above discussion that most of the micro based studies and even macro based studies using the recent (21st century) cross-country data suggest that market-oriented countries are better suited for overall financial development of the country and firms perform better in terms of overall growth and market values. One of the possible reasons can be increased capital flows across equity and bond markets in recent year around the globe and a surge in foreign bonds and equity issuances in recent times. Market-oriented countries have deep and liquid bond and equity markets whereas the banks are the main lenders in bank-oriented countries. In case of a shock to the supply of credit, firms operating in market-oriented countries have alternate sources of financing and therefore they should be able to offset a tightening in lending. On the other hand, firms are mainly dependent on banks for obtaining external finance

in bank-oriented countries, hence there should be a decrease in overall lending after tightening of credit conditions in bank-oriented countries.

Our main argument is that firms (especially higher growth) operating in market-oriented countries have greater availability of non-bank modes of financing and therefore these firms have greater opportunities to issue bonds on favourable terms, even during difficult times. Therefore, we expect that after the financial crisis, higher growth firms operating only in market-oriented countries should face lower spreads and higher intensive and extensive margins of bond financing.

3.2.4 Asian Bond Markets and Capital Structure

Asian Financial Crisis was a big financial shock for most Asian countries and financial and non-financial firms operating in those countries. Currency and maturity mismatch coupled with fire sales of assets and flight of foreign capital deteriorated the financial health of many Asian firms which resulted in a multi-country financial crisis (see Spiegel (2012) and Mizen and Tsoukas (2014)). After this crisis, many policy level initiatives were carried out in many Asian countries, to encourage the development of bond markets. Among many of these initiatives, Asian Bond Fund (ABF1) was launched in 2003 and further supplemented by introduction of ABF2 in 2004 (see Mizen and Tsoukas (2014) for details). Moreover, the Asian Bond Market Initiative (ABMI) was launched in 2003 and the Asian Bond Market Forum (ABMF) was established in 2010 (Mizen and Tsoukas (2010), (2014)) . These bond market initiatives provided credit guarantees and investment facilities for market participants in different Asian countries. These policy initiatives increased the demand for local currency bonds, improved the regulatory framework in the bond markets and enhanced the overall bond market infrastructure in the Asian countries. These initiatives considerably changed the landscape of the bond markets in Asian countries. Amount of local currency bonds outstanding in the Asian countries, rose almost 50 times from 1995 to 2003. The volume of the Asian bond markets stood at 8.6% of global bond markets in 2012. The average maturity of bonds in Asian countries increased over time and foreign currency bond financing stood at 7 times higher in 2013 as compared to 2003 (Chan et al. (2012) and Ryoo (2014)).

An important policy question is that whether the above mentioned bond initiative programs worked and improved the access of firms to bonds market for raising external finance. Mizen and Tsoukas (2014) report that ratio of bond market or capitalization increased from 7% in 1995 to 34% in 2011. Moreover, growth in domestic bonds outstanding in Asian countries, from 2000 to 2008 was 244.2%, whereas for all other markets included in Bank for International Settlements (BIS) was 104.5%, for the same period. Using probit and difference in difference analysis, these authors also provide statistical support that firms in treated group (China, Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore and Thailand) have higher probabilities of issuing bonds, as compared to the firms in control group (Taiwan did not participate in any of the above mentioned bond development programs and hence in control group). Similar growth patterns in Asian bond markets were also reported by Spiegel (2012), Ayala et al. (2017) and Bose et al. (2018). Infact, the volume of the domestic bonds issuance (as a % of GDP), increased from 42.8% in 2003 to 54.5% in 2008. Bose et al. (2018) find that firms experienced a decrease (increase) in their short (long) term debt after the implementation of Asian Bond Fund 2 but overall, ABF2 was successful in increasing the bonds issuance volume in Asian countries.

Introduction of policy initiatives like ABF1, ABF2 etc. also increased the depth of bond markets in Asian countries and firms had better options of obtaining external finance, especially through capital markets. Therefore, firms operating in Asian countries were better equipped to offset any shock to the bank lending, especially after the Global Financial Crisis 2007 (see Mizen and Tsoukas (2012) for details). Figure 3.3 below also corroborates this conjecture, as we can see that after the Global Financial Crisis 2007, the volume of domestic and foreign bonds outstanding in Asian countries increased. One of the possible reasons for this increase in the domestic and foreign bonds issued in Asian countries, after the financial crisis, is that bonds markets in Asian countries were already deep and well developed and provided firms with an alternate mode of financing, when banks were hit by a liquidity shock after financial crisis.

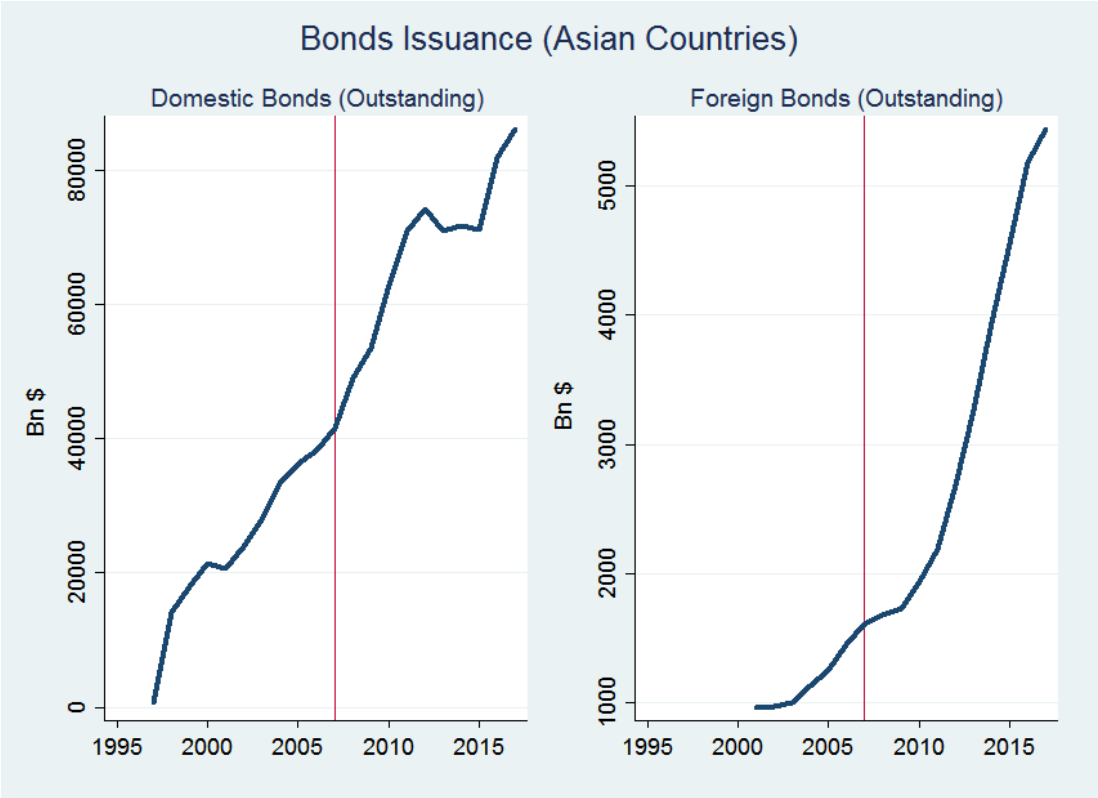

Figure 3.3: Domestic and Foreign Bonds Outstanding in Asian Countries.
Source: https://asianbondsonline.adb.org/data-portal/

As Asian bond markets underwent a major policy change before the Global Financial Crisis of 2007, therefore in our sample, we consider Asian countries as a treated group and non-Asian ones as the control group. Most Asian countries had deep and liquid bond markets before the onset of the financial crisis of 2007 and we expect that higher growth firms in Asian countries will have greater options of obtaining external financing from non-bank sources after the financial crisis of 2007. Therefore, we expect that hypothesis 1, 2 and 3 mentioned above will also hold for non-financial firms operating only in Asian countries. In other words, we expect Asian firms will have a lower cost of debt (bond spreads) and higher intensive and extensive margins of bond financing.

3.2.5 Economic Growth and Capital Structure

Economic theory suggests that services provided by the banks and the capital markets differ in their nature and effectiveness. For example, Rajan (1992), Holmstrom and Tirole (1993) and Allen and Gale (1997), (1999) argue that banks are better in monitoring borrowers and reducing the frictions between borrowers and lenders. Moreover, capital markets perform better in financing green field and highly risky

projects where collateral can be intangible. In line with these theoretical arguments, Beck and Levine (2004) provide empirical evidence that both the banks and capital markets spur economic growth and have an independent and positive impact on the growth of the country. Using aggregate stock market and banking sector data for 40 countries and using panel data techniques to control for potential endogeneity and omitted variable bias, these authors find that overall financial development (including bond and stock markets) spur economic growth. These authors support the earlier theoretical evidence that financial development has a positive and significant role for economic growth of the country. These evidences suggest that the impact of banks and markets on the economic development are not interlinked with the economic growth of the country. On the other hand, Allen and Gale (1995), (2000) and Song and Thakor (2010) argue that the importance of banks and capital markets evolve as countries become more developed i.e. capital markets and banks provide different, sometimes complimentary services, over the course of economic development. As economies progress more, the relative importance of the services provided by capital market increase in comparison to the banks. The comparative advantage of markets over banks become more important for R&D intensive and young firms which rely more on intangible assets and informal contracts for which capital markets are better suited. Similarly, Demirgüç-Kunt et al. (2013) is a very important paper which argue that as economies grow, the association between capital markets and economic activity increases and the correlation between bank development and economic activity decreases. These authors also emphasize that even though these results are not causal but still in line with a large body of theoretical literature.

Keeping in view the above discussion, we expect that hypothesis 1, 2 and 3 will hold only for firms operating in developed countries and not for developing countries. These developed economies have deep, liquid and well-functioning capital markets and therefore higher growth firms will have more opportunities for obtaining non-bank funding at favourable terms. This means that we expect higher growth firms after the crisis and operating only in developed countries to face lower cost of debt (bond spreads), to issue bonds with higher amounts (increase in intensive margins of bond financing) and to issue higher number of bonds (increase in extensive margins of bond financing)

3.3 Data Collection and Estimation Methodology

This section explains how we construct the dataset for this study. We combine the firm-level data with the firm bank linkages along with the information about bond transactions by non-financial firms in a novel way. We will highlight the uniqueness and strengths of our data and will also comment on any limitations.

3.3.1 Firm-Level Data

We download the firm level data using the similar methodology as described in section 2.4.1 above. The only difference is that we update the firm level and now our sample period ranges from 2004 to 2014. Firm-level controls variables include tangibility, profitability, solvency, current ratio, cash ratio and debt capacity of the firm. Table B.2 includes detailed definitions of all these variables and Table B.3 provides the summary statistics of all variables for the whole sample and for market-oriented and bank-oriented countries separately. We also include the correlation matrix of all independent variables (Table B.4) used in this study to show that none of our independent variables are highly correlated with others (highest correlation coefficient is 0.61, between natural log of bonds issued by firms and natural log of sales). We include standard firm and bank level control variables, in line with the literature of capital structure (see Rajan and Zingales (1995), de Jong et al. (2008) and Popov and Van Horen (2015)). Tobin's Q measures future growth opportunities of the firms which are recognized by the investors and we expect these firms to perform better than their peers. Following Claessens and Laeven (2003), we define Tobin's Q as the sum of the market value of equity plus the book value of total liabilities divided by total assets. We define a dummy variable "TQ_Dum" which is equal to one of Tobin's Q of the firm is above the median value (higher growth firms) and zero if it is lower than the median value (lower growth firms).

3.3.1.1 Dependent Variables

Our objective in this study is to investigate the impact of market risk of banks of the firm on various capital structure decisions of non-financial firms, which include the cost of debt (spread), intensive margins (amount of bond financing) and extensive margins (number of bonds issued). This essentially means that we will run separate regressions for investigating each capital structure decision mentioned above. Our first dependent variable "Cost of Debt (Spread)" is defined as the difference between the

coupon rate of the bond issued by the non-financial firms at time "t" and the central bank policy or discount rate at that time "t", for the country in whose currency the bond is issued. For example, if a Chinese firm issued a bond in Renminbi in 2012, then spread is the difference between the coupon rate of the bond and policy rate of Central Bank of China in 2012. On the other hand, if a Chinese firm issued a bond in USD in 2012, then spread is the difference between the coupon rate of the bond and policy rate of Central Bank of USA (Fed) in 2012. To investigate the increase in bond financing after the financial crisis, we construct another dependent variable called intensive margins. This is the natural log of the amount of each bond issued by the firm. Another approach used in the literature is to sum total amount of bonds issued by each firm in each year and divide it by total assets or total loans to define bond financing ratio (see Allayannis et al. (2003)). We do not use this ratio but instead take the natural log of the amount of each bond issued because firms issue bonds in different currencies and we cannot sum up the bond amounts issued in different currencies. Finally, to investigate the frequency of tapping the bond markets, our third dependent variable is called extensive margins which is the number of bonds issued by each firm in each year.

3.3.2 Matching Firm-Level Data with Banks

We use the similar methodology to download the bank level information and to construct firm-bank linkages, as described in section 2.4.2 above.

The definitions of all bank-level variables are in Table B.2, but we will discuss here our main variable of interest. The focus of this study is to investigate the impact of the market risk of the banks of the firms on various bond issuance decisions (capital structure) of non-financial firms. Our proxy for market risk of the banks of the firm is 5 Year CDS (Credit Default Swap) spread for all the banks of the firm, implied by the Bloomberg Issuer Default Risk model of Likelihood of Default. We call it "Avg_Bank_CDS". In case of multiple banks of any firm, we average CDS for all banks of the firm in each year. We measure Avg_Bank_CDS in percentage points and a higher average Avg_Bank_CDS means the higher market risk of the banks.

3.3.3 Bonds Issuance Data

As mentioned earlier, few earlier studies including Giannetti and Ongena (2012) and Kalemli-Ozcan et al. (2018) have constructed datasets containing firm-bank linkages. For example, Giannetti and Ongena (2012) and Kalemli-Ozcan et al. (2018) link firms with their banks using Orbis but they do not have any information about banks loans or bond issuances by the firms. Some other studies use bank loans and bonds transactions (see Altunbaş et al. (2010) and Becker and Ivashina (2014)) but these studies do not provide any information about the financial health of the banks (lenders) of the firms. We combine both these attributes (information about the banks and bonds transactions of non-financial firms) in our data, which makes our data unique as compared to other studies. We combine the data on firm-bank linkages with the transactional information about bonds issued by non-financial firms. We obtain bonds issuance data from Bloomberg. This data contains information about the names of the firms who issued a bond, the country of the firm, the currency of the bond, amount of the bond issued and most importantly the coupon rate of the bond. Again, in the absence of a unique identifier between firm-bank linkages data (from Osiris & Bankscope) and Bloomberg, we hand-match[15] the names of the companies between the two datasets and construct our final sample for this study. A snapshot of the final dataset is given in Table 3.1 below. Our final dataset contains 1,576 non-financial firms from 13 countries with a mix of bank-oriented and market-oriented economies. These firms had issued 7,980 bonds during the sample period from 2004 to 2014 and total firm-year observations are 16,426. We also drop all such bonds which have maturity for less than one year and trim all bond level variables below 1% and above 99%. Definitions of all bond level variables are in Table B.2. To control for all such firms who have ever issued a foreign bond during the entire sample period, we include a dummy variable which is equal to one if the firm has ever issued a foreign bond during the entire sample period.

[15] As described earlier, we again use Microsoft Excel add in "Fuzzy Look up" to match the names of the firms across firm-bank linkages data (from Osiris and Bankscope) and bonds issuance data from Bloomberg.

Table 3.1 : Sample Coverage

Country	No. of Firms	No. of Bonds Issued	No. of Obs.
Australia	42	88	324
Canada	96	400	858
China	89	323	796
Hong Kong	177	367	1,894
India	268	1,859	3,922
Japan	64	334	600
Malaysia	34	98	314
New Zealand	12	54	121
Singapore	61	208	653
South Africa	23	60	205
South Korea	630	3,910	6,021
Thailand	6	43	89
United Kingdom	74	236	629
Total	**1,576**	**7,980**	**16,426**

3.3.4 Bank-Oriented and Market-Oriented Countries

One of the objectives of this study is to investigate the impact of heterogenous financial architecture of the country on the security issuance behaviour of the firms operating in bank-oriented and market-oriented countries. We follow the exact methodology as described in section 2.4.4, to divide our overall sample into bank-oriented and market-oriented countries. Following the approach mentioned in section 2.4.4, we classify China, India, Japan, Malaysia, New Zealand, Thailand and United Kingdom as bank-oriented countries and Australia, Canada, Hong Kong, Singapore, South Africa and South Korea as market-oriented countries.

We also divide all countries in our sample as developing and developed countries. We use World Bank income classification as of 2014 to divide the countries into each group. If the income group of any country is “High Income OECD” or “High Income non-OECD”, we treat that country as developed and categorize all other countries as developing economies. We classify Australia, Canada, Hong Kong, Japan, New Zealand, Singapore, South Korea and United Kingdom as developed countries and categorize China, India, Malaysia, South Africa and Thailand as developing countries.

3.3.5 Descriptive Statistics

Table B.3 in Appendix B describes the statistics for the whole sample, for bank-oriented and market-oriented and for developing and developed countries. We can see that in the overall sample, average Tobin's Q of the firms is greater than one (1.26), which means that on average, market value (or replacement value) of the firms is greater than their book value. This implies that investors tend to recognize the future growth potential of the firms in our sample, which consists of 1,576 firms from 13 different countries. Moreover, firms on average hold higher fixed assets (66%). These firms do not enjoy high profit margins (2%) and are not very cash rich firms (10%). On the other hand, firms are generally more solvent (current ratio of 1.81) and have reasonable cash from operations to pay off their short term obligations (30% debt capacity).

We find visible differences between the firms operating in bank-oriented and market-oriented countries. Firms in market-oriented countries have lower average Tobin's Q than firms operating in bank-oriented countries. At a first glance, this seems counter intuitive but it is possible that stock markets in bank-oriented countries are over pricing the financial assets and higher arbitrage opportunities are available in equity markets of bank-oriented countries. Similarly, firms in market-oriented countries hold less tangible assets, are less profitable, are less solvent and have lower debt capacity than the firms in bank-oriented countries. But these firms in market-oriented countries hold marginally higher cash than the firms in bank-oriented countries and have marginal higher sales as well. These statistics are averages, therefore we only take them into account for a broader understanding of the data and do not draw any conclusions based on these averages.

Banks in our overall sample, have moderate equity as compared to their loans (average bank capital ratio is 13%) and their loan losses are 7% of their equity (loan loss provision ratio). Even though banks are not highly capitalized but their loan losses are still very low, which is a good sign for the banks. At the same time, their weighted average cost of capital is 6.05%, which is still very high, keeping in view zero lower bound interest rates in many advanced countries, after the financial crisis. One of the possible reasons for such a high weighted average cost, despite zero lower bound interest rates is given by Illes et al. (2015). Authors argue that despite the drop in the

policy rates by most central banks around the world, banks did not change their funding composition and higher rates on long term maturity loans also played their role. Moreover, even though the central bank policy rates decreased after the crisis, risk premia increased, which also increased the funding costs. We also observe from our sample that banks in market-oriented countries are less risky (lesser average CDS spread) as compared to banks in bank-oriented countries. Moreover, the banks in market-oriented countries hold more capital and lend more but have equal losses and profitability, as compared to banks in bank-oriented countries. Most importantly, weighted average cost of debt for banks in market-oriented countries is lower. Overall, these averages suggest that banks perform better in market-oriented countries.

We would also like to discuss here, some important statistics about our matched and unmatched sample. Total firm year observations after matching Osiris (firm level data) and Bankscope (bank level data) were 98,872 out of which we could only match 16,426 firm year observations with Bloomberg (bonds level data). Our final sample includes 1,576 firms with 16,426 firm year observations. We discuss here, some important statistics about our matched (16,426) and unmatched (82,446) sample. Our matched (unmatched) sample refers to bond issuers (non-issuers), therefore we will discuss them in context of issuers and non-issuers (refer to Table B.3 - Summary Statistics for Matched (Issuers) and Unmatched (Non-Issuers) Sample). Issuers have higher future growth opportunities (higher Tobin's Q) and these issuer firms are larger as compared to non-issuers firms (issuers have higher fixed assets and higher sales – proxy of size). Moreover, issuers hold higher cash than non-issuers and are more profitable than non-issuers as well. On the other hand, banks of the issuer firms are better capitalized (higher capital ratio). It is also interesting to note that the banks of issuer firms have lower weighted average cost of capital as compared to banks of non-issuers. Finally, banks of issuer firms are marginally riskier than banks of non-issuer firms (higher average CDS spread of banks of issuer firms).

Overall these statistics provide evidence that our sample which comprises only of issuer firms, consists of larger (in terms of assets and sales), cash rich and more profitable firms. These observations are in line with the existing literature which suggests that bond issuers are larger firms and hold more fixed assets (see Mizen et al. (2018)). As mentioned earlier in section 3.1, our sample consists of only issuer firms

and therefore, we do not generalize our results for all kinds of firms. Rather our results are suggestive only for those firms, which issue bonds. In terms of our sample being a representative sample, we would like to discuss two important aspects here. First of all, our sample contains a balanced mix of bank-oriented and market-oriented countries, which is the main focus of our study. Out of total 13 countries, 7 are bank-oriented and 6 are market-oriented. Similar, there are 5 developing and 8 developed countries. Therefore, our sample represents a balanced mix of countries across financial architecture and overall economic development of countries.

Secondly and most importantly, we perform t-tests for difference in means across issuers and non-issuers (with unequal variances) for our matched (issuers) and unmatched (non-issuer) samples. Out of the total 50,104 firms from Osiris, we could only match 14,178 firms with Bankscope and remaining 35,926 firms dropped out of our sample. The main objective of this testing is to investigate if financial fundamentals differ across issuers and non-issuers. We have already provided summary statistics for different variables above, but these statistics do not involve any formal testing. T-tests provide us some interesting insights about issuers and non-issuers. P-value of t-tests for difference in means across issuers and non-issuers, for total assets, cash and profits of firms and bank capital and weighted average cost of capital of banks is 0.00. This means that we can reject the null hypothesis that the difference in means of all these variables (total assets, cash and profits), for issuers and non-issuers, is zero and therefore issuers and non-issuers differ from each other in terms of their mean values for these variables. On the other hand, p-value of t-test for difference in means across issuers and non-issuers is 0.30 for Tobin's Q and 0.52 for average bank CDS spread. This means that we cannot reject the null hypothesis of equal means (difference being zero) and we infer that issuers and non-issuers have statistically equal means of Tobin's Q and average bank CDS spreads. This is very important for our study because our main variables of interest in this study are Tobin's Q of the firm (proxy of future growth opportunities) and average bank CDS spread (proxy of market risk of banks of the firm). After performing these t-tests, we believe that even though our sample consists of only issuer firms but these issuer firms have similar average Tobin's Q (of the firms) and average CDS spread of banks of the firms, as compared to non-issuer firms.

3.3.6 Estimation Methodology

Our data involves a triangular matching. Our first step is to download the firm level information from Osiris and the sample consisted of 50,104 non-financial firms. The next step is to match the "BANKER" information across Osiris and Bankscope. Out of 50,104 firms, we could only match 14,178 firms across these two databases. Among remaining 35,926 firms (which we could not match between Osiris and Bankscope), many firms issued bonds but were dropped out of our sample because Osiris did not report the "BANKER" information for these firms[16]. Therefore, due to the data limitations, we cannot control for the selection/issuance effects for these firms which drop out of our sample at the first step.

Under such circumstances where we cannot fully control for selection effects due to the data limitations (matching process as explained above), we decide to use OLS (instead of any variant of Heckman Selection Models) for all estimations in this study. We caution our readers that our results are indicative only for those firms which issue bonds and therefore our results should not be generalized for all kinds of firms. We use equations 3.1 & 3.2 to investigate the validity of our baseline results (see section 3.2.1 & 3.2.2 for a discussion about baseline results) and equation 3.2 for hypothesis 1, 2 & 3. For testing these main hypotheses, we estimate equation 3.2 separately for bank-oriented and then for market-oriented countries. Similarly, for investigating hypothesis 1, 2 & 3 for Asian and Developed countries (see section 3.2.4 and 3.2.5 respectively), we estimate equation 3.2 separately for Asian and Non-Asian countries and then for developed and developing countries.

We use following equations to estimate all results in this paper.

Equation 3.1:

$$\begin{aligned}\text{Spread}_{ijskt} = {} & B_0 + B_1\,\text{Tobin's\_Q}_{jskt} + B_2\,\text{Crisis\_Dum}_t + B_3\,\overline{\text{Avg\_Bank\_CDS}}_{jkt} + \\ & \mathbf{B_4}\,(\mathbf{Crisis\_Dum_t}\ \#\ \overline{\mathbf{Avg\_Bank\_CDS_{jkt}}}) + B_5\,\text{Bond\_Controls}_{ijskt} + \\ & B_6\,\text{Firm\_Controls}_{jskt-1} + B_7\,\overline{\text{Avg\_Bank\_Controls}}_{jkt-1} + \mu_{skt} + \gamma_j + \varepsilon_{ijskt} \qquad (1)\end{aligned}$$

[16] During matching process, we check and confirm that many firms among 35,926 firms (which could not be matched between Osiris and Bankscope) issued bonds.

Equation 3.2:

$$\text{Spread}_{ijskt} = B_0 + B_1\,\text{TQ\_Dum}_{jskt} + B_2\,\text{Crisis\_Dum}_t + B_3\,\overline{\text{Avg\_Bank\_CDS}}_{jkt} + B_4\,(\text{TQ\_Dum}_{jskt} \# \text{Crisis\_Dum}_t) + B_5\,(\text{TQ\_Dum}_{jskt} \# \overline{\text{Avg\_Bank\_CDS}}_{jkt}) + B_6\,(\text{Crisis\_Dum}_t \# \overline{\text{Avg\_Bank\_CDS}}_{jkt}) + \mathbf{B_7\,(TQ\_Dum_{jskt} \# Crisis\_Dum_t \# \overline{Avg\_Bank\_CDS}_{jkt})} + B_8\,\text{Bond\_Constrols}_{ijskt} + B_9\,\text{Firm\_Controls}_{jskt-1} + B_{10}\,\overline{\text{Avg\_Bank\_Controls}}_{jkt-1} + \mu_{skt} + \gamma_j + \varepsilon_{ijskt} \quad (2)$$

In both the above equations, a bond "i" is issued by a firm "j", which operates in sector "s", country "k" in time "t". In both the above equations, μ_{skt} are sector-country-year fixed effects, γ_j are firm fixed effects (only for robustness results) and ε_{ijskt} is the idiosyncratic error term. Equations 3.1 and 3.2 also contain bond level control variables ($\text{Bond\_Controls}_{ijskt}$), firm level control variables ($\text{Firm\_Controls}_{jskt-1}$) and average bank level control variables ($\overline{\text{Avg\_Bank\_Controls}}_{jkt-1}$). Definitions of all these variables are in Table B.2. From now onwards, $\overline{\text{Avg\_Bank\_Controls}}_{jkt-1}$ will be written without an upper bar and would mean that in case of multiple banks for any firm, the bank level information is averaged for each firm in each year. For all the regressions, we use robust standard errors. Both the above equations contain a dummy variable called "Crisis_Dum" which is equal to one if year is greater than 2008 and zero otherwise. This indicator variable is used to identify any differential behaviour of firms before and after the financial crisis. Another very important dummy variable is "TQ_Dum" which is equal to one if Tobin's Q of the firms is greater than median and zero otherwise (for hypothesis 1 and 2 i.e. cost of debt and intensive margins). Similarly, "TQ_Dum" is equal to 1 if Tobin's Q of the firms is greater than 75% and zero otherwise (for hypothesis 3 i.e. extensive margins).

Our main interest in equation 3.1 is the double interaction (Crisis_Dum * Avg_Bank_CDS) with coefficient B_4. This coefficient tells us the impact of an increase in the market risk of the banks of the firm; after the financial crisis (as compared to before the crisis), on the cost of debt (and intensive and extensive margins of bond financing subsequently) for an average firm. Therefore, this interaction is a typical difference in difference estimation about the differential impact of market risk on various bond financing (capital structure) decisions, before and after

the global financial crisis. Similarly, our main interest in equation 3.2 is the triple interaction (TQ_Dum * Crisis_Dum * Avg_Bank_CDS) with coefficient B_7. This triple interaction is akin to a triple difference in difference estimator. It tells us the impact of an increase in the market risk of the banks of the firms on the cost of debt (and intensive and extensive margins of bond financing subsequently) for higher growth firms after the financial crisis, as compared to lower growth firm before the crisis. These double and triple difference in difference estimations, along with high dimensional fixed effects (sector-country-year without or with firm fixed effects), isolate the effects of market risk of banks on various capital structure decisions of the firms.

For our baseline results, the dependent variable in equation 3.1 is the cost of debt (spread of bonds). In the next step, where we try to investigate the impact of the market risk of the banks on the intensive margins of bond financing, the dependent variable in equation 3.1 is the natural log of the amount of each bond issued by the firm (and keep right-hand side unchanged). Finally, for the analysis of extensive margins of bond financing, we keep the right-hand side of equation 3.1 unchanged and change the dependent variable to the number of bonds issued by each firm in each year. In a similar fashion, for investigating hypothesis 1, the dependent variable in equation 3.2 is the cost of debt (spread of bonds). For hypothesis 2, we keep the right-hand side of equation 3.2 unchanged and our dependent variable is the natural log of the amount of each bond, issued by the firm (intensive margins of bond financing). Finally, to investigate hypothesis 3, the dependent variable is number of bonds issued by each firm (extensive margins of bond financing) in each year and we do not change the right hand of equation 3.2.

All firms in our sample have a non-zero demand for credit because all firms in the sample are bond issuers. This makes it essential to control firm's demand for credit, without which the results can either be driven by a demand side effect or a supply side shock. We make sure that our empirical methodology (described below) carefully controls for firm's demand for credit and any productivity shocks to the firm's production as well (although both are unobservable). After controlling for the firm's demand for credit and any productivity shocks, we are confident that our results tell the story about the supply side effects of the credit (a shock to the supply of credit) on

capital structure of non-financial firms. Following Kalemli-Ozcan et al. (2018), we use sector-country-year fixed effects in all our regressions to control firm's demand for credit and any demand shocks to the productivity of the firms. These high dimensional sector-country-year fixed effects control for both time invariant (unobservable) and time variant (observable) heterogeneity across these narrowly defined sector-country-year pairs. This essentially means that these sector-country-year fixed effects not only control for any time varying (or time invariant) demand for credit by the firm (along with any aggregate demand shocks to the productivity of the firm) but also control for all time-varying macroeconomic movements along different countries as well. Therefore, we do not need to worry if the demand for credit is either time invariant or varying over time. Our main assumption using these high dimensional fixed effects is that firm's demand for credit and aggregate product demand fluctuates at these narrowly defined sector country and year levels instead of fluctuating at the firm level. Another advantage of these sector-country-year fixed effects is that they control for all time-variant macroeconomics factors for all 13 countries in our sample. After controlling for all the macroeconomic variables with these high dimensional fixed effects, we split our sample into bank-oriented and market-oriented countries (based on the financial architecture of the country) for testing the validity of all the main hypotheses in this study. This method provides us greater confidence that our results are only driven by supply side factors such as the financial architecture of the country of the firm (bank-oriented and market-oriented countries) and not by any other macroeconomic variables across these countries e.g. rule of law, corruption, creditor and/or shareholder protection etc. We use either US SIC 1-digit or 2-digit sector codes to construct sector-country-year fixed effects.

Readers may object that our analysis does not include firm fixed effects to control for any time-invariant unobserved heterogeneity across firms. As described earlier, sector-country-year fixed effects will not only control for time-invariant unobservable factors (e.g. demand for credit and any shock to the aggregate product demand of the firms) but also for any time-varying characteristics in these sector country year pairs, but only if our main assumption holds that a firm's demand for credit and productivity fluctuates due to these sector-country specific factors and not due to any firm-specific factors. Nevertheless, to alleviate any concerns of the readers, we perform robustness tests by estimating equations 3.1 and 3.2, with both sector-country-year and firm fixed

effects. In presence of firms fixed effects, the number of dummies exponentially increase and due to the unbalanced nature of our data, there are various single observations (single firms), for which the value of the firm fixed effects dummy is equal to 1 (single firm observations). This essentially means falling into "Singleton Dummy Problem". Due to this problem, the F-Statistics in all the regressions including firm fixed effects is missing. But the robust standard errors and variance-covariance matrix are still valid. Due to the problem of missing F-statistic, we remain cautious and leave the robustness results (with both kinds of fixed effects) to the appendices (Table B.5, B.6 & B.7). We are able to confirm that our results do not change quantitatively and qualitatively, if we use sector-country-year fixed effects along with firm fixed effects. It is also pertinent to mention that after using both high dimensional fixed effects, the sample size of Non-Asian countries is not sufficient enough to estimate equation 3.2, separately for Asian and Non-Asian countries. Therefore, our robustness results mentioned in Table B.5, B.6 & B.7 do not include results for Asian and Non-Asian countries. Finally, Table B.8 contains results for extensive margins of bond financing using the Poisson estimator. These results include sector, country and time fixed effects (separately and not combined) but does not include firm fixed effects.

Including demanding fixed effects to control for firm's demand for credit (e.g. firm cluster-time, industry-country-year or firm-time fixed effects) crucially depends on the frequency of variation in the data. For example, availability of only firm level data will constrain the researcher to use only industry, country and time fixed effects separately or a combination of industry-country-year (high dimensional) fixed effects. On the other hand, if researcher uses transactional level data which varies at quarterly or even monthly level, then it is possible to include all the above mentioned fixed effects along with firm-year fixed effects. For example, while investigating the impact of a shock to the supply of credit to the banks, on the firm's performance, Degryse et al. (2017) use time and firm fixed effects along with firm-time fixed effects. These authors use monthly credit register level data for Belgium from 2002 to 2012. Therefore, the variation in the data is at monthly level and it is possible to include firm-year fixed effects. These firm-year fixed effects will not only control for firm level, time-invariant unobservable characteristics (shocks e.g. firm's demand for credit and/or productivity shock to the firm) but will also control for all time variant characteristics of the firm

at yearly level (profits, sales, leverage, investment etc.). These firm-year fixed effects will also control for time varying firm's demand for credit.

On the other hand, Berton et al. (2018) investigate the impact of bank credit supply on the firm level employment, using monthly loan and employment data from the credit registers of Italy. As the variation of the data is at monthly level, therefore authors use different versions of demanding fixed effects, which include industry-quarter, province-quarter and firm_class_size-quarter fixed effects. All these fixed effects are an attempt to control for firm's demand for credit and any productivity shocks. The main assumption while using these fixed effects in Degryse et al. (2017) and Berton et al. (2018) and other relevant papers is to control for the unobservable characteristics including but not limited to firm's demand for credit and any productivity shocks as well. In this thesis, even though we use bond transaction level data but our main (independent) variables of interest are the double interaction (Crisis_Dum * Avg_Bank_CDS) in equation 1 and triple interaction (TQ_Dum * Crisis_Dum * Avg_Bank_CDS) in equation 2 above. These interactions vary at firm year level, therefore we cannot include firm-year fixed effects in equation 1 and 2. Including firm-year fixed effects will absorb everything varying at firm year level (including these interactions as well). We also do not include province-time fixed effects because our data is a cross-country data and we do not investigate the spatial distribution of our firms across provinces and/or cities.

Therefore, we argue that we include the most demanding fixed effects, keeping in view the yearly variation in our data, in equation 1 and 2 above i.e. sector-country-time fixed effects. As explained earlier, these high dimensional sector-country-year fixed effects will not only control for all unobservables characteristics across sectors, countries and time (firm's demand for credit and any productivity shocks as well) but will also control all time varying characteristics across sectors and countries and time. In our robustness tests, we also include firm fixed effects along with sector-country-time fixed effects. These firm fixed effects will control for all time-invariant unobservable factors at firm level, including but not limited to firm's demand for credit and productivity shocks, if firm's demand for credit and productivity shocks vary at firm level. Combination of firm fixed effects and sector-country-year fixed effects make

sure that we include the most demanding fixed effects, keeping in view the yearly variation in our data.

It is also pertinent to mention that it is essential to control for any interest rate pass through from the banks (lenders) to the firms (borrowers). This is very important because without controlling for the interest rate pass-through, our results can be driven by any change in the cost of funding of the banks and their ability to pass it on to the borrowers. We use the weighted average cost of capital (WACC) of the banks to control for interest rate pass through.

The following table summarizes our expectations (and outcomes) about the above interactions in relation to baseline results and main hypotheses in this paper.

Table 3.2 : Expectations and Actual Results

Dependent Variables	**Equation**	**Coefficient**	**Expectation**	**Actual Outcome Sector-Country-Year (Firm-Fixed)**
Baseline Results (Average Firms)				
Spread	3.1	B_4	+ve	+ve (+ve)
Intensive Margins	3.1	B_4	+ve	+ve (+ve)
Extensive Margins	3.1	B_4	+ve	insignificant (insignificant)
Baseline Results (Higher Growth Firms)				
Spread	3.2	B_7	-ve	-ve (-ve)
Intensive Margins	3.2	B_7	+ve	+ve (+ve)
Extensive Margins	3.2	B_7	+ve	+ve (insignificant)
Main Hypotheses (Bank-Oriented vs. Market-oriented Countries)				
Spread (Hypothesis 1)	3.2	B_7	-ve	-ve (-ve)
Intensive Margins (Hypothesis 2)	3.2	B_7	+ve	+ve (+ve)

Extensive Margins (Hypothesis 3)	3.2	B_7	+ve	+ve (+ve)
Main Hypotheses (Asian vs. Non-Asian Countries)				
Spread (Hypothesis 1)	3.2	B_7	-ve	-ve
Intensive Margins (Hypothesis 2)	3.2	B_7	+ve	+ve
Extensive Margins (Hypothesis 3)	3.2	B_7	+ve	+ve
Main Hypotheses (Developed vs. Developing Countries)				
Spread (Hypothesis 1)	3.2	B_7	-ve	-ve (-ve)
Intensive Margins (Hypothesis 2)	3.2	B_7	+ve	+ve (+ve)
Extensive Margins (Hypothesis 3)	3.2	B_7	+ve	+ve (+ve)

3.4 Main Empirical Results

In this section, we present our baseline results and main results for hypothesis 1, 2 & 3 (along with the results for Asian and Developed countries) as mentioned in the above table. Section 3.4.1 contains a discussion about our baseline and main results for cost of debt (hypothesis 1), section 3.4.2 presents the results about baseline and main results for intensive margins (hypothesis 2), section 3.4.3 discusses the baseline and main results for extensive margins (hypothesis 3) and section 3.4.4 contains the results about hypothesis 1, 2 & 3 in developed and developing countries and in Asian and Non-Asian countries. We call a coefficient as simply "significant" if it is significant at 1% or 5% and we call the coefficient "slightly significant" if it is significant at 10%.

3.4.1 Baseline and Main Results (Cost of Debt)

Our baseline results discuss the impact of market risk of the banks of the firms on the cost of debt (spread), amount of bond financing (intensive margins) and number of bonds issued (extensive margins) for an average firm (firms with average growth opportunities). In Table 3.3 below, we use equation 3.1 to estimate results in Column 1 and equation 3.2 for Column 2.

Table 3.3: Impact of Market Risk of Banks of the Firm on the Cost of Debt (for Higher Growth Firms after the Financial Crisis)

Dep Variable = Spread (Cost of Debt)	Col 1	Col 2
	All Firms	Higher & Lower Growth Firms
	All Sample	All Sample
Firm's Tobin's Q	-0.116**	
	[-2.01]	
TQ Dum		0.170
		[0.46]
TQ Dum # Crisis Dum		0.098
		[0.24]
Avg Bank CDS	-0.850**	-1.081†
	[-2.42]	[-3.10]
TQ Dum # Avg Bank CDS		0.234
		[1.13]
Crisis Dum # Avg Bank CDS	**1.115†**	1.460†
	[3.00]	[3.92]
TQ Dum # Crisis Dum # Avg Bank CDS		**-0.482****
		[-2.15]
TRANSACTION CONTROLS		
Bond Log Issue Amount	-0.154†	-0.149†
	[-5.18]	[-5.09]
Bond Maturity	0.073†	0.071†
	[6.97]	[6.71]
Foreign Bond	-0.103	-0.097
	[-0.55]	[-0.52]
Zero Bond	-2.053†	-2.051†
	[-18.20]	[-18.32]
FIRM LEVEL CONTROLS		
Firm's Tangibility	0.017	-0.019
	[0.05]	[-0.06]
Firm's Profit	-1.038**	-0.988*
	[-2.06]	[-1.96]
Firm's Current Ratio	-0.054	-0.053
	[-1.25]	[-1.22]
Firm's Cash	-0.818	-1.015
	[-1.22]	[-1.52]
BANK LEVEL CONTROLS		
Bank Avg Capital	0.765	0.988
	[0.63]	[0.81]
Bank Avg Loss Provision	1.783	1.817
	[1.25]	[1.27]

Bank Avg Profit	-2.203*	-1.873
	[-1.81]	[-1.54]
Bank Avg WACC	0.145†	0.147†
	[3.65]	[3.72]
Constant	4.592†	4.204†
	[6.32]	[5.89]
Observations	2,755	2,755
R-squared	0.63	0.64
Country FE	No	No
Sector FE	No	No
Year FE	No	No
Firm FE	No	No
Country-Sector-Year FE	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in all the above regressions is Spread which is the coupon rate of the bond issued minus the central bank policy or discount rate of the country in whose currency the bond is issued (in %age points). For the definition of all other variables, please see Table B.2. For the baseline results with both sector-country-year and firm fixed effects, please see Table B.5. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Results in Columns 1 and 2 are baseline results for the impact of an increase in the market risk of banks on the cost of debt (spread of bonds) of bonds before and after the financial crisis, for firms with average growth opportunities. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

As explained earlier the above baseline results contain a host of bond transaction, firm and bank level control variables. We control for the maturity of the bonds, foreign bonds and zero-coupon bonds. We also include standard firm-level capital structure control variables e.g. tangibility, profitability, solvency, financial coverage, cash and sales of the firms. Finally, bank-level controls include capital (equity), loan loss provision, profitability, loans to deposit ratio, interbank ratio, risk category, Value-at-risk and most importantly weighted average cost of capital (WACC), cost of equity (WACE) and cost of debt (WACD). We mainly focus our discussion on our main variables of interest (the double and triple interactions mentioned above) but few other results in Table 3.3 above calls for some discussion. Bank control variables include a mix of book value based variables (equity and profitability etc.) along with market value based variable i.e. WACC. It is interesting to note that in the presence of WACC, most of the book value (accounting) based variables are insignificant, other than just bank profitability, which is only slightly significant in column 1. This is not surprising because income statement and balance sheets of banks are marked to market much more frequently than non-financial firms and therefore market value based variables

dominate the accounting (book value) based variables. These findings are also in line with Balduzzi et al. (2017) who also report that the effects of CDS of banks on investment and employment are dominated as compared to accounting based balance sheet variables. It is also interesting to note that after an increase in WACC of the banks, firms also face an increase in the bond spreads (0.145% and 0.147% in column 1 & 2 respectively). This means that firms face an increased cost of debt in capital markets, if the banks of the firms have a higher cost of capital.

Bond transactions controls reveal some interesting results. These results suggest that when firms issue bonds with higher amounts or such firms which issue zero coupon bonds face lower bonds spreads. On the other hand, bonds with longer maturity have higher spreads mainly due to the higher maturity risk associated with bonds with longer maturities. We also find that almost all the firm level controls (tangibility, solvency and cash) are insignificant, except the profitability of the firm, which shows that firms with higher profits face reduced spreads. Almost all the results for bond, firm and bank controls remain same for all the regressions, therefore in all the subsequent discussions about these and other results, we only focus on our main variables of interest (double and triple interactions) and do not discuss these control variables separately for each set of results.

The coefficient of Avg_Bank_CDS is negative and significant (-0.850), which shows that before the financial crisis, firms did not face increased spreads even when market riskiness of their banks increased. Infact, we see that firms with average growth opportunities face lower spreads before the crisis. A possible explanation is that before the crisis, the market risk of the banks (measured by average 5 year CDS of all the banks of the firm) in our sample ranges from 0.06% to 3.14%. Whereas the same market riskiness of the bank after the crisis varies between 0.32% to 4.72%. This shows that the market risk of the banks of the firms is considerably lower before the crisis, therefore it did not force the bond spreads of the firms to increase.

Our main interest in our baseline regressions (column 1) is the coefficient of double interaction (Crisis_Dum # Avg_Bank_CDS). This coefficient is positive and significant (1.115) and shows that when the market risk of the banks of the firm (with average growth opportunism) increases after the financial crisis, these firms face

higher spreads. We attribute this increase in the bond spreads to the switching behaviour of the firms, from bank loans to bonds under such circumstances that the banks of these firms have a higher market risk. This increase in the riskiness of the banks causes these firms to face an increase in the cost of debt in capital markets as well. Our main interest in column 2, which is the triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS) is negative and significant (-0.482). This confirms our baselines results that with an increase in the market risk of the bank after the crisis, higher growth firms face lower spreads. These lower spreads are manifest of the fact that future growth opportunities of these firms are duly recognized by the investors and therefore these higher growth firms can obtain external financing with relatively lower spreads, even when the market risk of the banks of these higher growth firms is higher. It is interesting to observe that when market risk of the banks increases after the financial crisis, firms with lower growth opportunities face higher spreads while issuing bonds (positive and significant coefficient for double interaction Crisis_Dum # Avg_Bank_CDS in column 2 i.e. 1.460) but firms with higher future growth opportunities face relatively lower spreads after the crisis. These baseline results also lay the foundation for the main hypotheses of this study.

Column 1 and 2 in Table B.5 present our robustness results for our baseline results using OLS and both sector-country-year and firm fixed effects. Column 1 in Table B.5 presents robustness results for firms with average growth opportunities and Column 2 for firms with higher growth opportunities. A positive and significant coefficient (1.841) of double interaction (Crisis_Dum # Avg_Bank_CDS) in column 1 confirms our baseline results for firms with average growth opportunities, as presented in Table 3.3 above. Moreover, a negative and slightly significant coefficient (-0.870) on triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS) in column 2 also validates our baseline results for higher growth firms after the crisis, presented in Table 3.3 above.

Now we discuss the results for our first hypothesis which extends the baseline results presented in Table 3.3 above and asks a simple yet very important question. Do higher growth firms behave in a similar fashion with respect to the impact of market risk of the banks on the cost of bond financing, in different countries with heterogenous financial architectures? Our main proxy for financial architecture is classification of

the countries as bank-oriented and market-oriented. We are mainly interested to see any differential impact of the market risk of banks on the cost of debt of higher growth firms after the crisis in bank-oriented and market-oriented countries. We split our overall sample into bank-oriented and market-oriented countries and estimate equation 3.2 for each sample separately, with the results for bank-oriented countries in column 1 and market-oriented in column 2 respectively. We present the results for hypothesis 1 in Table 3.4 below.

Table 3.4: Impact of Market Risk of Banks of the Firm on the Cost of Debt (for Higher Growth Firms after the Financial Crisis in Bank-Oriented and Market-Oriented Countries)

Dep Variable = Spread (Cost of Debt)	**Col 1**	**Col 2**
	Higher & Lower Growth Firms	**Higher & Lower Growth Firms**
	Bank-Oriented Countries	**Market-Oriented Countries**
TQ Dum	0.151	-0.785
	[0.30]	[-1.31]
TQ Dum # Crisis Dum	0.107	1.205
	[0.14]	[1.62]
Avg Bank CDS	-1.976†	3.953
	[-3.27]	[1.30]
TQ Dum # Avg Bank CDS	0.389	1.292**
	[1.14]	[2.04]
Crisis Dum # Avg Bank CDS	2.473†	-4.589
	[3.92]	[-1.51]
TQ Dum # Crisis Dum # Avg Bank CDS	**-0.415**	**-1.707****
	[-1.04]	**[-2.34]**
TRANSACTION CONTROLS		
Bond Log Issue Amount	-0.115†	-0.159**
	[-3.12]	[-2.58]
Bond Maturity	0.096†	0.059**
	[7.65]	[2.49]
Foreign Bond	0.225	0.402
	[0.62]	[0.96]
Zero Bond	-1.919†	-1.275†
	[-9.48]	[-7.16]
FIRM LEVEL CONTROLS		
Firm's Tangibility	-0.224	0.076
	[-0.30]	[0.11]

Firm's Profit	-3.502†	-0.928
	[-3.04]	[-1.04]
Firm's Current Ratio	-0.040	-0.124
	[-0.51]	[-1.53]
Firm's Cash	-0.598	0.017
	[-0.38]	[0.01]
BANK LEVEL CONTROLS		
Bank Avg Capital	3.122	1.971
	[1.22]	[0.79]
Bank Avg Loss Provision	1.181	3.852
	[0.51]	[0.62]
Bank Avg Profit	1.768	-2.533
	[0.86]	[-0.78]
Bank Avg WACC	-0.032	0.136
	[-0.44]	[1.18]
Constant	3.916†	4.983†
	[3.30]	[3.02]
Observations	1,582	1,173
R-squared	0.79	0.78
Country FE	No	No
Sector FE	No	No
Year FE	No	No
Firm FE	No	No
Country-Sector-Year FE	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in all the above regressions is Spread which is the coupon rate of the bond issued minus the central bank policy or discount rate of the country in whose currency the bond is issued (in %age points). For the definition of all other variables, please see Table B.2. For the baseline results with both sector-country-year and firm fixed effects, please see Table B.5. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 and 2 are the main results for Hypothesis 1 i.e. impact of an increase in the market risk of banks of the firm on the cost of debt (spread of bonds), for higher growth firms after the financial crisis, as compared to lower growth firms before the crisis, Column 1 presents the results for bank-oriented countries and Column 2 for market-oriented countries. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Our main interest in Column 1 Table 3.4, above is the triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS). As discussed earlier, the coefficient of this triple interaction is the differential impact of the market risk of the banks on the cost of debt (spread of bonds) but for higher growth firms after the crisis as compared to lower growth firms before the crisis. This interaction provides evidence in support (or against) of hypothesis 1 mentioned above. A negative and insignificant coefficient in column 1 (-0.415 for bank-oriented countries) but a negative and significant coefficient

in column 2 (-1.707 for market-oriented countries) clearly provides evidence in support of hypothesis 1 that after an increase in the market risk of banks of the firms after the crisis, higher growth firms operating only in market-oriented countries (and not in bank-oriented countries) face a relatively lower spread. In column 2 of our baseline results in Table 3.3, we attributed the lower spreads of higher growth firms to the higher future growth opportunities of the firms, duly recognized by the investors. In Table 3.4 above, higher growth firms have lower spreads but only in market-oriented countries. These results confirm our main argument put forward in this study that firms operating in market-oriented countries have greater availability of non-bank modes of financing. Therefore, firms in these countries have greater opportunities to issue bonds on favourable terms, even during difficult times. Therefore, higher growth firms should perform relatively better in terms of the cost of debt as compared to lower growth firms because future growth opportunities of these higher growth firms are recognized by the investors and thus these firms enjoy a higher reputation and investor confidence among others. Therefore, the results presented in Table 3.4 above, support first hypothesis of this paper.

Table B.5 presents our robustness results for hypothesis 1 (column 3 & 4) using OLS and both sector-country-year and firm fixed effects. Column 3 presents the robustness results for bank-oriented countries and column 4 for market-oriented countries. A positive and non-significant coefficient (0.124) on the double interaction (Crisis_Dum # Avg_Bank_CDS) in column 3 and a negative and significant coefficient (-2.891) on the triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS) in column 4 confirms our results for hypothesis 1 presented in Table 3.4 above. These robustness results, similarly to the results mentioned in Table 3.4 above, provide support in favour of our first hypothesis that after an increase in the market risk of the banks after the crisis, higher growth firms face a lower cost of bond (spread) but only in market-oriented countries. This confirms the fact that the financial architecture of any country plays the most important role in capital structure decisions of non-financial firms.

Results in Table 3.3 & 3.4 and Table B.5 about the impact of the market risk of banks on the cost of debt confirm that these results are actually driven by market-oriented countries. In the overall sample (Table 3.3), we find support for the fact that higher growth firms after the crisis, face lower spreads. When we split our sample into bank-

oriented and market-oriented countries (Table 3.4), we can clearly see that the higher growth firms have reduced cost of debt but only in market-oriented countries, as we get insignificant results in bank-oriented countries. These empirical settings confirm that even in the overall sample, the results are driven by market-oriented countries and only a split between different types of countries (based on their heterogenous financial architecture) unfolds these findings. These results confirm the most important message of this paper as well, that financial architecture is one of the most important capital structure determinants of non-financial firms.

3.4.2 Baseline and Main Results (Intensive Margins)

In this section, we present baseline and main results for the intensive margins of bond financing i.e. the additional amount of external financing raised through bond issuances by firms that are already bond issuers. The main assumption for these set of results is that when market risk of the banks of the firms increases after the crisis, firms will have more incentives to raise greater external financing through bond issuances because an increase in the market risk of the banks is associated with a reduction in the bank credit (shock to the bank lending). We expect that all issuing firms, including higher growth firms, will issue larger amounts of bonds (baseline results for intensive margins) but higher growth firms after the crisis will be able to issue bonds with higher amounts (as compared to lower growth firms before the crisis) only in market-oriented countries (hypothesis 2). We present our baselines results for the intensive margins in Table 3.5 below. For the below-mentioned results, we replace the dependent variable in equation 3.1 and 2 as the natural log of the amount of each bond issued. We estimate equation 3.1 for obtaining results in Column 1 and equation 3.2 for Column 2 in Table 3.5 below, respectively.

Table 3.5: Impact of Market Risk of Banks on the Amount of Bond Financing of Non-Financial Firms - Intensive Margins (for Higher Growth Firms after the Financial Crisis)

Dep Variable = Intensive Margins	Col 1	Col 2
	All Firms	Higher & Lower Growth Firms
	All Sample	All Sample
Firm's Tobin's Q	-0.144†	
	[-3.18]	
TQ Dum		0.497*
		[1.70]
TQ Dum # Crisis Dum		-1.171†
		[-3.49]
Avg Bank CDS	-1.053†	-1.050†
	[-3.17]	[-3.09]
TQ Dum # Avg Bank CDS		-0.085
		[-0.48]
Crisis Dum # Avg Bank CDS	**0.885****	0.580*
	[2.58]	[1.66]
TQ Dum # Crisis Dum # Avg Bank CDS		**0.399****
		[2.07]
TRANSACTION CONTROL		
Bond Maturity	0.049†	0.050†
	[3.82]	[3.87]
Bond Spread	-0.043**	-0.054†
	[-2.23]	[-2.98]
Foreign Bond	-1.559†	-1.557†
	[-9.67]	[-10.21]
FIRM LEVEL CONTROLS		
Firm's Tangibility	2.439†	2.592†
	[8.29]	[9.44]
Firm's Profit	3.060†	2.553†
	[6.86]	[6.47]
Firm's Cash	2.785†	2.337†
	[5.05]	[4.58]
Firm's Current Ratio	-0.091†	
	[-2.98]	
Firm's Financial Cover	-0.007	
	[-0.15]	
BANK LEVEL CONTROLS		
Bank Avg Capital	3.079**	4.081†
	[2.11]	[2.83]
Bank Avg Loss Provision	-0.576	1.186
	[-0.47]	[1.01]
Bank Avg Profit	-2.484**	-1.421
	[-2.06]	[-1.23]

Bank Avg Loans to Deposits	-0.815†	-0.841†
	[-3.68]	[-3.92]
Bank Avg WACC	0.050	0.080
	[0.88]	[1.45]
Bank Avg Default Risk Premium	0.172**	0.219†
	[2.14]	[2.81]
Constant	18.273†	17.381†
	[17.73]	[17.39]
Observations	2,648	2,740
R-squared	0.74	0.73
Country FE	No	No
Sector FE	No	No
Year FE	No	No
Firm FE	No	No
Country-Sector-Year FE	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Note: Dep. variable is equal to Ln (Amount of Each Bond Issued). It's a log-linear model which should be read as if we change x by 1 (unit), we'd expect our y variable to change by 100*β1 percent. For the definition of all other variables, please see Table B.2. For the baseline results with both sector-country-year and firm fixed effects, please see Table B.6. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 and 2 are the baseline results for the impact of market risk of banks on the amount of bond financing (intensive margins), before and after the financial crisis, for firms with average growth opportunities. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Our main interest in Table 3.5 and column 1 above is the coefficient of the double interaction (Crisis_Dum # Avg_Bank_CDS). A positive and significant coefficient (0.885) on this double interaction in column 1 confirms that firms with average growth opportunities have higher intensive margins of bond financing after the financial crisis. This confirms the shift from bank lending to bond financing, after the global financial crisis, in many countries as shown by Shin (2014). An increase in the market risk of the banks is linked to a shock to the bank lending. Under such circumstances where there is a decrease in the bank lending, firms have more incentives to raise external financing from capital markets, especially bonds which is the focus of our paper.

Our main interest of interest in column 2 in Table 3.5 is the coefficient of triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS). A positive and significant coefficient (0.399) shows that despite an increase in the market risk of the banks, higher growth firms after the crisis, have higher intensive margins of bond financing. This supports our baseline results about the intensive margins of higher growth firms

after the crisis. Overall these results confirm the earlier findings in the literature as well about the shift in external financing from banks to capital markets.

Columns 1 and 2 in Table B.6 present the robustness results for intensive margins of bond financing containing both sector-country-year and year fixed effects. A positive and slightly significant coefficient of double interaction in column 1 (1.201) and a positive and again slightly significant coefficient of triple interaction in column 2 (0.438) confirms our baseline results presented in Table 3.5 above. In the presence of both sector-country-year and firm fixed effects, the coefficients of double and triple interactions (in column 1 and 2 of Table B.6 respectively) are positive and significant at only 10% whereas if we only include sector-country-year fixed effects, the double and triple interactions in column 1 and 2 of Table 3.5 above are positive and significant at 5%. Overall both these results support our baseline results about intensive margins of bond financing.

Now we present results in support of the second hypothesis of this paper which extends the baseline results about intensive margins of higher growth firms (discussed above) and investigates the role played by the financial architecture of the country on intensive margins of higher growth firms. As previously, we split our overall sample into bank-oriented and market-oriented countries and estimate equation separately for each set of countries, after replacing the dependent variable in equation 3.2 as the natural log of the amount of each bond issued (intensive margins). We present the results for hypothesis 1 in Table 3.6 below.

Table 3.6: Impact of Market Risk of Banks on the Amount of Bond Financing of Non-Financial Firms - Intensive Margins (for Higher Growth Firms after the Financial Crisis in Bank-Oriented and Market-Oriented Countries)

Dep Variable = Intensive Margins	Col 1	Col 2
	Higher & Lower Growth Firms	Higher & Lower Growth Firms
	Bank-Oriented	Market-Oriented
TQ Dum	-0.034	0.345
	[-0.08]	[0.49]
TQ Dum # Crisis Dum	0.472	-1.041
	[0.77]	[-1.27]
Avg Bank CDS	0.134	-1.249
	[0.18]	[-0.60]
TQ Dum # Avg Bank CDS	0.121	-1.115*
	[0.45]	[-1.94]
Crisis Dum # Avg Bank CDS	0.070	1.523
	[0.10]	[0.72]
TQ Dum # Crisis Dum # Avg Bank CDS	**-0.158**	**1.567****
	[-0.49]	**[2.36]**
TRANSACTION CONTROL		
Bond Maturity	0.040†	0.058
	[2.98]	[1.52]
Bond Spread	-0.045	-0.063*
	[-1.61]	[-1.68]
Foreign Bond	-1.942†	-1.254†
	[-8.80]	[-3.24]
FIRM LEVEL CONTROLS		
Firm's Tangibility	2.559†	1.887†
	[3.70]	[4.11]
Firm's Profit	0.264	3.876†
	[0.22]	[5.61]
Firm's Cash	5.022†	
	[4.19]	
Firm's Current Ratio	-0.104*	-0.035
	[-1.90]	[-0.59]
Firm's Financial Cover	-0.180	0.056
	[-1.53]	[0.66]
BANK LEVEL CONTROLS		
Avg Bank Capital	7.489†	-2.009
	[3.18]	[-0.70]
Avg Bank Loss Provision	1.730	-1.831
	[1.12]	[-0.58]
Avg Bank Profit	-3.511*	-4.799
	[-1.81]	[-1.56]
Avg Bank Loans to Deposits	-1.703*	-0.766*
	[-1.88]	[-1.68]

Avg Bank WACC	-0.138	0.168
	[-1.32]	[1.29]
Avg Bank Default Risk Premium	-0.014	0.173
	[-0.07]	[1.08]
Constant	19.655†	19.032†
	[9.81]	[8.79]
Observations	1,502	1,211
R-squared	0.75	0.88
Country FE	No	No
Sector FE	No	No
Year FE	No	No
Firm FE	No	No
Country-Sector-Year FE	Yes	Yes

Robust t-statistics in brackets
† p<0.01, ** p<0.05, * p<0.1

Note: Dep. variable is equal to Ln (Amount of Each Bond Issued). It's a log-linear model which should be read as if we change x by 1 (unit), we'd expect our y variable to change by 100*β1 percent. For the definition of all other variables, please see Table B.2. For the baseline results with both sector-country-year and firm fixed effects, please see Table B.6. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 and 2 are the main results for Hypothesis 2 i.e. impact of an increase of the market risk of banks of the firm on the amount of bond financing (intensive margins) of higher growth firms after the financial crisis, as compared to lower growth firms before the crisis, Column 1 presents the results for bank-oriented countries and Column 2 for market-oriented countries. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Our main interest in Table 3.6 above is coefficient of the triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS) in columns 1 and 2. This triple interaction investigates the impact of market risk of banks on the intensive margins of bond financing for higher growth firms after the financial crisis, operating in bank-oriented countries (column 1) and in market-oriented countries (column 2). After controlling for a host of bond transactions, firm and bank level controls and sector-country-year fixed effects and splitting our sample into the bank and market-oriented countries, these triple interactions try to investigate any differential behaviour of intensive margins of bond financing in countries with heterogeneous financial architecture. A negative and insignificant coefficient of triple interaction in column 1 (-0.158) and a positive and significant coefficient of triple interaction in column 2 (1.567) support our second hypothesis that even after an increase in the market risk of the banks, higher growth firms after the financial crisis have higher intensive margins but only in market-oriented countries. This implies that higher growth firms operating in market-oriented countries can raise more funds through bond financing, even though their banks are riskier after the financial crisis. We do not observe similar results in bank-

oriented countries and there is no evidence that intensive margins of higher growth firms increase after an increase in the market risk of their banks in bank-oriented countries.

Similarly, a negative and an insignificant coefficient (-0.164) and a positive and significant coefficient (3.967) in columns 3 and 4 respectively of Table B.6 provide additional support in favour of intensive margin results in Table 3.6 above. These results in Table B.6 are the robustness results for the second hypothesis and include both sector-country-year and firm fixed effects, along with all other control variables. Results from column 1 and 2 of Table 3.6 and column 3 and 4 of Table B.6 provide strong support in favour of hypothesis 2 mentioned above. This confirms the fact that financial architecture is one of the most important determinants of capital structure decisions (especially bond financing) of non-financial firms.

Results in Table 3.5 & 3.6 and Table B.6 about the impact of market risk of banks on intensive margins of bond financing suggest that these results are driven by firms in market-oriented countries. In our overall sample (Table 3.5), we find that higher growth firms increase their intensive margins after the crisis when the market risk of the banks of these firms is higher. On the contrary, when we split our sample into the bank and market-oriented countries in Table 3.6, we find that this phenomenon is only observable in market-oriented countries. Therefore, we infer that even in the overall sample, the results about the intensive margins are driven by the financial architecture of the countries i.e. whether the main country of the firm is bank-oriented or market-oriented. These results again provide support to the main theme of this paper, that financial architecture of any country is one of the most important determinants of capital structure of non-financial firms.

3.4.3 Baseline and Main Results (Extensive Margins)

In this section, we present baseline and main results for the extensive margins of the bonds financing. An increase in the market risk of the banks can provide incentives for the firms to switch to alternate modes of financing; namely bond financing which is the focus of this paper. Alongside an increase in the intensive margins of bonds after the financial crisis (as explained in the previous section), we also expect an increase in the extensive margins i.e. we expect that when the market risk of the banks of the

firms increases after the financial crisis, firms will issue higher number of bonds. An increase in the market risk of the banks is associated with a shock to the bank lending as the banks are riskier and may cut back on their overall lending. Baseline results include results about the impact of market risk of banks on the number of bonds issued by firms (per year), with average growth opportunities and higher growth firms, after the financial crisis. Main results provide empirical evidence in favour of the third hypothesis of this paper, which investigates any differential impact on the extensive margins of bond financing for higher growth firms in bank-oriented and market-oriented countries (impact of financial architecture on bond issuance decisions).

We present our baselines results for the extensive margins in Table 3.7 below. For the below mentioned results, we replace the dependent variable in equation 3.1 and 2 as the number of bonds issued by each firm in each year. We estimate equation 3.1 for obtaining results in Column 1 and equation 3.2 for Column 2 in Table 3.7 below, respectively.

Table 3.7: Impact of Market Risk of Banks on the Number of Bonds Issued by Non-Financial Firms - Extensive Margins (for Higher Growth Firms after the Financial Crisis)

Dep. Variable = Extensive Margins	Col 1	Col 2
	All Firms	Higher & Lower Growth Firms
	All Sample	All Sample
Firm's Tobin's Q	0.002	
	[0.01]	
TQ Dum		0.865
		[1.26]
TQ Dum # Crisis Dum		-1.945*
		[-1.87]
Avg Bank CDS	0.161	0.834
	[0.11]	[1.42]
TQ Dum # Avg Bank CDS		-0.432
		[-1.05]
Crisis Dum # Avg Bank CDS	**0.766**	-0.593
	[0.46]	[-0.90]
TQ Dum # Crisis Dum # Avg Bank CDS		**1.267***
		[1.78]
TRANSACTION LEVEL CONTROLS		
Foreign Bond	-0.983*	-0.856**
	[-1.66]	[-2.43]
FIRM LEVEL CONTROLS		
Firm's Tangibility	-0.090	-0.471
	[-0.08]	[-0.69]
Firm's Current Ratio		0.084
		[1.39]
Firm's Profit	3.328**	-0.283
	[2.36]	[-0.35]
Firm's Financial Cover	-0.228	-0.141
	[-1.32]	[-1.40]
Firm's Sales		0.441†
		[4.11]
Firm's Cash	2.695	
	[0.94]	
BANK LEVEL CONTROLS		
Bank Avg Capital	-3.728	1.347
	[-0.41]	[0.35]
Bank Avg Interbank Ratio	-0.248**	-0.177†
	[-2.46]	[-3.15]
Bank Avg Loans to Deposits	-0.024	0.373
	[-0.02]	[0.94]
Bank Avg Loss Provision	4.664	
	[0.82]	

Bank Avg WACC	0.363	0.142
	[1.19]	[1.09]
Bank Avg VAR	7.618	
	[0.89]	
Constant	-0.254	-9.109†
	[-0.09]	[-3.78]
Observations	757	1,216
R-squared	0.24	0.24
Country FE	No	No
Sector FE	No	No
Year FE	No	No
Firm FE	No	No
Country-Sector-Year FE	Yes	Yes

Robust t-statistics in brackets
† p<0.01, ** p<0.05, * p<0.1

Note: Dep. variable is a count variable equal to Number of Bonds Issued by each firm in each year. For the definition of all other variables, please see Table B.2. For the baseline results with both sector-country-year and firm fixed effects, please see Table B.7. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 and 2 are baseline results for the impact of market risk of banks on the number of bonds issued by each firm (extensive margins), before and after the financial crisis, for firms with average growth opportunities. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Columns 1 and 2 in Table 3.7 above present our baseline results for the impact of market risk of the banks on the extensive margins of bond financing (number of bonds issued by each firm in each year) for firms with average and higher growth opportunities, respectively. We expect that firms with average and higher growth will issue higher number of bonds when the market risk of the banks of these firms increases after the financial crisis. In the previous section, we have seen empirical evidence in favour of an increase in the intensive margins of bond financing. In Table 3.7 above, a positive but insignificant coefficient of double interaction (Crisis_Dum # Avg_Bank_CDS) in column 1 (0.766) and a positive but slightly significant coefficient of triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS) in column 2 (1.267) do not provide strong support in favour of our baselines results. These results indicate that we do not have strong empirical evidence in favour of our argument that average growth firms (column 1) and higher growth firms (column 2) issue higher number of bonds (an increase in the extensive margins), when market risk of the banks of these firms increases after the financial crisis. Similarly, when we look at baseline robustness results in Table B.7 (column 1 & 2), we again find that coefficients for average growth

firms in column 1 (1.868) and for higher growth firms in column 2 (0.240) are both positive yet insignificant, again confirming the above-mentioned results.

Combining these results with the baseline results from the previous section, we conclude that while average and higher growth firms increase their intensive margins of bond financing (as seen in the previous section) when their banks become riskier after the crisis, but these firms do not experience an increase in extensive margins (as seen here in this section). This implies that after the financial crisis and in our overall sample (including all countries), average and higher growth firms prefer to raise higher amounts of external financing using bonds, yet they do not issue higher number of bonds. This may also imply that they do not prefer tapping bond markets frequently, therefore, they issue fewer bonds with higher amounts instead of issuing higher number of bonds with smaller amounts. As we do not investigate this result directly in this paper, therefore we do not emphasize it any further.

The third hypothesis of this paper tries to investigate the proposition that when the market risk of the banks of the firms increases, higher growth firms after the financial crisis issue higher number of bonds but only when these higher growth firms are operating in market-oriented countries as opposed to bank-oriented countries. These results extend the baseline results about extensive margins of higher growth firms obtained in Table 3.7 above. In Table 3.8 below which presents the results for our third hypothesis, we split our overall sample into bank-oriented and market-oriented countries and estimate equation 3.2 separately for each set of countries, after replacing the dependent variable in equation 3.2 as the number of bonds issued by each firm in each year.

Table 3.8: Impact of Market Risk of banks on the Number of Bonds Issued by Non-Financial Firms - Extensive Margins (for Higher Growth Firms after the Financial Crisis in Bank-Oriented and Market-Oriented Countries)

Dep. Variable = Extensive Margins	Col 1	Col 2
	Higher & Lower Growth Firms	Higher & Lower Growth Firms
	Bank Oriented Countries	Market Oriented Countries
TQ Dum	1.032	0.390
	[0.94]	[1.06]
TQ Dum # Crisis Dum	-1.930	-0.703
	[-1.24]	[-1.43]
Avg Bank CDS	1.037	-0.932
	[1.52]	[-1.10]
TQ Dum # Avg Bank CDS	-0.382	-0.771**
	[-0.59]	[-2.14]
Crisis Dum # Avg Bank CDS	-0.881	1.156
	[-1.05]	[1.27]
TQ Dum # Crisis Dum # Avg Bank CDS	**0.981**	**0.927****
	[1.00]	**[2.18]**
TRANSACTION LEVEL CONTROLS		
Foreign Bond	-1.504**	-0.270**
	[-2.29]	[-1.97]
FIRM LEVEL CONTROLS		
Firm's Tangibility	-1.337	1.216†
	[-0.72]	[3.34]
Firm's Current Ratio	-0.101	-0.063*
	[-0.91]	[-1.78]
Firm's Profit	4.177	0.185
	[1.53]	[0.48]
Firm's Financial Cover	-0.181	-0.045
	[-1.03]	[-0.70]
Firm's Cash	2.095	0.903
	[0.68]	[1.52]
BANK LEVEL CONTROLS		
Bank Avg Capital	-10.665*	0.907
	[-1.67]	[0.45]
Bank Avg Loans to Deposits	0.083	0.197
	[0.14]	[0.69]
Bank Avg Loss Provision	-7.459	-6.637†
	[-1.38]	[-2.70]
Bank Avg Profit	-4.854	-5.469**
	[-0.72]	[-2.43]
Bank Avg WACC	0.175	0.065
	[0.85]	[0.93]
Bank Avg WACE	-0.062	0.036
	[-0.71]	[0.84]

Constant	4.712	0.596
	[1.58]	[0.54]
Observations	680	782
R-squared	0.16	0.35
Country FE	No	No
Sector FE	No	No
Year FE	No	No
Firm FE	No	No
Country-Sector-Year FE	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Note: Dep. variable is a count variable equal to Number of Bonds Issued by each firm in each year. For the definition of all other variables, please see Table B.2. For the baseline results with both sector-country-year and firm fixed effects, please see Table B.7. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 and 2 are the main results for Hypothesis 3 i.e. impact of an increase of the market risk of banks of the firm on the number of bonds issued by each firm in each year (extensive margins) of higher growth firms after the financial crisis, as compared to lower growth firms before the crisis, Column 1 presents the results for bank-oriented countries and Column 2 for market-oriented countries. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Our main interest in Table 3.8 above is the coefficient of triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS) in column 1 and 2 which presents results for bank-oriented and market-oriented countries respectively. The coefficient of this triple interaction provides support for the third hypothesis of this paper i.e. the impact of financial architecture on the extensive margins of bond financing. We find that coefficient of this triple interaction in column 1 is positive but insignificant (0.981), whereas the coefficient of triple interaction in column 2 is positive and significant (0.927). These results support the fact that when market risk of the banks of the firm increases after the crisis, higher growth firms after the crisis issue higher number of bonds (an increase in the extensive margins of bond financing) but only when these higher growth firms are operating in market-oriented countries. Our baseline results in Table 3.7 shows that higher growth firms do not experience an increase in the extensive margins of bond financing but column 2 in Table 3.8 above confirms that higher growth firms have higher extensive margins but only when they are operating in market-oriented countries. These results once again point out the importance of financial architecture for the capital structure decisions of non-financial firms, especially bond financing.

Coefficients of triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS) in column 3 and 4 in Table B.7 present the robustness results for extensive margins of bond financing, for bank-oriented and market-oriented countries respectively. A positive but insignificant coefficient in column 3 (0.819 – for bank-oriented countries) and positive and slightly significant in column 4 (6.886 – for market-oriented countries) moderately support our above mentioned results in Table 3.8, that higher growth firms only experience an increase in the extensive margins of bond financing, when they are operating in market-oriented countries. For extensive margins of bond financing, we also produce robustness results for our baseline and main results i.e. for our third hypothesis, using Poisson estimator instead of OLS. While using the Poisson estimator, we do not use sector-country-year and firm fixed effects but instead, we use sector, country and year fixed effects separately and do not include firm effects. These results are shown in Table B.8. Columns 1 and 2 in Table B.8 confirm our baseline results (reported in Table 3.7 above) and columns 3 & 4 in Table B.8 present results in support of the third hypothesis (reported in Table 3.8 above).

Baseline and main results for the third hypothesis mentioned above provide support to the fact that in the overall sample, firms with average and higher growth opportunities do not face an increase in the extensive margins of bond financing (i.e. they do not issue higher number of bonds), but higher growth firms after the crisis and only operating in market-oriented countries do experience an increase in extensive margins. Once again, these results confirm the fact that financial architecture is one of the most important determinants of capital structure for non-financial firms.

3.4.4 Asian Bonds Market, Economic Growth and Financial Crisis

We discussed in section 3.2.4 that after the Asian Financial Crisis in 1997, most of the Asian countries went through policy changes for deepening bond markets, increased transparency and restoring the confidence of the investors. Due to these financial developments, there was an increase in the bond issuance activity in many Asian countries. Mizen and Tsoukas (2012) find evidence that due to these bond development programs in Asian countries after the Asian Financial crisis, the probability of obtaining external financing from these bond markets increased after the Global Financial crisis in 2007. Therefore, we expect that higher growth firms after the financial crisis and only operating in Asian countries will perform better in terms

of cost of debt (bond spreads) and intensive and extensive margins of bond financing. In other words, we expect that hypothesis 1, 2 & 3 will only hold for firms operating in Asian countries and not for those firms which operate in non-Asian countries. We split our overall sample into Asian and Non-Asian countries and estimate equation 3.2 separately for each subsample, after changing the dependent variables according to the cost of debt and intensive and extensive margins of bonds.

Similarly, section 3.2.5 sheds light on the fact that relative importance of capital markets (as opposed to banking sector) is directly proportional to the economic growth of any country. Therefore, we observe that developed countries have deep, liquid and well-functioning credit markets. All firms, especially higher growth firms in these developed countries have greater options of obtaining alternate external financing (especially bonds), as compared to higher growth firms in developing countries. Therefore, we again expect hypothesis 1, 2 & 3 to only hold for firms operating in developed countries and not in developing countries. As described above, we split our overall sample into developed and developing countries and estimate equation 3.2 separately for each of the subsamples after changing the dependent variable accordingly.

These results should not be viewed as a contradiction to our main results where our main emphasis is on the financial architecture of the country in terms of its bank or market orientation. Whether we split countries into bank-oriented or market-oriented, or Asian or Non-Asian, or developing or developed countries, we are trying to create two distinct groups of countries where, in one group (market-oriented, Asian and Developed), the probability of obtaining external finance through bond financing is higher than the other group of countries (bank-oriented, Non-Asian and Developing).

Table 3.9 below presents results in support of our first hypothesis for Non-Asian, Asian, developing and developed countries. We split our overall sample into Non-Asian, Asian developing and developed countries and estimate equation 3.2, when our dependent variable is the cost of debt (spread of the bonds).

Table 3.9: Impact of Market Risk of Banks of the Firm on the Cost of Debt (for Higher Growth Firms after the Financial Crisis in Non-Asian, Asian, Developing and Developed Countries)

Dep Variable = Spread (Cost of Debt)	Col 1	Col 2	Col 3	Col 4
	Higher & Lower Growth Firms	Higher & Lower Growth Firms	Higher & Lower Growth Firms	Higher & Lower Growth Firms
	Non-Asian Countries	Asian Countries	Developing Countries	Developed Countries
TQ Dum	3.028	0.110	0.023	-0.260
	[1.56]	[0.28]	[0.03]	[-0.62]
TQ Dum # Crisis Dum	-3.748	0.085	-0.503	0.662
	[-1.58]	[0.19]	[-0.57]	[1.07]
Avg Bank CDS	-2.337	-0.978**	-2.835†	4.505
	[-1.36]	[-2.54]	[-3.28]	[1.55]
TQ Dum # Avg Bank CDS	-8.601	0.234	0.367	1.256*
	[-1.29]	[1.07]	[0.96]	[1.74]
Crisis Dum # Avg Bank CDS	1.805	1.303†	2.946†	-5.615**
	[0.91]	[3.18]	[3.41]	[-1.96]
TQ Dum # Crisis Dum # Avg Bank CDS	**9.448**	**-0.468****	**-0.141**	**-1.633****
	[1.38]	**[-1.99]**	**[-0.32]**	**[-1.99]**
TRANSACTION CONTROLS				
Bond Log Issue Amount	0.012	-0.144†	-0.132†	-0.125**
	[0.09]	[-4.77]	[-3.24]	[-2.17]
Bond Maturity	0.083†	0.063†	0.105†	0.066†
	[3.19]	[5.38]	[6.63]	[3.87]
Foreign Bond	-0.631	0.044	0.504	0.298
	[-1.55]	[0.21]	[1.36]	[0.71]
Zero Bond	-3.466**	-2.051†	-2.161†	-1.071†
	[-2.01]	[-18.28]	[-9.94]	[-6.40]
FIRM LEVEL CONTROLS				
Firm's Tangibility	-1.595	0.047	-0.394	0.092
	[-0.70]	[0.14]	[-0.50]	[0.13]
Firm's Profit	-1.396	-1.167**	-3.832†	-1.225
	[-0.52]	[-2.21]	[-3.25]	[-1.30]
Firm's Current Ratio	0.083	-0.064	-0.040	-0.145*
	[0.58]	[-1.46]	[-0.49]	[-1.77]
Firm's Cash	0.130	-0.935	-0.609	0.035
	[0.03]	[-1.39]	[-0.35]	[0.03]
BANK LEVEL CONTROLS				
Bank Avg Capital	8.440	2.751*	2.635	7.653*
	[0.95]	[1.82]	[0.68]	[1.74]
Bank Avg Loss Provision	8.302	0.565	0.459	6.510
	[1.31]	[0.37]	[0.16]	[1.25]

Bank Avg Profit	0.016	-2.391*	2.481	0.047
	[0.00]	[-1.68]	[0.93]	[0.01]
Bank Avg Loans to Deposits	3.825**	0.515	0.163	0.314
	[2.24]	[1.62]	[0.11]	[0.51]
Bank Avg WACC	0.463†	0.165†	-0.012	0.345*
	[2.74]	[2.89]	[-0.09]	[1.77]
Bank Avg Default Risk Premium			0.394	0.291
			[1.50]	[1.38]
Constant	-3.186	3.389†	2.028	-0.281
	[-0.88]	[3.57]	[0.59]	[-0.08]
Observations	275	2,457	1,379	1,342
R-squared	0.84	0.59	0.78	0.80
Country FE	No	No	No	No
Sector FE	No	No	No	No
Year FE	No	No	No	No
Firm FE	No	No	No	No
Country-Sector-Year FE	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in all the above regressions is Spread which is the coupon rate of the bond issued minus the central bank policy or discount rate of the country in whose currency the bond is issued (in %age points). For the definition of all other variables, please see Table B.2. For the baseline results with both sector-country-year and firm fixed effects, please see Table B.5. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 to 4 are the main results for Hypothesis 1 i.e. impact of an increase of the market risk of banks of the firm on the cost of debt (bond spreads) of higher growth firms after the financial crisis, as compared to lower growth firms before the crisis, Column 1 presents the results for Non-Asian countries, Column 2 for Asian, Column 3 for Developing and Column 4 present results for Developed countries. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Our main interest in Table 3.9 above is the coefficient of triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS) in all the columns. The interpretation of the coefficient of this triple interaction is exactly similar as in Table 3.4, above. We find that this coefficient is insignificant for Non-Asian (9.448 in column 1) and developing countries (-0.141 in column 3) which means that we do not have any evidence that an increase in the market risk of the banks have an impact on the cost of debt of higher growth firms, after the financial crisis and operating in Non-Asian and developing countries. On the other hand, this coefficient is negative and significant for firms operating Asian countries (-0.468 in column 2) and negative and significant for firms operating in developed countries (-1.633 in column 4). Similarly, robustness results in column 5 & 6 of Table B.5 also show that the coefficient of triple interaction is positive but insignificant (0.368) for developing countries in column 5 but it is negative and

significant (-2.540) for developed countries in column 6. These results (including robustness) suggest that we have a strong evidence that after an increase in the market risk of the banks, higher growth firms after the crisis and operating in Asian countries and developed countries, have lower spreads. Therefore, we conclude that we have strong empirical support that hypothesis 1 holds in Asian countries and in developed countries as well.

Table 3.10 below shows the results in support of our second hypothesis (intensive margins) for Non-Asian, Asian, developing and developed countries. We split our overall sample into Non-Asian, Asian developing and developed countries and estimate equation 3.2, when our dependent variable is the natural log of the amount of the bond issued (intensive margins).

Table 3.10: Impact of Market Risk of Banks on the Amount of Bond Financing of Non-Financial Firms - Intensive Margins (for Higher Growth Firms after the Financial Crisis in Non-Asian, Asian, Developing and Developed Countries)

Dep Variable = Intensive Margins	**Col 1**	**Col 2**	**Col 3**	**Col 4**
	Higher & Lower Growth Firms	**Higher & Lower Growth Firms**	**Higher & Lower Growth Firms**	**Higher & Lower Growth Firms**
	Non-Asian Countries	**Asian Countries**	**Developing Countries**	**Developed Countries**
TQ Dum	1.358	0.516*	0.322	-0.012
	[0.69]	[1.78]	[0.62]	[-0.02]
TQ Dum # Crisis Dum	-2.516	-1.177†	0.128	-0.788
	[-1.15]	[-3.52]	[0.18]	[-1.08]
Avg Bank CDS	4.379	-1.201†	0.203	-0.398
	[0.97]	[-3.40]	[0.27]	[-0.18]
TQ Dum # Avg Bank CDS	-8.796	-0.089	-0.037	-0.792
	[-1.23]	[-0.51]	[-0.12]	[-1.44]
Crisis Dum # Avg Bank CDS	-5.425	0.728**	-0.313	0.373
	[-1.24]	[2.02]	[-0.43]	[0.17]
TQ Dum # Crisis Dum # Avg Bank CDS	**9.650**	**0.397****	**0.005**	**1.345****
	[1.35]	**[2.09]**	**[0.01]**	**[2.09]**
TRANSACTION CONTROL				
Bond Maturity	0.014	0.063†	0.054†	0.044*
	[0.85]	[3.87]	[3.17]	[1.68]
Bond_Spread	-0.019	-0.055†	-0.049*	-0.063
	[-0.28]	[-3.03]	[-1.74]	[-1.62]
Foreign Bond	0.420	-1.846†	-2.080†	-1.124†
	[1.06]	[-11.59]	[-9.34]	[-2.97]

FIRM LEVEL CONTROLS				
Firm's Tangibility	3.651	2.489†	1.105**	1.919†
	[1.58]	[9.22]	[2.15]	[4.10]
Firm's Profit	5.713†	2.302†	0.278	3.855†
	[3.44]	[5.86]	[0.25]	[5.55]
Firm's Cash	1.085	2.238†		
	[0.25]	[4.43]		
Firm's Current Ratio			-0.016	-0.026
			[-0.36]	[-0.44]
Firm's Financial Cover			-0.102	0.054
			[-1.07]	[0.65]
BANK LEVEL CONTROLS				
Bank Avg Capital	6.602	4.503†	9.990†	-2.340
	[1.33]	[2.91]	[3.79]	[-0.83]
Bank Avg Loss Provision	-1.816	1.259	0.113	2.451
	[-0.40]	[1.07]	[0.06]	[0.73]
Bank Avg Profit	-1.563	-1.060	-6.877†	-2.081
	[-0.42]	[-0.88]	[-3.94]	[-0.62]
Bank Avg Loans to Deposits	0.632	-0.996†	-1.344	-1.166**
	[0.57]	[-4.49]	[-1.34]	[-2.45]
Bank Avg WACC	0.230*	0.049	0.029	0.156
	[1.66]	[0.83]	[0.35]	[1.09]
Bank Avg Default Risk Premium	-0.018	0.273†	0.285	0.221
	[-0.10]	[3.26]	[1.35]	[1.31]
Bank Avg Risk Premium			-0.053	-0.047
			[-1.17]	[-0.60]
Constant	13.795†	17.476†	17.829†	19.326†
	[4.29]	[16.21]	[8.50]	[9.10]
Observations	270	2,470	1,329	1,351
R-squared	0.74	0.73	0.68	0.88
Country FE	No	No	No	No
Sector FE	No	No	No	No
Year FE	No	No	No	No
Firm FE	No	No	No	No
Country-Sector-Year FE	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Note: Dep. variable is equal to Ln (Amount of Each Bond Issued). It's a log-linear model which should be read as if we change x by 1 (unit), we'd expect our y variable to change by 100*β1 percent. For the definition of all other variables, please see Table B.2. For the baseline results with both sector-country-year and firm fixed effects, please see Table B.5. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 to 4 are the main results for Hypothesis 2 i.e. impact of an increase of the market risk of banks of the firm on the amount of bond financing (intensive margins), of higher growth firms after the financial crisis, as compared to lower growth firms before the crisis, Column 1 presents the results for Non-Asian countries, Column 2 for Asian, Column 3 for Developing and Column 4 present results for Developed countries. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Our main interest in Table 3.10 above is again the coefficient of triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS) in all the columns. The interpretation of the coefficient of this triple is exactly similar as in Table 3.6 above. The coefficient of this triple interaction is insignificant for Non-Asian countries in column 1 (9.650) and also for developing countries in column 3 (0.005). This shows that the evidence does not support the fact that an increase in the market risk of the banks increases the intensive margins of bonds financing for higher growth firms after the crisis and operating in Non-Asian and developing countries. On the other hand, we find that the coefficient of the same triple interaction is positive and significant for Asian countries in column 2 (0.397) and positive and slightly significant for developed countries in column 4 (1.345). Robustness results in column 5 & 6 of Table B.6 also show that the coefficient of the triple interaction is not significant for developing countries in column 5 (-0.200) and positive and significant in column 6 for developed countries (3.496). Combining the results obtained in Table 3.10 above along with those in Table B.6, we find strong support of the validity of hypothesis 2 only in Asian and developed countries.

Table 3.11 below shows the results in support of our third hypothesis (extensive margins) for Non-Asian, Asian, developing and developed countries. We split our overall sample into Non-Asian, Asian developing and developed countries and estimate equation 3.2, when our dependent variable is the number of bonds issued by each firm in each year (extensive margins).

Table 3.11: Impact of Market Risk of Banks on the Number of Bonds Issued by Non-Financial Firms - Extensive Margins (for Higher Growth Firms after the Financial Crisis in Non-Asian, Asian, Developing and Developed Countries)

Dep. Variable = Extensive Margins	Col 1	Col 2	Col 3	Col 4
	Higher & Lower Growth Firms	Higher & Lower Growth Firms	Higher & Lower Growth Firms	Higher & Lower Growth Firms
	Non-Asian Countries	Asian Countries	Developing Countries	Developed Countries
TQ Dum	0.841	0.786	1.225	0.306
	[0.72]	[0.97]	[1.02]	[0.94]
TQ Dum # Crisis Dum	-0.001	-1.459	-2.260	-0.656
	[-0.00]	[-1.53]	[-1.30]	[-1.45]
Avg Bank CDS	-0.882	0.697	0.808	0.221
	[-0.42]	[1.46]	[1.05]	[0.40]
TQ Dum # Avg Bank CDS	-0.640	-0.427	-0.547	-0.664*
	[-0.23]	[-0.96]	[-0.77]	[-1.87]
Crisis Dum # Avg Bank CDS	1.100	-0.615	-0.754	-0.163
	[0.51]	[-1.08]	[-0.85]	[-0.28]
TQ Dum # Crisis Dum # Avg Bank CDS	**0.100**	**1.076***	**1.195**	**0.828****
	[0.04]	**[1.67]**	**[1.14]**	**[1.99]**
TRANSACTION LEVEL CONTROLS				
Foreign Bond	0.373	-1.114†	-1.601**	-0.147
	[1.15]	[-3.14]	[-2.27]	[-1.22]
FIRM LEVEL CONTROLS				
Firm's Tangibility	3.516†	0.110	-1.515	1.242†
	[2.72]	[0.17]	[-0.80]	[3.43]
Firm's Current Ratio	0.107	0.078	-0.102	
	[0.69]	[1.60]	[-0.89]	
Firm's Profit	0.949	-1.136*	4.339	
	[0.64]	[-1.96]	[1.55]	
Firm's Financial Cover	-0.234	-0.152**	-0.204	-0.028
	[-1.62]	[-1.98]	[-1.12]	[-0.56]
Firm's Sales	0.149*	0.432†		
	[1.79]	[5.07]		
Firm's Cash	3.512	1.033	2.223	0.378
	[1.12]	[0.76]	[0.68]	[0.75]
BANK LEVEL CONTROLS				
Bank Avg Capital	-0.452	-2.408	-12.502	1.017
	[-0.13]	[-1.00]	[-1.54]	[0.77]
Bank Avg Loans to Deposits	-0.121	0.205	0.102	
	[-0.17]	[0.65]	[0.16]	
Bank Avg Loss Provision			-7.918	-4.674**
			[-1.45]	[-2.45]
Bank Avg Profit			-6.052	-4.010**
			[-0.77]	[-2.29]

Bank Avg WACC	-0.036	0.174	0.251	0.027
	[-0.42]	[1.53]	[1.06]	[0.57]
Constant	-4.608	-9.488†	4.139	1.145**
	[-1.65]	[-4.22]	[1.63]	[2.16]
Observations	231	1,311	567	935
R-squared	0.80	0.22	0.15	0.36
Country FE	No	No	No	No
Sector FE	No	No	No	No
Year FE	No	No	No	No
Firm FE	No	No	No	No
Country-Sector-Year FE	Yes	Yes	Yes	Yes
Robust t-statistics in brackets				
† p<0.01, ** p<0.05, * p<0.1				

Note: Dep. variable is a count variable equal to Number of Bonds Issued by each firm in each year. For the definition of all other variables, please see Table B.2. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 to 4 are the main results for Hypothesis 3 i.e. impact of an increase of the market risk of banks on the number of bonds issued by firms (extensive margins), of higher growth firms after the financial crisis, as compared to lower growth firms before the crisis, Column 1 presents the results for Non-Asian countries, Column 2 for Asian, Column 3 for Developing and Column 4 present results for Developed countries. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

As in case of previous results, our main interest in Table 3.11 above is the coefficient of triple interaction (TQ_Dum # Crisis_Dum # Avg_Bank_CDS) in all the columns and the interpretation of this coefficient is similar as in Table 3.8 above. In Table 3.11 above, we again find that coefficient of this triple interaction is insignificant both for Non-Asian countries in column 1 (0.100) and for developing countries in column 3 (1.195). On the contrary, the coefficient of triple interaction for Asian countries is positive and slightly significant in column 2 (1.076) and positive and significant for developed countries in column 4 (0.828). For the robustness results of extensive margins in Table B.7, we find that the coefficient of triple interaction for developing countries in column 5 is positive but insignificant (1.144) but is positive and slightly significant for developed countries in column 6 (5.738). Overall these results provide moderate support for the third hypothesis in Asian countries but strong support in developed countries.

3.5 Conclusion

This paper provides strong empirical evidence that financial architecture of the country is one of the most important determinants of bonds issuance (capital structure) decisions of non-financial firms. Our results hold after controlling for the financial health of lenders (banks), borrowers (firms), demand for credit by the firm and any

productivity shocks. Our estimation methodology also ensures that our results are driven solely by the financial architecture of the country instead of any other macroeconomic variable e.g. rule of law, corruption or investor confidence etc.

For this purpose of this study, we construct a novel dataset containing firm-bank linkages along with the information on bond transactions by non-financial firms. Rich information about borrowers (transactional and firm-level information about non-financial firms) and lenders (bank-level information for all banks of the firm) enable us to investigate supply-side effects of the financial architecture of the country of the firm on various important capital structure decisions. Our main proxy for the financial architecture is whether the main country of the firm is bank-oriented or a market-oriented country. These empirical settings allow us to investigate the channels through which higher growth firms after the financial crisis perform better (along various dimensions of bond financing decisions) in market-oriented, Asian and developed countries.

The central finding of this study is that the financial architecture of any country is one of the most important determinants of capital structure. An increase in the market riskiness of the banks of the firm can have a heterogeneous impact on higher growth firms after the financial crisis depending on the financial orientation of the country. An increase in the market risk of the banks is a shock to the financial health of the banks and therefore they may reduce the credit supply to the firms or make marginal credit more expensive. Therefore, we interpret our results in this paper through the substitution channel of credit i.e. what happens when firms located in countries with heterogeneous financial architecture issue bonds and the banks of these firms have a high market risk.

We find strong support that when market risk of the banks increases after the global financial crisis, firms with average (higher) growth opportunities face higher (lower) cost of debt (bond spreads) and face an increase in the intensive margins of bond financing but not in extensive margins. Most importantly, we find that higher growth firms operating in market-oriented countries (and not in bank-oriented countries) after the financial crisis, as compared to lower growth firms before the crisis, face a relatively lower cost of debt (bond spreads). These higher growth firms in market-

oriented countries also issue bonds with higher amounts (higher intensive margins) and also issue higher number of bonds (higher extensive margins).

We also find similar results about higher growth firms operating in developed (and in not developing) and in Asian (and not in Non-Asian) countries. We characterize market-oriented, Asian and developed countries with deep, liquid and well-functioning credit markets (especially bond markets) and higher growth firms in these countries have greater options of obtaining external finance from these capital markets. We also observe that when the market risk of the banks of the firms is higher, any substitution to the bond financing comes at a higher cost only for firms with average growth opportunities. Firms with higher future growth still have lower cost of debt. These higher growth firms have a competitive advantage over their peers because their future growth opportunities are recognized by the investors and they have a higher probability of obtaining external funding at favorable terms. Our results hold after controlling for firm's demand for credit and any shock to the firm's productivity as well, which is essential so that we are confident that we observe supply side effects which are the focus of this paper.

Appendix B:

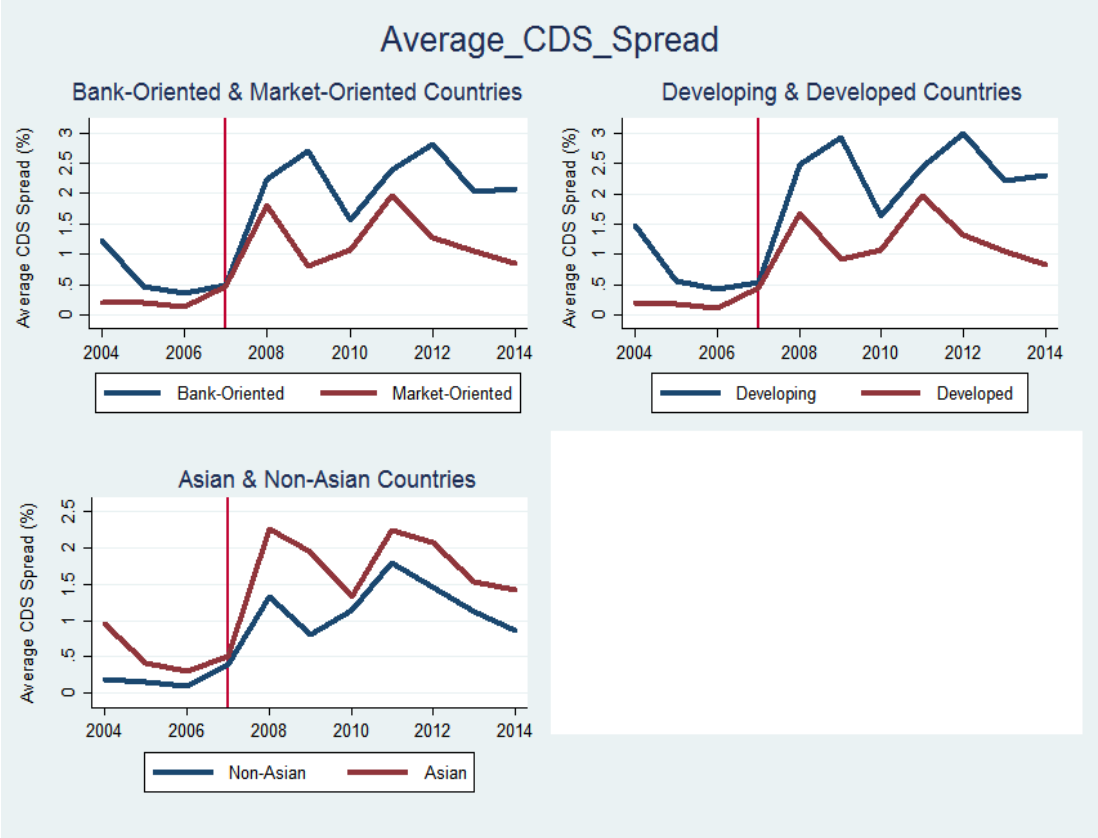

Figure 3.4: Average VaR across Bank-Oriented & Market-Oriented, Developing & Developed and Asian & Non-Asian Countries.
Source: CDS Spread from Bloomberg and Authors Own Calculations

Figure 3.4 above shows the average CDS spread across different groups of economies employed in this study. We can see that the pattern of average CDS spread across all three different groups of economies (bank-oriented and market-oriented, developing and developed and asian and non-asian countries) is almost similar. CDS spread increases after the financial crisis and fluctuates until 2012, after which it starts decreasing once again. As explained in Chapter 2, we can attribute this rise in CDS spread to the Global Financial Crisis. Liquidity crunch in interbank market and consumer and corporate defaults made financial institutions riskier. To counter the effects of Global Financial crisis, Bank of International Settlement introduced BASEL III in Nov 2010. BASEL III emphasized over efficient risk management and timely supervision activities, including stress testing. As a result of these policy initiatives, average CDS spread across all economies starts declining after 2012. We can also see from the above figure that average CDS spread is higher in bank-oriented as compared to market oriented countries. Banks are the main lenders in bank-oriented countries

and it seems that after the financial crisis, banks in these bank-oriented countries became riskier, as compared to banks in market-oriented countries. Similarly, banks in developing countries had higher CDS spreads after the financial crisis, as compared to banks in developed countries. We may attribute this effect to better risk managements techniques adopted by banks in market-oriented and developed countries as compared to the banks in bank-oriented and developing countries. Finally, we observe that banks in Asian countries have higher average CDS spreads in comparison to banks in non-Asian countries.

It should be noted that lower average CDS spread in market-oriented and developed countries as compared to higher average CDS spread in bank-oriented and developed countries does not dilute our empirical analysis. Our main research question is as follows: After controlling for the financial health of the lenders (banks) and borrowers (firms), can financial architecture of a country explain capital structure and investment decisions of non-financial firms? This shows that we investigate the impact of financial architecture on various capital structure decisions of non-financial firms, after controlling for the financial health of the banks especially market risk of the banks (CDS spread is the proxy for market risk of the banks).

Table B.1: Sample Coverage

	No. of Observations		
Country	**Bank-Oriented**	**Market-Oriented**	**Total**
Australia	0	324	324
Canada	0	858	858
China	796	0	796
Hong Kong	0	1,894	1,894
India	3,922	0	3,922
Japan	600	0	600
Malaysia	314	0	314
New Zealand	121	0	121
Singapore	0	653	653
South Africa	0	205	205
South Korea	0	6,021	6,021
Thailand	89	0	89
United Kingdom	629	0	629
Total	**6,471**	**9,955**	**16,426**

Table B.2: Definitions of All Variables

Dependent Variables		
Name	**Definition**	**Source**
Spread	The coupon rate of the bond issued minus the central bank policy or discount rate of the country in whose currency the bond is issued (in %age points)	Bloomberg
Ln of Amount of Bond Issued	Natural log of the amount of the bond issued	Bloomberg
Number of Bonds Issued	Number of bonds issued by each firm in each year	Bloomberg

Bond Level Variables (Control Variables)		
Name	**Definition**	**Source**
Bond Log Issue Amount	Natural log of the amount of bond issued	Bloomberg
Bond Maturity	The maturity of the bond in years	Bloomberg
Foreign Bond	A dummy variable equal to one if the firm has ever issued a foreign bond during the entire sample period and zero otherwise. We identify a bond as foreign if the bond is issued in a different currency than the domestic currency of the country of the firm	Bloomberg
Zero Bond	A dummy variable equal to one if the firm has ever issued a zero-coupon bond during the entire sample period and zero otherwise.	Bloomberg

Firm Level Variables (Control Variables)		
Name	**Definition**	**Source**
TQ Dum	A dummy variable equal to 1, if Tobin's Q of the firm is above the median (higher growth firms) and zero if Tobin's Q is lower than the median of all firms (lower growth firms). In case of extensive margins of bonds (number of bonds issued), this dummy variable is equal to 1, if Tobin's Q is greater than 75% and zero otherwise.	Own Calculation
Crisis Dum	Dummy variable equal to one if year>2008	Own Calculation
Country Dummy	Dummy variable equal to one if the country is a market-oriented country and zero if bank-oriented.	Gambacorta et al. (2014)
Region Dummy	Region Dummy indicating the region of the firm (Asia, Oceania, Americas, Europe, Africa)	Own Calculation
Firm's Tobin's Q	Sum of the market value of equity plus the book value of total liabilities divided by total assets. Higher values of Tobin's Q indicate that firms have higher future growth	Osiris

	opportunities which are recognized by the market investors	
Firm's Tangibility	Inventory plus total fixed assets divided by total assets. This variable is a proxy of total collaterable assets of the company	Osiris
Firm's Profit	Earnings before taxes divided by total assets of the firm. This variable is a proxy of a firm's profitability	Osiris
Firm's Size (Proxy for Size)	Natural log of net sales of the firm.	Osiris
Firm's Current Ration (Proxy for Firm's Liquidity)	The current ratio which is defined as total current assets divided by total current liabilities of the firm. A firm with a higher current ratio will be considered as more solvent. There is no strict cut-off defined for defining more or less solvent firms, but a natural cut-off can be a current ratio of one	Osiris
Firm's Debt Capacity	Cash from Operating Activities divided by Total Short-term liabilities.	Osiris
Firm's Cash	Cash at the end of the year divided by Total Assets of the firm	Osiris

Bank Level Variables (Control Variables)		
Name	**Definition**	**Source**
In case of multiple banks for any firm, we average the variable for each year across all the banks and call it Bank_avg_Variable.		
Avg Bank CDS	5 Year CDS (credit default swap) spread for the banks of the firm, implied by the Bloomberg Issuer Default Risk model of Likelihood of Default.	Bloomberg
Avg Bank Capital	We sum total equity and net loans in USD for all the banks of each firm. We define Bank_avg_Capital as the ratio of total equity to total net loans.	Bankscope
Avg Bank Loss Provision	We sum total loan impairment charges and total equity in USD for all the banks of each firm. We define Bank_avg_Loss_Provision as the ratio of total loan impairment charges to total equity.	Bankscope
Avg Bank Loans to Deposits	We sum total gross loans and total customer deposits in USD for all the banks of each firm. We define Bank_avg_Loans_to_Deposits as the ratio of total gross loans to total customer deposits.	Bankscope
Avg Bank Profitability	We sum total net income and total equity in USD for all the banks of each firm. We define Bank_avg_Profitability as the ratio of total net income to total equity.	Bankscope

Avg Bank Interbank Ratio	We sum total advances to banks and total deposits from banks in USD for all the banks in each firm. we define Bank_avg_InterBank_Ratio as the ratio of total advances to all banks to total deposits from all banks.	Bankscope
Avg Bank WACC	Overall Cost of Capital of the bank in which each category of capital is proportionately weighted and includes all capital sources (equity and debt)	Bloomberg
Avg Bank Risk Category	Risk class assigned to each bank based on the Bloomberg Issuer Default Risk Model Generated Probability of Default over the next one year. A higher probability of default implies a higher risk of the bank	Bloomberg
Avg Bank VAR	Value of Risk (95% and 99%) of the banks of the firms, as calculated by the bank, considering its total exposure at the end of the accounting year.	Bloomberg

Country Level Variables (Control Variables)		
Name	**Definition**	**Source**
Country GDP Growth	Percentage yearly growth in GDP	World Bank
Country Stock Market Volume	Total value of stock market trading expressed as a percentage of GDP. This variable is a proxy of volume and liquidity of the stock market of the domestic country of the firm.	World Bank
Country Bank Concentration	Assets of three largest commercial banks as a share of total commercial banking assets	World Bank

Table B.3: Summary Statistics for the Whole Sample, Bank-Oriented and Market-Oriented Countries

Variables	All Countries			Bank-Oriented			Market-Oriented		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Spread (Bond's Cost of Debt)	7,766	2.14	2.24	2,831	2.13	2.13	4,935	2.15	2.31
Bond Log Issue Amount	7,980	21.39	2.86	2,947	20.02	1.93	5,033	22.19	3.00
Bond Maturity	7,906	4.81	3.85	2,922	6.37	4.35	4,984	3.90	3.18
Firm's Tobin's Q	13,387	1.26	0.81	5,467	1.29	0.80	7,920	1.24	0.82
Firm's Tangibility	13,395	0.66	0.18	5,496	0.67	0.17	7,899	0.65	0.19
Firm's Profit	13,394	0.02	0.12	5,501	0.05	0.09	7,893	0.00	0.14
Firm's Current Ratio	13,406	1.81	1.62	5,495	1.98	1.67	7,911	1.70	1.57
Firm's Cash	13,207	0.10	0.10	5,478	0.09	0.10	7,729	0.10	0.10
Firm's Debt Capacity	12,820	0.30	1.24	5,359	0.40	1.11	7,461	0.22	1.32
Firm's Sales	13,588	23.42	3.45	5,542	23.09	2.48	8,046	23.65	3.96
Bank Avg CDS	10,678	1.36	1.00	5,315	1.73	1.16	5,363	1.00	0.63
Bank Avg Capital	13,394	0.13	0.04	5,436	0.12	0.03	7,958	0.13	0.05
Bank Avg Loss Provision	12,821	0.07	0.04	5,384	0.07	0.04	7,437	0.07	0.04
Bank Avg Loans to Deposits	13,387	1.08	0.69	5,445	0.84	0.18	7,942	1.24	0.85
Bank Avg Profitability	12,906	0.11	0.05	5,400	0.11	0.06	7,506	0.11	0.05
Bank Avg WACC	11,561	6.05	1.99	5,317	6.92	2.11	6,244	5.31	1.54

Summary Statistics for Developing and Developed Countries

Variable	Developing			Developed		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Spread (Bond's Cost of Debt)	4,334	1.96	2.10	3,432	2.36	2.39
Bond Log Issue Amount	4,442	20.86	2.74	3,538	22.06	2.86
Bond Maturity	4,403	5.11	3.96	3,503	4.44	3.67
Firm's Tobin's Q	4,550	1.28	0.81	8,838	1.25	0.82
Firm's Tangibility	4,592	0.66	0.17	8,803	0.66	0.19
Firm's Profit	4,575	0.05	0.09	8,819	0.00	0.13
Firm's Current Ratio	4,577	2.08	1.73	8,829	1.68	1.54
Firm's Cash	4,561	0.09	0.10	8,646	0.10	0.10
Firm's Debt Capacity	4,526	0.83	18.38	8,575	3.38	244.79
Firm's Sales	4,619	23.16	2.13	8,969	23.56	3.95
Bank Avg CDS	4,415	1.90	1.15	6,266	0.98	0.65
Bank Avg Capital	4,610	0.13	0.03	8,784	0.13	0.05
Bank Avg Loss Provision	4,562	0.07	0.04	8,259	0.07	0.04
Bank Avg Loans to Deposits	4,572	0.81	0.14	8,815	1.21	0.81
Bank Avg Profitability	4,556	0.12	0.05	8,361	0.10	0.05
Bank Avg WACC	4,442	7.51	1.79	7,119	5.14	1.51

Summary Statistics for Matched (Issuers) and Unmatched (Non-Issuers) Sample

Variable	Matched (Issuers)			Not Matched (Non-Issuers)		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Firm Tobin's Q	6,091	2.11	0.73	87,563	1.93	1.19
Firm Fixed Assets	4,997	1.23E+11	2.41E+11	89,166	1.45E+10	6.90E+10
Firm Profit	4,915	8.50E+09	1.88E+10	88,396	1.09E+09	6.06E+09
Firm Current Ratio	6,085	1.60	1.97	86,885	2.72	3.40
Firm Cash	5,132	1.55E+10	2.95E+10	87,491	2.24E+09	1.04E+10
Firm Sales	5,113	1.98E+11	4.09E+11	86,057	2.85E+10	1.33E+11
Bank Average CDS Spread	4,489	139.86	101.09	82,029	135.50	108.08
Bank Capital	6,073	7.29	2.35	87,777	6.54	2.16
Bank Loan Loss Provision	6,051	0.02	0.01	84,955	0.02	0.01
Bank Loans to Deposits	5,740	0.97	0.27	88,021	0.94	0.30
Bank WACC	5,114	6.09	1.96	82,978	6.35	2.14

Table B.4: Correlation Matrix

	Spread	Firm's Tobin's Q	Bank Avg CDS	Bond Log Issue Amount	Bond Maturity	Firm's Tangibility	Firm's Profit	Firm's Current Ratio
Spread	1.00							
Firm's Tobin's Q	-0.09	1.00						
Bank Avg CDS	0.16	-0.04	1.00					
Bond Log Issue Amount	-0.22	-0.04	0.00	1.00				
Bond Maturity	0.13	0.09	0.00	-0.02	1.00			
Firm's Tangibility	0.05	-0.08	0.05	0.07	0.19	1.00		
Firm's Profit	0.05	0.11	0.06	-0.08	0.14	-0.04	1.00	
Firm's Current Ratio	-0.07	0.09	-0.06	-0.17	-0.01	-0.31	0.17	1.00
Firm's Cash	-0.04	0.21	-0.13	-0.10	0.03	-0.50	0.14	0.42
Firm's Debt Capacity	0.04	0.07	0.04	-0.03	0.08	-0.02	0.63	0.08
Firm's Sales	-0.22	-0.08	0.22	0.68	-0.04	-0.03	0.11	-0.22
Bank Avg Capital	0.06	0.07	-0.01	-0.07	-0.04	-0.04	0.08	0.03
Bank Avg Loss Provision	0.15	0.04	0.41	0.00	0.03	-0.03	0.03	0.00
Bank Avg Loans to Deposits	-0.19	0.01	-0.18	0.25	-0.10	-0.01	-0.30	-0.07
Bank Avg Profitability	0.00	-0.06	-0.11	-0.30	-0.03	-0.08	0.09	0.11
Bank Avg WACC	0.20	-0.02	0.50	-0.28	0.04	0.06	0.23	0.03

	Firm's Cash	Firm's Debt Capacity	Firm's Sales	Bank Avg Capital	Bank Avg Loss Provision	Bank Avg Loans to Deposits	Bank Avg Profitability	Bank Avg WACC
Spread								
Firm's Tobin's Q								
Bank Avg CDS								
Bond Log Issue Amount								
Bond Maturity								
Firm's Tangibility								
Firm's Profit								
Firm's Current Ratio								
Firm's Cash	1.00							
Firm's Debt Capacity	0.08	1.00						
Firm's Sales	-0.19	0.07	1.00					
Bank Avg Capital	0.07	0.06	-0.13	1.00				
Bank Avg Loss Provision	0.01	0.03	0.07	-0.17	1.00			
Bank Avg Loans to Deposits	-0.05	-0.13	0.08	-0.32	0.15	1.00		
Bank Avg Profitability	0.11	0.00	-0.22	-0.23	-0.25	-0.18	1.00	
Bank Avg WACC	-0.12	0.11	0.03	0.01	0.23	-0.49	0.20	1.00

Table B.5: Impact of Market Risk of banks on the Cost of Debt of Non-Financial Firms (OLS with Sector-Country-Year and Firm Fixed Effects).

Dep Variable = Spread (Cost of Debt)	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
	All Firms	All Firms	All Firms	All Firms	All Firms	All Firms
	All Sample	All Sample	Bank-Oriented Countries	Market-Oriented Countries	Developing Countries	Developed Countries
Firm's Tobin's Q	-0.374**					
	[-2.02]					
TQ Dum		-0.729	1.115	0.095	1.263	0.375
		[-1.28]	[1.53]	[0.09]	[1.41]	[0.58]
Crisis Dum	-2.983**	1.053	-2.528	21.474**	-1.020	9.547†
	[-2.49]	[0.93]	[-1.54]	[2.26]	[-0.88]	[3.85]
TQ_Dum # Crisis_Dum		-0.447	-2.084**	1.128	-2.622**	0.732
		[-0.50]	[-2.18]	[1.03]	[-2.48]	[0.94]
Avg Bank CDS	-1.616**	-4.095†	-2.525**	4.520**	-3.613†	4.395**
	[-2.10]	[-2.92]	[-2.47]	[2.14]	[-3.32]	[2.58]
TQ Dum # Avg Bank CDS		1.110†	0.050	1.650*	-0.084	1.435
		[2.73]	[0.13]	[1.69]	[-0.20]	[1.61]
Crisis_Dum # Avg Bank CDS	**1.841****	4.973†	2.780†	-3.727*	3.810†	-3.460*
	[2.43]	[3.42]	[2.83]	[-1.72]	[3.60]	[-1.84]
TQ Dum # Crisis Dum # Avg Bank CDS		**-0.870***	**0.124**	**-2.891†**	**0.368**	**-2.540****
		[-1.77]	**[0.28]**	**[-2.64]**	**[0.75]**	**[-2.56]**
TRANSACTION CONTROLS						
Bond log Issue Amount	-0.105†		-0.059	-0.147	-0.079*	-0.088
	[-2.65]		[-1.31]	[-1.55]	[-1.70]	[-0.96]
Bond Maturity	0.089†	0.102†	0.120†	0.088†	0.131†	0.087†
	[6.88]	[5.94]	[8.00]	[3.99]	[7.60]	[4.69]
Foreign Bond	0.666*		0.245	0.609	0.078	1.036*
	[1.95]		[0.51]	[1.17]	[0.16]	[1.78]
Zero Bond	-2.336†	-2.531†				
	[-12.64]	[-10.42]				
FIRM LEVEL CONTROLS						
Firm's Tangibility	-1.433	-3.879**	-3.161†	1.879	-4.517†	2.587
	[-1.42]	[-1.98]	[-2.64]	[1.40]	[-2.88]	[1.56]
Firm's Current Ratio	-0.123	-0.133	0.011	-0.220	0.013	-0.277
	[-1.14]	[-1.17]	[0.10]	[-1.06]	[0.11]	[-1.35]
Firm's Sales		-0.623*	0.260	-0.588†	0.452	-0.586**
		[-1.84]	[0.77]	[-2.68]	[1.34]	[-2.40]
Firm's Profit	-0.690					
	[-0.54]					
Firm's Cash	-0.756				-0.802	3.032
	[-0.50]				[-0.38]	[1.03]
Firm's Financial Cover			-0.250	0.002		
			[-1.34]	[0.01]		

BANK LEVEL CONTROLS						
Avg Bank Capital	-4.106	-16.788*	-0.965	-14.194	5.790	-12.966
	[-0.71]	[-1.69]	[-0.10]	[-1.34]	[0.42]	[-1.27]
Avg Bank Inter Bank Ratio		-0.022				
		[-0.27]				
Avg Bank Profit	-1.471		2.593	4.503	2.466	2.073
	[-0.60]		[0.79]	[0.65]	[0.74]	[0.32]
Avg Bank Loss Provision	-0.027		6.610**	-5.901	7.472**	-8.319
	[-0.01]		[2.20]	[-0.56]	[2.32]	[-0.95]
Avg Bank loans to deposits					1.921	4.042*
					[0.91]	[1.85]
Avg Bank WACC		-0.560**				
		[-2.34]				
Avg Bank WACD	-0.160		-0.586†	0.932†	-0.662†	1.054**
	[-0.90]		[-2.71]	[2.73]	[-2.97]	[2.42]
Avg Bank WACE	-0.067		-0.108	-0.033	-0.210†	-0.057
	[-1.10]		[-1.32]	[-0.31]	[-2.60]	[-0.58]
Avg Bank VAR		-1.406				
		[-0.31]				
Constant	10.561†	24.079†	4.923	-2.640	-0.332	2.899
	[5.59]	[2.74]	[0.65]	[-0.23]	[-0.04]	[0.47]
Observations	2,694	1,621	1,486	1,219	1,370	1,312
R-squared	0.87	0.90	0.81	0.87	0.80	0.88
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
Year FE	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Sector-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable in all the above regressions is Spread which is coupon rate of the bond issued minus the central bank policy or discount rate of the country in whose currency the bond is issued (in %age points). For the definition of all other variables, please see Table B.2. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 and 2 are baseline results for the impact of market risk of banks on the cost of debt (spread of bonds), before and after the financial crisis, for firms with average growth opportunities. Columns 3 and 4 presents the results for hypothesis 1 i.e. in the bank and market-oriented countries respectively. Columns 5 and 6 present the results for hypothesis 1 for developing and developed countries respectively. Due to the small sample size, we could not estimate hypothesis 1 for Non-Asian and Asian countries, using both Sector-Country-Year and firm fixed effects. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Table B.6: Impact of Market Risk of banks on the Amount of Bond Financing of Non-Financial Firms - Intensive Margins (OLS with Sector-Country-Year and Firm Fixed Effects).

Dep. Variable = Intensive Margins	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
	All Firms	All Firms	All Firms	All Firms	All Firms	All Firms
	All Sample	All Sample	Bank-Orien-ted	Market-Orien-ted	Develop-ing Countries	Develop-ed Countries
Firm's Tobin's Q	-0.191**					
	[-2.24]					
TQ Dum		0.155	-1.099	-0.835	-1.111*	-0.451
		[0.44]	[-1.64]	[-0.48]	[-1.71]	[-0.27]
Crisis Dum	-1.245	-1.049	-0.233	3.550	-1.203	-12.801*
	[-1.13]	[-1.01]	[-0.14]	[1.21]	[-1.21]	[-1.74]
TQ_Dum # Crisis Dum		-0.611	0.384	0.903	0.426	0.385
		[-1.44]	[0.45]	[0.44]	[0.51]	[0.20]
Avg Bank CDS	-0.963	-1.173**	-0.649	-14.091*	-0.646	-10.855*
	[-1.49]	[-2.16]	[-0.86]	[-1.80]	[-0.87]	[-1.90]
TQ Dum # Avg Bank CDS		-0.185	0.425	-3.604**	0.454	-3.103**
		[-0.79]	[1.16]	[-2.38]	[1.27]	[-2.49]
Crisis Dum # Avg Bank CDS	**1.201***	**0.946***	0.774	13.928*	0.852	10.662*
	[1.83]	**[1.75]**	[0.95]	[1.71]	[1.06]	[1.85]
TQ Dum # Crisis Dum # Avg Bank CDS		**0.438***	**-0.164**	**3.967****	**-0.200**	**3.496****
		[1.69]	**[-0.39]**	**[2.31]**	**[-0.49]**	**[2.42]**
TRANSACTION CONTROL						
Bond Maturity	0.018	0.008	0.023	0.037	0.030	0.019
	[1.57]	[0.72]	[1.25]	[1.07]	[1.35]	[0.85]
Bond Spread	-0.044*		-0.042	-0.088	-0.049	-0.076
	[-1.81]		[-1.31]	[-1.06]	[-1.54]	[-0.90]
Foreign Bond	-2.010†		-1.418†	0.036	-1.546†	0.095
	[-7.08]		[-3.54]	[0.07]	[-3.78]	[0.20]
Zero Bond		-0.353**				
		[-2.44]				
FIRM LEVEL CONTROLS						
Firm's Tangibility	0.450		-2.828†	0.733	-2.663**	0.429
	[0.64]		[-2.63]	[0.47]	[-2.48]	[0.29]
Firm's Current Ratio	0.129**	0.040				
	[2.50]	[0.68]				
Firm's Cash	1.118					
	[0.95]					
Firm's Sales	-0.009	-0.095	0.059	-0.843**	0.029	-0.826**
	[-0.08]	[-0.75]	[0.16]	[-2.21]	[0.08]	[-2.27]
Firm's Financial Coverage		-0.165	-0.307*	0.028	-0.289*	0.051
		[-1.61]	[-1.95]	[0.10]	[-1.86]	[0.17]
Firm's Profit			-1.493	-2.764	-2.042	-2.213
			[-0.68]	[-0.96]	[-0.92]	[-0.77]

BANK LEVEL CONTROLS						
Bank Avg Capital	-1.144		-11.022	36.737*	-14.037	36.679*
	[-0.30]		[-1.05]	[1.71]	[-1.31]	[1.87]
Bank Avg Loans to deposits	-1.328		-3.761	16.467†	-4.206	13.682†
	[-1.38]		[-1.43]	[2.83]	[-1.54]	[2.88]
Bank Avg Interbank Ratio		0.095	0.173*	0.132	0.177*	0.261
		[1.19]	[1.86]	[0.35]	[1.93]	[0.82]
Bank Avg Profit		0.865	4.165*	-6.831	3.927	-8.737*
		[0.50]	[1.83]	[-1.07]	[1.64]	[-1.68]
Bank Avg WACC	-0.117	-0.126	-0.327*	-0.102	-0.353**	0.068
	[-1.24]	[-1.21]	[-1.87]	[-0.21]	[-2.03]	[0.16]
Bank Avg Default Risk Premium	-0.100	0.171	-0.064	1.037**	-0.130	1.033**
	[-0.83]	[1.14]	[-0.25]	[2.12]	[-0.50]	[2.29]
Bank Avg VAR			-7.385**	15.908	-7.389**	15.879
			[-2.00]	[1.07]	[-2.01]	[1.30]
Constant	24.509†	22.893†	27.711†	9.030	30.612†	25.294*
	[7.26]	[5.99]	[3.03]	[0.91]	[3.47]	[1.95]
Observations	2,851	2,346	1,032	444	952	524
R-squared	0.90	0.86	0.69	0.87	0.66	0.86
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
Year FE	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Sector-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Note: Dep. variable is equal to Ln (Amount of Each Bond Issued). It's a log-linear model which should be read as if we change x by 1 (unit), we'd expect our y variable to change by 100*β1 percent. For the definition of all other variables, please see Table B.2. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 and 2 are baseline results for the impact of market risk of banks on the amount of bond financing (intensive margins), before and after the financial crisis, for firms with average growth opportunities. Columns 3 and 4 presents the results for hypothesis 2 i.e. intensive margins of bond financing for higher growth firms, after the crisis, in the bank and market-oriented countries respectively. Columns 5 and 6 present the results for hypothesis 2 for developing and developed countries respectively. Due to the small sample size, we could not estimate hypothesis 1 for Non-Asian and Asian countries, using both Sector-Country-Year and firm fixed effects. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Table B.7: Impact of Market Risk of banks on the Number of Bonds Issued by Non-Financial Firms - Extensive Margins (OLS with Sector-Country-Year and Firm Fixed Effects)

Dep. Variable = Extensive Margins	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
	All Firms	All Firms	All Firms	All Firms	All Firms	All Firms
	All Sample	All Sample	Bank-Oriented	Market-Oriented	Develop-ing Countries	Develop-ed Countries
Firm's Tobin's Q	0.263					
	[0.64]					
TQ Dum		1.875	3.188	3.609**	3.320	3.006**
		[0.88]	[1.05]	[2.21]	[1.11]	[1.98]
Crisis Dum	-5.796	-5.737	-7.992	21.261	-0.926	1.541
	[-1.07]	[-1.09]	[-1.17]	[1.34]	[-0.22]	[0.39]
TQ Dum # Crisis Dum		-2.336	-4.170	-4.093**	-4.658	-3.379**
		[-0.73]	[-0.83]	[-2.39]	[-0.85]	[-2.10]
Avg Bank CDS	-2.724	-2.609	-3.129	4.860	-3.864	1.228
	[-0.73]	[-0.71]	[-0.78]	[1.29]	[-0.90]	[0.44]
TQ Dum # Avg Bank CDS		-0.136	-0.569	-6.655*	-0.805	-5.612*
		[-0.10]	[-0.33]	[-1.75]	[-0.42]	[-1.79]
Crisis Dum # Avg Bank CDS	**1.868**	1.618	1.742	-4.744	2.742	-1.475
	[0.71]	[0.62]	[0.61]	[-1.32]	[0.86]	[-0.59]
TQ Dum # Crisis Dum # Avg Bank CDS		**0.240**	**0.819**	**6.886***	**1.144**	**5.738***
		[0.12]	**[0.33]**	**[1.85]**	**[0.44]**	**[1.83]**
TRANSACTION LEVEL CONTROLS						
Foreign Bond	-1.263	-1.243	-1.977*	0.296	-2.304**	0.316
	[-1.59]	[-1.64]	[-1.83]	[0.56]	[-2.03]	[0.69]
Zero Bond	-0.036	-0.043	0.525	-0.302	0.803	-0.262
	[-0.02]	[-0.03]	[0.19]	[-0.80]	[0.28]	[-0.71]
FIRM LEVEL CONTROLS						
Firm's Tangibility	2.305	1.669	2.211	0.642	2.408	0.785
	[0.55]	[0.41]	[0.31]	[0.39]	[0.34]	[0.49]
Firm's Current Ratio	0.147	0.218	0.244	0.038	0.207	0.035
	[0.42]	[0.67]	[0.53]	[0.20]	[0.46]	[0.20]
Firm's Financial Cover	0.171	0.239	0.748	-0.049	0.791	-0.067
	[0.46]	[0.63]	[1.05]	[-0.25]	[1.08]	[-0.37]
Firm's Sales	0.533	0.564	1.238	0.278	1.180	0.255
	[1.34]	[1.39]	[1.04]	[0.94]	[0.99]	[0.89]
BANK LEVEL CONTROLS						
Bank Avg Capital	-20.954	-15.262	-10.786	9.680	-13.686	5.801
	[-0.81]	[-0.55]	[-0.26]	[0.72]	[-0.29]	[0.60]
Bank Avg Loss Provision	-7.393	-6.754	-9.254	4.206	-10.508	6.419
	[-0.69]	[-0.60]	[-0.69]	[0.49]	[-0.72]	[0.80]
Bank Avg Profit	-22.826	-22.903	-34.422	2.892	-40.561	-0.360
	[-1.18]	[-1.16]	[-1.34]	[0.42]	[-1.35]	[-0.07]

Bank Avg WACC	0.123	0.160	0.299	0.003	0.098	-0.011
	[0.33]	[0.41]	[0.60]	[0.01]	[0.17]	[-0.04]
Bank Avg Default Risk Premium				0.032		
				[0.06]		
Constant	-0.561	-1.442	-14.385	-27.999	-17.222	-7.178
	[-0.05]	[-0.13]	[-0.53]	[-1.46]	[-0.59]	[-0.83]
Observations	1,542	1,558	721	834	587	971
R-squared	0.74	0.75	0.73	0.88	0.73	0.88
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
Year FE	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-Sector-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Note: Dep. variable is a count variable equal to Number of Bonds Issued by each firm in each year. For the definition of all other variables, please see Table B.2. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 and 2 are baseline results for the impact of market risk of banks on the number of bonds issued by each firm (extensive margins), before and after the financial crisis, for firms with average growth opportunities. Columns 3 and 4 presents the results for hypothesis 2 i.e. extensive margins of bond financing for higher growth firms, after the crisis, in the bank and market-oriented countries respectively. Columns 5 and 6 present the results for hypothesis 2 for developing and developed countries respectively. Due to the small sample size, we could not estimate hypothesis 1 for Non-Asian and Asian countries, using both Sector-Country-Year and firm fixed effects. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Table B.8: Impact of Market Risk of banks on the Number of Bonds Issued by Non-Financial Firms – Extensive Margins (Poisson with Sector, Country and Year Fixed Effects)

Dep Variable = Extensive Margins	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8
	All Firms	All Firms	All Firms	All Firms	All Firms	All Firms	All Firms	All Firms
	All Sample	All Sample	Bank Orien-Ted	Market Orien-Ted	Non-Asian	Asian	Devel-oping	Devel-oped
Firm's Tobin's Q	-0.011							
	[-0.35]							
TQ Dum		0.418*	0.412	0.406*	0.306	0.406	0.577	0.388**
		[1.67]	[1.11]	[1.83]	[1.53]	[1.36]	[1.33]	[2.08]
Crisis Dum	0.145	0.354*	0.636**	-0.040	-0.640**	0.446**	0.934**	0.063
	[0.79]	[1.74]	[2.10]	[-0.14]	[-2.05]	[1.97]	[2.36]	[0.31]
TQ Dum # Crisis Dum		-0.724†	-0.840**	-0.500*	-0.302	-0.749**	-1.083**	-0.541**
		[-2.62]	[-1.97]	[-1.76]	[-1.06]	[-2.34]	[-2.16]	[-2.26]
Avg Bank CDS	-0.262	-0.156	-0.112	0.122	0.150	-0.140	0.258	0.147
	[-1.54]	[-0.84]	[-0.56]	[0.49]	[0.38]	[-0.73]	[1.11]	[0.82]
TQ Dum # Avg Bank CDS		-0.305	-0.243	-0.525**	-0.256	-0.287	-0.261	-0.634†
		[-1.43]	[-0.91]	[-2.25]	[-0.78]	[-1.26]	[-0.88]	[-2.61]
Crisis Dum # Avg Bank CDS	**0.313****	0.144	0.098	-0.128	0.071	0.088	-0.271	-0.279
	[2.07]	[0.85]	[0.50]	[-0.49]	[0.17]	[0.49]	[-1.14]	[-1.33]
TQ Dum # Crisis Dum # Avg Bank CDS		**0.492****	**0.479**	**0.544****	**0.182**	**0.490****	**0.521**	**0.716†**
		[2.09]	**[1.63]**	**[2.02]**	**[0.49]**	**[1.98]**	**[1.60]**	**[2.69]**
TRANSACTION LEVEL CONTROLS								
Foreign Bond	-0.482†	-0.454†	-0.805†	-0.108	0.166*	-0.593†	-1.034†	-0.076
	[-5.04]	[-4.75]	[-4.60]	[-1.39]	[1.67]	[-4.97]	[-4.35]	[-1.10]
Zero Bond	-0.030	-0.036	0.244	-0.167†	-0.425**	-0.011	0.464	-0.211†
	[-0.19]	[-0.22]	[0.78]	[-2.89]	[-2.18]	[-0.07]	[1.32]	[-3.76]
FIRM LEVEL CONTROLS								
Firm's Tangibility	0.166	0.101	-0.462	0.621†	0.796**	0.019	-0.545	0.645†
	[0.68]	[0.43]	[-1.05]	[3.59]	[1.98]	[0.07]	[-1.07]	[3.62]
Firm's Profit	0.467**	0.360	0.840	-0.017	0.554*	0.406	0.655	0.152
	[2.00]	[1.59]	[1.34]	[-0.10]	[1.86]	[1.62]	[0.85]	[0.79]
Firm's Current Ratio		-0.042**	-0.043	-0.028	0.012	-0.047**	-0.044	-0.025
		[-2.14]	[-1.22]	[-1.61]	[0.43]	[-2.24]	[-1.11]	[-1.34]
Firm's Cash	0.054	0.191	0.522	0.028	0.253	0.178	0.839	0.026
	[0.12]	[0.41]	[0.64]	[0.10]	[0.35]	[0.36]	[0.96]	[0.08]

Firm's Financial Cover							-0.038	-0.018
							[-0.66]	[-0.59]
BANK LEVEL CONTROLS								
Bank Avg Capital	-1.108	-1.506*	-3.856**	0.453	-0.213	-1.640	-4.793**	0.553
	[-1.37]	[-1.69]	[-2.14]	[0.54]	[-0.21]	[-1.61]	[-2.37]	[0.71]
Bank Avg Loans to Deposits	-0.137	-0.114	-0.244	-0.184	0.029	-0.058	-0.089	-0.140
	[-1.34]	[-1.12]	[-1.01]	[-1.31]	[0.14]	[-0.50]	[-0.29]	[-1.16]
Bank Avg Profit	-0.972	-1.023	-0.923	-0.699	0.986	-1.794*	-1.441	-0.286
	[-1.19]	[-1.27]	[-0.70]	[-0.82]	[1.31]	[-1.72]	[-0.82]	[-0.49]
Bank Avg WACC	0.059**	0.067**	0.069*	-0.004	-0.037	0.096†	0.048	0.004
	[2.07]	[2.32]	[1.81]	[-0.13]	[-1.29]	[2.91]	[1.04]	[0.14]
COUNTRY LEVEL CONTROLS								
Country GDP Growth	0.018	0.018	0.041	0.007	-0.056	0.020	0.040	0.004
	[1.01]	[1.00]	[1.40]	[0.17]	[-0.78]	[0.98]	[1.10]	[0.12]
Country Stock Market Volume	0.094	0.095	0.061	0.372*	-0.406*	0.222	0.128	0.197
	[0.64]	[0.56]	[0.36]	[1.71]	[-1.79]	[1.09]	[0.55]	[1.45]
Country Bank Concentration		-0.283	-0.256	-0.843**	-1.574†	-0.067	-0.131	-0.723**
		[-1.09]	[-0.75]	[-2.10]	[-3.52]	[-0.22]	[-0.32]	[-2.21]
Constant	0.257	1.467	1.342	3.198	8.380†	0.021	0.610	3.501**
	[0.35]	[0.92]	[0.73]	[1.47]	[3.67]	[0.01]	[0.28]	[2.11]
Observations	1,503	1,495	700	795	207	1,288	568	884
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	No	No	No	No	No
Country-Sector-Year FE	No	No	No	No	No	No	No	No

Robust z-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Note: Dep. variable is a count variable equal to Number of Bonds Issued by each firm in each year. For the definition of all other variables, please see Table B.2. We use Poisson estimator to estimate all the above regressions. All independent variables are lagged except Avg_Bank_CDS and WACC of the bank and Tobin's Q of the firm. Columns 1 and 2 are baseline results for the impact of market risk of banks on the number of bonds issued by each firm (extensive margins), before and after the financial crisis, for firms with average growth opportunities. Columns 3 and 4 presents the results for hypothesis 2 i.e. extensive margins of bond financing for higher growth firms, after the crisis, in the bank and market-oriented countries respectively. Columns 3 and 4 presents the results for hypothesis 2 for Non-Asian and Asian countries respectively. Columns 5 and 6 present the results for hypothesis 2 for developing and developed countries respectively. All regressions include robust standard errors. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Chapter 4

Macroeconomic Uncertainty and Security Issuance Behaviour of Non-Financial Firms: An International Comparison

4.1 Introduction

The recent Global Financial Crisis has renewed interest in understanding the implications of macroeconomic uncertainty for the ability of firms to issue new financial securities. Macroeconomic conditions can influence the financing decisions made by the firms through two non-mutually exclusive channels. The first channel operates through the firm's own demand for credit as it varies over the business cycle. The demand for capital (bank loans, bonds and equity) is heterogeneous across firms. This demand can be dependent on information asymmetries between lenders and borrowers (Baker (2009)). The second channel operates through the market supply of capital. Economic downturns are characterized by an increase in financial frictions along with a tightening of the lending standards (see Becker and Ivashina (2014)). Under circumstances where bank credit is tightened, firms have higher incentives to tap capital markets in order to annul such credit contractions arising from the supply side.

Financial crisis increased the macroeconomic uncertainty and tightened the supply of bank lending as well. This decrease in bank lending was accompanied by an increase in bond issuances by non-financial firms, in order to compensate for the effects of credit tightening. On the other hand, the evidence about the effect of crisis on equity issuances is mixed. Another big challenge while investigating the impact of macroeconomic uncertainty on the security issuance behaviour of the firms is selecting an appropriate measure of the uncertainty. There are many such indices proposed in the literature (see section 4.2.1 for a detailed discussion). Most of these indices do not distinguish between upside (good) and downside (bad) uncertainty. Macroeconomic uncertainty is not always bad. For example, if the forecast of next quarter's GDP growth is 1% next quarter and realized (actual) GDP growth next quarter turns out to be 1.2%, then the difference between forecasted and realized value cannot be attributed

as a negative uncertainty. Higher (lower) GDP than its forecasted value is a positive (negative) productivity shock to the economy.

The main contribution of this study is to investigate the impact of both downside and upside macroeconomic uncertainty on the security issuance behaviour (bank loans, bonds and equity) of non-financial firms. We treat the global financial crisis as a natural experiment for an exogenous shock to the supply of credit. In this study, we use a very recent macroeconomic uncertainty index developed by Rossi and Sekhposyan (2015), (2017); henceforth called Rossi Index. The Rossi Index distinguishes between upside (good/positive) and downside (bad/negative) sources of macroeconomic uncertainty. This asymmetric nature of the uncertainty index allows us to investigate the impact of downside and upside uncertainty on the likelihood of bank loans, bonds and equity issuance, after the financial crisis. Increase in the downside uncertainty index is equivalent of higher negative macroeconomic uncertainty including, but not limited to, tightening of supply of capital. We find that after the crisis, an increase in the downside uncertainty decreases the probability of bank loans and equity issuance but increases the likelihood of issuance of bonds. On the other hand, an increase in the upside uncertainty only causes an increase in the probability of equity issuance with no impact on the likelihood of issuing banks loans and bonds.

We also divide the countries in our sample into two groups according to their financial architecture; namely, bank-oriented and market-oriented countries[17]. Market-oriented countries are characterized with greater options for obtaining external financing as these countries have deep and liquid bond and equity markets. On the other hand, banks are the main suppliers of credit in bank-oriented countries. Division of countries into these two groups is an attempt to investigate the impact of financial architecture on the issuance decisions of non-financial firms, when these firms face downside and upside macroeconomic uncertainty. The main results of our paper (mentioned above) hold after splitting our data into bank-oriented and market-oriented countries but most

[17] Countries in which banks are the major lenders are characterized as bank-oriented countries and countries where capital markets (bond and equity) provide greater opportunities of external financing are classified as market-oriented economies. For a detailed discussion about the classification of countries into either group in this study, please see section 4.4.3.

importantly, downside uncertainty affects the probability of issuance of bank loans (bonds and equity) only in bank-oriented (market-oriented) countries. Bank-oriented and market-oriented countries may vary across various other macroeconomic dimensions; e.g. enforcement of law, corruption, ease of business, investment friendly environment etc. Therefore, we restrict our sample only for OECD countries and again divide these OECD countries into bank-oriented and market-oriented countries. Our main assumption for this robustness test is that most of the OECD countries have similar macroeconomic environments. Restricting our sample only to OECD countries and further dividing it into bank-oriented and market-oriented countries, will help us in isolating the effects of other macroeconomic variables which will make sure that our results are only driven by the financial architecture (bank and market-oriented countries) of the country, instead of other macroeconomic variables. We confirm that our results mentioned above do not change after this robustness tests as well. We also investigate the impact of an increase in the downside and upside uncertainty on the probability of issuing capital market securities (bond and/or equity instead of a bank loan) after the crisis. We find that the probability of issuance of capital market securities increases after the crisis but only with an increase in the downside uncertainty.

It is well documented in the literature that firms can reduce the information asymmetries using various channels including the foreign assets (institutional channel)[18] and cross listing on various exchanges which have stricter requirement for disclosures (informational channel)[19] as documented by Campello and Larrain (2016), Lee et al. (2016) and Lee et al. (2017). Therefore, we dissect the cross section of the firms into foreign[20] and domestic firms and firms with higher and lower asymmetric information costs[21]. We find that after an increase in the downside uncertainty after

[18] When firms have foreign assets in place, they can pledge these assets to obtain lending. Moreover, these firms have to comply with local regulations in order to maintain their credibility in foreign countries. Local presence of these firms in foreign countries gives them a competitive advantage as compared to other firms.

[19] When firms are listed on multiple stock exchanges, they are subject to higher disclosure of information. Information dissemination will be greater and therefore these firms will have greater transparency and hence will face lower asymmetric information costs.

[20] Foreign firms are those which have physical presence (assets or subsidiaries or offices) in countries other than the country of origin of the firm.

[21] We identify all such firms which are followed by the analysts and call them firms with low asymmetric costs. The other group of the firms, which are not followed by any analysts or brokers are classified as firms with high asymmetric information costs.

the crisis, foreign firms and firms with lower asymmetric information costs have greater chances of issuing capital market securities whereas there is no impact of an increase in the upside uncertainty on the security issuance of foreign firms. We include financial crisis dummy ("Crisis_Dum") to investigate any differential behaviour of the firms while issuing bank loans, bonds and equity, before and after the financial crisis. This dummy is equal to one if year is greater than 2008. We also control for foreign and domestic securities along with host of transaction and firm level controls.

The decision to either investigate the supply or demand side of credit depends on the availability of the data. Jiménez et al. (2014b) is one of the very few papers that investigate the demand side of credit on the financing decisions of firms but it was only possible because they had access to loan application level data. This kind of data provides the researcher with the information about the total number of firms who applied for the credit and the proportions of acceptances and rejections of the loan applications. In our transactional level data, we do not have any information about the proportions of acceptance and rejection of the firms and demand of credit is unobservable in transactional level data. Therefore, it is essential to control for the firm's demand for credit. In spirit of Becker and Ivashina (2014), we control firm's demand for credit using firm fixed effects which control for all time-invariant unobservable characteristics of firms, including the demand for credit. We retain only those firms in our sample who have access to both bank loans and capital markets (bonds and equity). Any substitution from bank loans to capital market financing can only be measured if all firms in the sample have access to both the markets. After controlling for the demand of credit by the firms, our results point out to the supply side effects about the impact of an increase in the macroeconomic uncertainty on the probability of issuance of bank loans, bonds and equity.

Our paper is closely related to Erel et al. (2012), Becker and Ivashina (2014) and Gulen and Ion (2016) but we differ from each of these papers in various important ways as well. Erel et al. (2012) investigate the impact of macroeconomic uncertainty (NBER recession/expansion dates) on the bank loans, privately and publicly placed debt and equity, by using a Multinomial Logit approach, where the base category is when firms

do not issue any type of security. Their focus is more on the cyclicality of different securities and they find that capital issuance is pro-cyclical (cyclical) for non-investment (investment) grade firms. We construct a similar database to theirs but do not differentiate between public and privately placed debt and equity. Moreover, instead of using Multinomial Logit, we use a Linear Probability Model (LPM) to investigate the impact of macroeconomic uncertainty on the probability of capital issuance behaviour of the firms. Our choice of LPM is motivated by Ai and Norton (2003) and Greene (2010). The central message of these papers is that standard statistical measures and techniques for testing the marginal effects of the interactions terms in non-linear models (Logit and Probit) are generally misleading and uninformative. Authors suggest that standard statistical tests about the partial effects, especially about the interactions in a model are generally not information and sometimes may produce misleading results as well. These authors also provide some graphical techniques for calculating the marginal effects of interaction terms in non-linear models. These graphical techniques are particularly useful when the aim of the researcher is forecasting (especially out of the sample forecasting) using Logit or Probit models. As we are only interested in assessing the impact of macroeconomic uncertainty on capital issuance behaviour without aiming for any in and out of sample forecasting, we use LPM following Becker and Ivashina (2014).

Gulen and Ion (2016) use a very recent news based Economic Policy Uncertainty (EPU) Index developed by Baker et al. (2016), and investigate its impact on firm level capital investment, for non-financial US firms. They find that an increase in EPU index is associated with a strong decrease in the investment of the firms and this relationship is even stronger for firms which are dependent more on government spending. EPU Index measures the macroeconomic uncertainty using key terms related to policy uncertainty, in different newspapers and articles, uncertainty arising from the federal tax code in the future (Congressional Budget Office) and uncertainty arising from the dispersion of individual forecasts of CPI, Federal and State expenditures taken from Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters. Even though the EPU index is widely used in the recent literature about macroeconomic uncertainty and it is available for almost 23 countries, our decision to use Rossi Index instead of EPU arises from the fact that EPU index does not distinguish between upside

and downside uncertainty. Moreover, the coverage of EPU index is not as wide as Rossi index, especially for emerging economies.

Our study is also related to the substitution effects of credit as documented by Kashyap et al. (1993), Baumann et al. (2005), Adrian et al. (2013) and Becker and Ivashina (2014). The main theme of all these papers is that after a tightening in the lending conditions due to an increase in the macroeconomic uncertainty or after a crisis, firms have greater propensity to switch to more market based financing (bonds and equity) as compared to bank loans. These studies also establish that all such firms with an access to capital markets substitute their financing mix from bank funding to capital market lending. Following these studies, we only retain such firms in our sample, that have issued at least one bond or equity during the entire sample period. Our findings suggest that there is a strong evidence that firms switch to capital market financing (bond and/or equity) after an increase in the downside uncertainty. Moreover, this effect is dominated by foreign firm, as compared to domestic firms. It is also pertinent to mention that our results are only suggestive for the issuer firms, as we exclude all non-issuer firms from our sample (for details, please refer to section 4.4).

The rest of the paper is organized as follows. Section 4.2 discusses the most relevant papers to our study and lays down the main hypotheses of this study. We also describe the Rossi Index in greater detail in this section. Section 4.3 discusses the empirical methodology and section 4.4 explains the construction of data. Section 4.5 presents the results and section 4.6 concludes.

4.2 Literature Review and Hypothesis Development

This section begins with an explanation about the Rossi index in greater detail and its advantages over other similar indices in the literature. We also discuss the most relevant literature which lays the foundation for the testable hypotheses of this study. These hypotheses are derived from existing studies about the impact of macroeconomic uncertainty on the security issuance behaviour of non-financial firms.

4.2.1 Rossi Index of Macroeconomic Uncertainty

Among the whole family of macroeconomic indices, we chose Rossi index for this study. Potential candidates for choosing a suitable macroeconomic uncertainty

indicator for this paper were news-based Economic Policy Uncertainty Index (EPU) by Baker et al. (2016), Uncertainty and Surprise Index by Scotti (2016) and Macroeconomic Uncertainty Index by Rossi and Sekhposyan (2015), (2017). The EPU index constructs a macroeconomic uncertainty index using a weighted average of three components for 23 countries. The first component is the normalized index from all the newspaper articles discussing the economic policy uncertainty of the respective country. The second component is a measure of the uncertainty arising from the dollar impact on the number of tax code provisions in the federal tax code. Last and third component is the dispersion between individual forecasters for the future levels of CPI, Federal and State expenditures taken from the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters. These all three components are used to construct the EPU index for USA. For 22 other countries, the EPU index is calculated using only the first component i.e. newspaper articles. Even though the EPU index is widely used and cited in the recent literature but it does not distinguish between downside (negative/bad) and upside (positive/good) uncertainty. Downside (Upside) uncertainty measures negative (positive) shock to the economy if the realized value of GDP is higher (lower) than its forecasted value. Downside (Upside) uncertainty is related to realized outcomes of the macroeconomic variable being higher (lower) than the anticipated value of the macroeconomic variable of interest; e.g. GDP. There is enough evidence in the literature that downside and upside uncertainty affect the economy in different ways. Segal et al. (2015) decompose the overall macroeconomic uncertainty of the USA into good (positive) and bad (negative) components and show that these components have opposite effects on asset prices and overall growth. Therefore, we prefer using an index that is able to distinguish between good and bad uncertainty.

We also consider using macroeconomic uncertainty index developed by Scotti (2016). The author compares the realized values of macroeconomic indicators (GDP, industrial production, employment etc.) and its forecast which is measured by the median expectations from Bloomberg. Using this data, the author calculates a positive (negative) surprise index, along with an uncertainty index. The author distinguishes between upside (positive) and downside (negative) uncertainty but we chose not to use this index because of its insufficient coverage. This index is only available for USA, UK, Euro Area (whole region), Japan and Canada and a very low coverage precludes

us from using this index. Coverage of the EPU index is relatively better but not greater than Rossi index, which we use in this study and describe it in detail below.

Rossi and Sekhposyan (2015), (2017) originally developed the Rossi index for USA and 17 other EU countries. This index is a distribution based index and distinguishes between upside (good) and downside (bad) periods of uncertainty. Authors use the consensus economic forecasts of macroeconomic variables and compare these forecasts with actual (realized) values. Their index is based on cumulative density of forecast errors calculated at the actual realized forecast error. More specifically, the index is a percentile which is associated with the realized (actual) value of the forecast error of the macroeconomic variable at hand (GDP), in the unconditional distribution of the observed forecast errors. A higher value of the index indicates that forecast error is in the tail of the distribution and therefore it is very difficult to predict the actual realized value of GDP in that quarter and thus overall macroeconomic uncertainty about GDP is very high in the economy.

Rossi Index is a complimentary measure of macroeconomic uncertainty, which is a distribution based index instead of relying on any arbitrary thresholds. As explained earlier, we prefer this measure over other uncertainty indices in the literature because Rossi index distinguishes between downside (negative) and upside (positive) periods of uncertainty and we aim to exploit this heterogeneity in the macroeconomic uncertainty and investigate its impact on the security issuance decisions. Even though, macroeconomic uncertainty index by Scotti (2016) also bifurcates the overall macroeconomic uncertainty into a surprise and uncertainty component (similar to downside and upside uncertainty), but the coverage of Scotti index is only restricted to five economies. We do not claim that Rossi index is the best among the family of similar macroeconomic uncertainty indices in the existing literature but given the widest coverage (see below for details) and its ability to distinguish between downside (negative) and upside (positive) GDP uncertainty, we decide to use Rossi index in this study.

As reported by Rossi and Sekhposyan (2015), overall Rossi GDP uncertainty index has a correlation coefficient of 0.29 with VXO measure as in Bloom (2009) and Rossi GDP downside uncertainty index has a correlation of 0.37 with the uncertainty index

proposed by Jurado et al. (2015). This shows that Rossi GDP uncertainty index has a reasonable correlation with existing uncertainty indices in the literature.

Figure 4.1 to 4.4 below show the evolution of Rossi GDP Downside Index for major countries in our sample and also across bank-oriented and market-oriented countries. We can see in Figure 4.1, that in almost all the countries after the financial crisis, GDP downside uncertainty increased, as shown by large spikes in Rossi index. This is because overall macroeconomic environment became more uncertain after the financial crisis. Most economies recovered from this uncertainty shock after the financial crisis e.g. Brazil, Canada, China, Germany and to some extent United Kingdom. In other countries, GDP uncertainty remained higher even after the financial crisis, until the end of 2014 (Australia, India, Japan and United States). This does not necessarily mean that the increase in the macroeconomic uncertainty was definitely caused by the post financial crisis events.

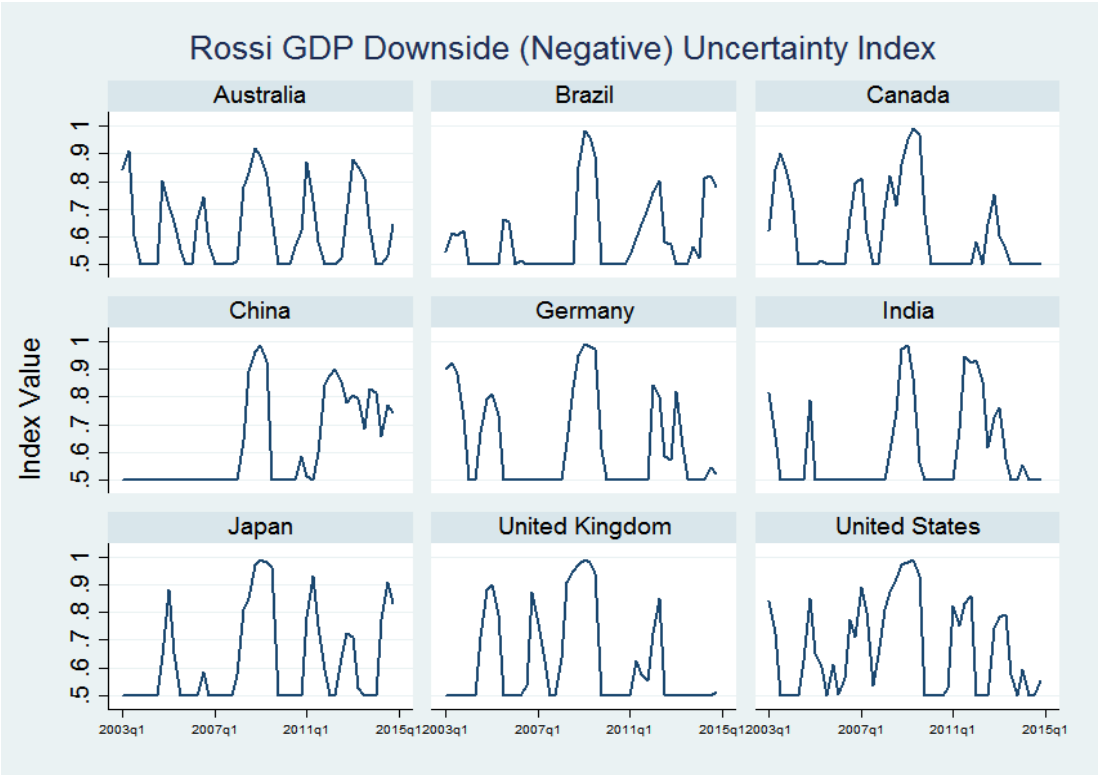

Figure 4.1: Rossi GDP Downside (Negative) Uncertainty Index.

Figure 4.2 (4.3) below plots Rossi GDP Downside index for bank-oriented (market-oriented) countries. Apart from usual spikes in the uncertainty index after the financial crisis, we also observe that Rossi index has a similar pattern in bank-oriented countries

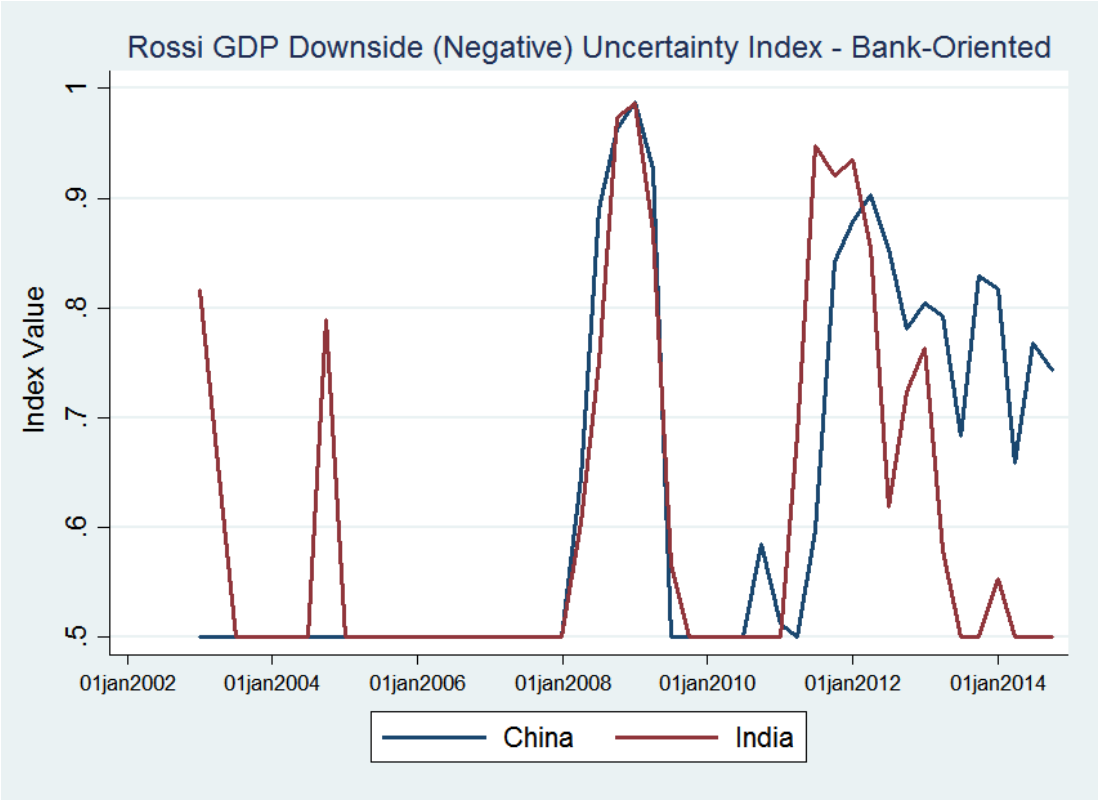

Figure 4.2: Rossi GDP Downside (Negative) Uncertainty Index for Bank-Oriented Countries

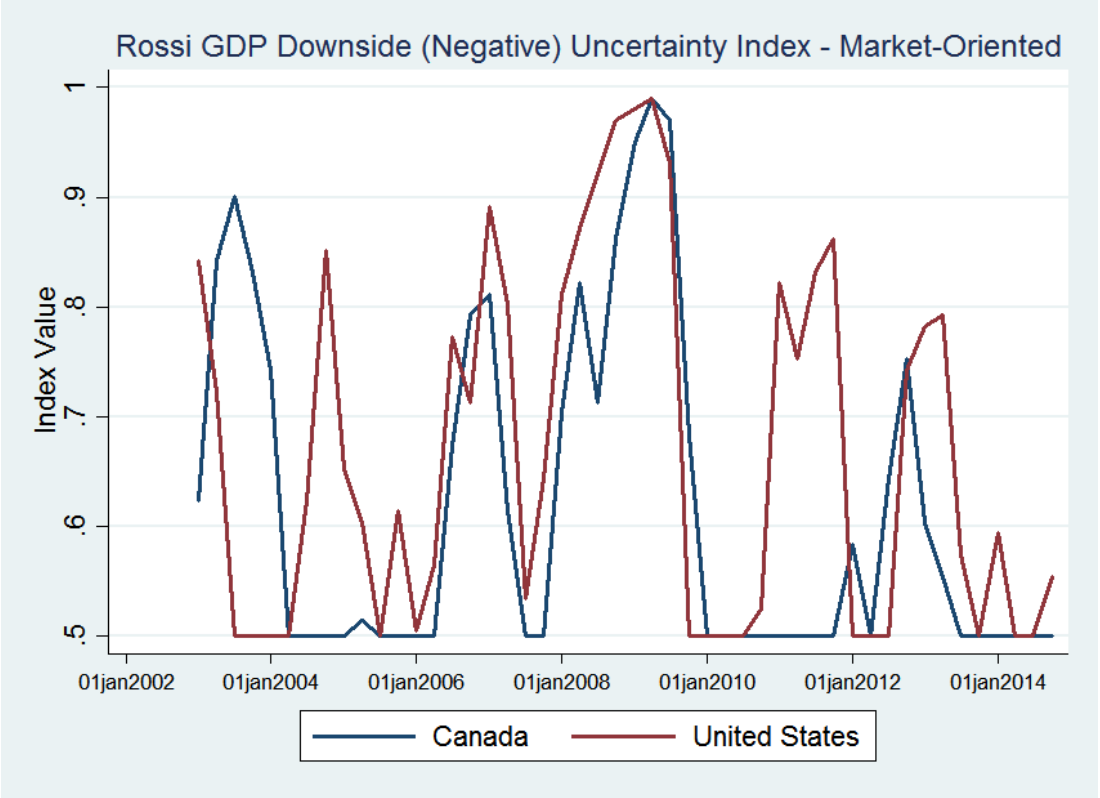

Figure 4.3: Rossi GDP Downside (Negative) Uncertainty Index for Market-Oriented Countries

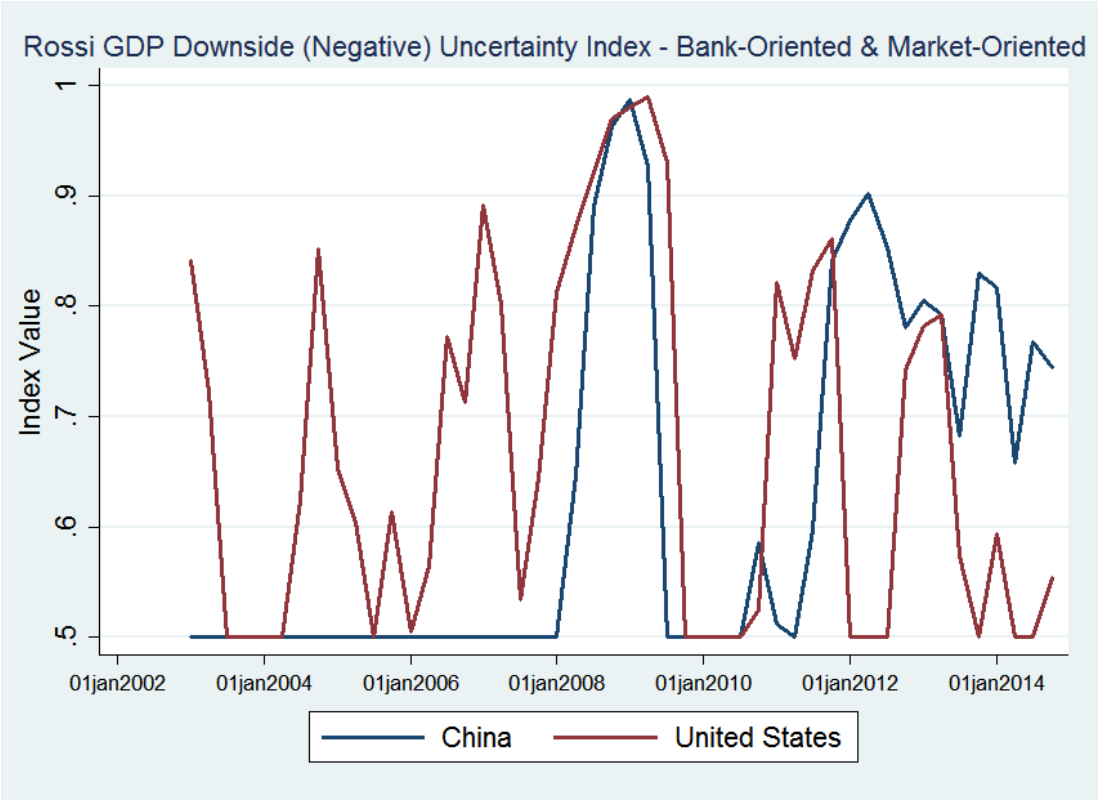

Figure 4.4: Rossi GDP Downside (Negative) Uncertainty Index for Bank-Oriented and Market-Oriented Countries

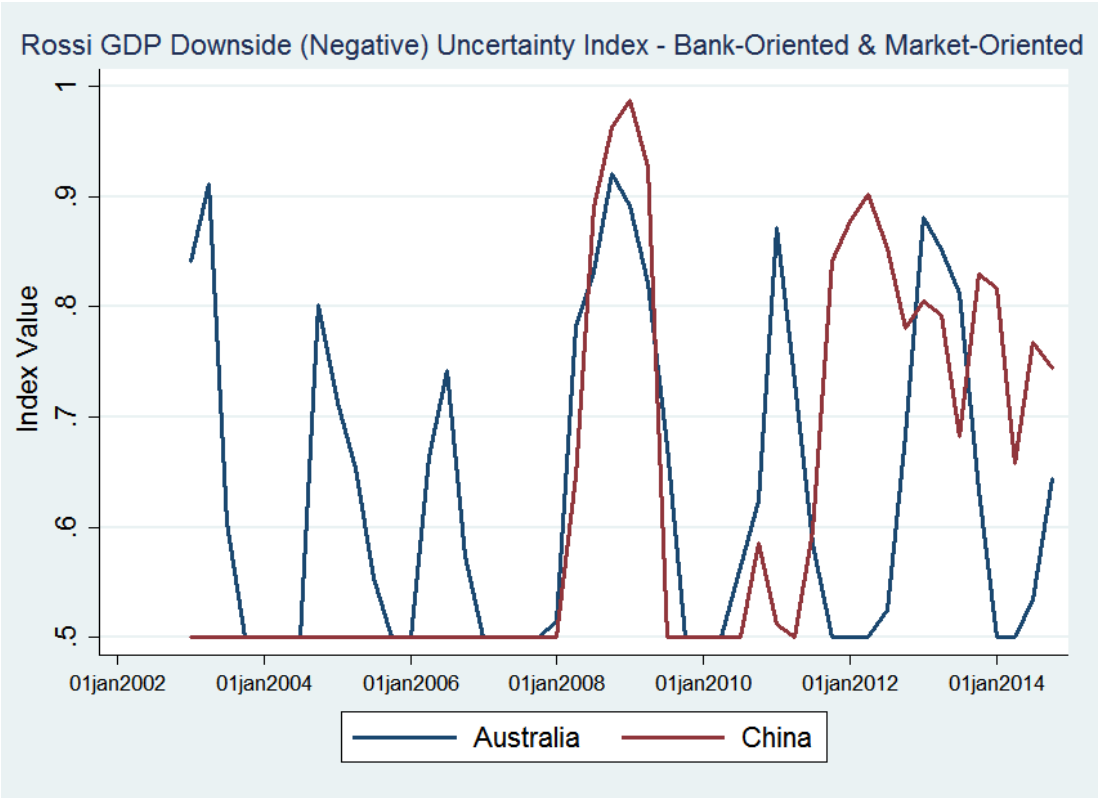

Figure 4.5: Rossi GDP Downside (Negative) Uncertainty Index for Bank-Oriented and Market-Oriented Countries

countries i.e. China & India in Figure 4.2. We also observe a similarity in the evolution of Rossi index while we compare United States and Canada, which are market-oriented countries (Figure 4.3). This shows that bank-oriented and market-oriented economies have similar patterns in terms of GDP uncertainty as shown by Rossi index. Interestingly, we observe in Figure 4.4, that the evolution of Rossi index is not similar across United States (market-oriented) and China (bank-oriented). Infact, we can see that Rossi index moves in an opposite direction in both the countries (other than the spike after the financial crisis). This shows that market-oriented and bank-oriented countries behave differently in terms of evolution of macroeconomic uncertainty. To reinforce this trend, we also plot two other countries i.e. Australia (market-oriented) and China (bank-oriented). We can again see that Rossi index moves in an opposite direction in both these countries. The above graphs, broadly, conveys that message that there is enough variation of Rossi index across different countries and this index behaves differently in bank-oriented and market-oriented countries.

The most compelling reason to use Rossi index in this study is the high cross-country coverage, as compared to other indices. Rossi index is only available for USA (Rossi and Sekhposyan (2015)) and 17 European countries (Rossi and Sekhposyan (2017)). We are very thankful to the authors for providing us the data for Rossi index for 46 countries, which includes a rich mix of bank and market-oriented and developed and emerging economies. We could not find any other index with such a wide coverage of countries, including bank and market-oriented and emerging and developing countries. The Rossi index is available for GDP and inflation uncertainty. We chose to use the GDP uncertainty index as our main variable of interest and control for inflation uncertainty indices in our estimations. The inherent assumption of the Rossi uncertainty index for GDP is that higher (lower) than forecasted GDP is always better (worse). We do not select inflation index as our main variable of interest in this study. Depending on the stage of the business cycle, higher levels of inflation can be desirable. As we do not differentiate between different stages of the business cycles for all the countries in our sample, therefore we decide not to use Rossi Inflation index. Hence, our main variable of interest for measuring macroeconomic uncertainty in this study is GDP uncertainty index, where a higher (lower) value of the index measures higher (lower) uncertainty in the economy with respect to the anticipated and actual GDP.

We combine this quarterly index with the transaction level data of bank loans, bonds and equity issuance for 16,212 non-financial firms from 46 different countries. These firms issue 25,871 bank loans, 19,951 bonds and 42,468 equity securities during the entire sample period i.e. from 2003-2014.

4.2.2 Financial Architecture of the Country and Security Issuance

Empirically, there has been a divide in the literature about the efficacy of either bank-based or market-based financial architecture of any country and its impact on country's growth and capital structure of the firms. Bank-oreinted systems are characterized by a close relationship between lenders and borrowers, which involves higher scrutiny and monitoring (see Diamond (1984) and Holmstrom and Tirole (1997)). On the other hand, market-oriented economies are the ones where borrowers have greater options of obtaining alternate sources of financing, other than the banking sector.

Research on the impact of financial architecture of any country (bank-oriented or market-oriented) on the overall growth/development of the country and performance of firms can be categorized into macro (country level) or micro (firm level) based studies. Most of the studies using macro level data do not find any support for the impact of either bank or market-oriented economies on the overall growth and financial development of any country (see Beck and Levine (2000), (2002), Levine (2002), Demirgüç-Kunt and Maksimovic (2002) and Chakraborty and Ray (2006)). Similarly, using firm level data and collapsing it across countries, Demirgüç-Kunt and Maksimovic (2002) find that it is the overall legal system of the country which predicts access to external financing in any country and not the financial architecture of that country.

On the other hand, various micro (firm) level studies find that financial architecture of the country does matter for various firm level decisions. For example, Antoniou et al. (2006) find that the debt maturity profile of the firm depends on the financial architecture of the country and firms operating in bank-oriented countries have longer debt maturities as compared to the firms in market-oriented countries. Moreover, firms in market-oriented countries consider the market conditions (market timing theory) while deciding about the maturity profile of their external financing. Similarly,

Anderson and Gupta (2009) suggest that the market values of the firms operating in market-oriented countries are higher than similar (and comparable) firms in bank-oriented countries. Didier et al. (2015) is a recent firm level study confirming that firms issuing bonds and equity grow faster in market-oriented countries as compared to similar issuing firms in bank-oriented economies. It is also pertinent to mention that using recent macro data (2000-2011), Demirgüç-Kunt et al. (2013) also provide empirical evidence that as economies grow, the financial services provided by capital markets become relatively more important for economic growth, as compared to the services offered by the banking sector. In another related study, Gambacorta et al. (2014) confirm that when recessions and crisis occur simultaneously, the impact on GDP in bank-oriented countries is three times severe than in market-oriented countries.

We can infer from the above discussion that most of the micro based studies and even macro based studies using the recent (21st century) cross-country data suggest that market-oriented countries are better suited for overall financial development of the country and firms perform better in terms of overall growth and market values. It is possible that increased capital flows across equity and bond markets around the globe and a surge in foreign bonds and equity issuances are responsible for this result. Market-oriented countries have deep and liquid bond and equity markets whereas the banks are the main lenders in bank-oriented countries. In case of a shock to the supply of credit, firms operating in market-oriented countries have alternate sources of financing and therefore they should be able to offset a tightening in lending. On the other hand, firms are mainly dependant on banks for obtaining external finance in bank-oriented countries, therefore there should be a decrease in bank lending after tightening of credit conditions in bank-oriented countries. Therefore, we expect that any impact of downside and upside uncertainty after the financial crisis, on the probability of issuance of banks loans (bonds and equity) should be observed only in bank-oriented (market-oriented) countries. For example, with an increase in the downside uncertainty after the financial crisis, we should expect a lower (higher) probability of bank loan (bond) issuance and this increase in the probability of issuing bank loans (bonds) should only be observed in bank-oriented (market-oriented) countries.

4.2.3 Macroeconomic Uncertainty and External Financing

The main contribution of this study is to investigate the impact of downside and upside macroeconomic uncertainty on the security issuance behaviour of non-financial firms. We investigate the impact of downside and upside uncertainty on the probability of issuance of bank loans, bonds and equity separately. Therefore, we discuss the literature and our expectations about each of these securities below.

In this study, we have different expectations about the impact of downside and upside uncertainty on the issuance of securities. There is some recent evidence that macroeconomic uncertainty is not symmetric. A downside shock will have a different impact on growth, output, stock prices and firm performance as compared to an upside shock. Feunou et al. (2013) investigate the downside and upside time varying risk in the equity returns of S&P 500 and other international return indices. They find that future volatility of stock returns is better explained by negative (downside) return shocks as compared to positive (upside) shocks. In another related paper, Patton and Sheppard (2015) provide strong empirical evidence that negative jumps in the stock prices lead to higher volatility in the future, as compared to positive jumps which produce lower future volatility. Therefore, throughout this paper, we expect downside uncertainty to be the key player in explaining the security issuance behaviour of the firms, with upside uncertainty having little or no impact.

4.2.3.1 Macroeconomic Uncertainty, Bank Loans and Bond Financing

Capital Structure is irrelevant in a Modigliani & Miller world, where there are no financial frictions, no transaction costs and no information asymmetries (Modigliani and Miller (1958), (1963)). In the real world, these factors are not absent and determinants of capital structure play an important role in shaping the external financing decisions of the firms (Rajan and Zingales (1995). Most importantly, financial frictions play a very important role in selecting the source of the external finance. Leary (2009) provide strong empirical evidence that in an event of a shock to the supply of bank loans, firms which have access to bond markets do not suffer a decrease in their leverage ratios. This evidence points to the available opportunity of raising external finance by issuing bonds, instead of bank loans, if there is a shock to the supply of bank credit. The opportunity of issuing bonds and making up for the decreased supply of credit from the banks is not homogenous for all firms. Those firms

who have access to the bond markets do not suffer a decline in their total leverage as they are able to substitute the decrease in the bank lending with an increase in the bond financing.

In the context of the recent global financial crisis, Adrian et al. (2013) provide strong empirical evidence that during the financial crisis, the reduction in the overall leverage overwhelmingly points to the reduction in the supply side of the credit instead of firm's demand for credit. Moreover, firms that had access to the bond markets during the crisis, made up for the lost supply of the bank credit by issuing bonds. Therefore, firms switched their financing mix from bank lending to the bond financing when faced by a reduced supply of bank credit after the crisis. The global financial crisis of 2007 changed the financial landscape for banks and non-financial firms. After the fall of Lehman Brothers, the volume of inter-bank lending and lending to the private sector fell. This shift to bond financing is attributed to various factors including but not limited to contraction in the bank-credit supply and an increase in the risk of the banking sector (Becker and Ivashina (2014)). This change in the mix of external financing is termed as "Second Phase of Global Liquidity" Shin (2014), where the bond markets played a central role in making up for the reduction in bank credit.

We do not investigate the cyclicality of the bank loans, bonds and equity issuance for non-financial firms because our sample is not long enough to cover various business cycles. Nevertheless, the huge literature about the cyclical nature of these securities provide us adequate guidance for formulating the hypotheses about the probability of issuance of these securities. Erel et al. (2012) and Becker and Ivashina (2014) are some of the most recent empirical evidences about the pro-cyclicality of bank loans and country-cyclicality of bonds. These authors investigate the impact of macroeconomic variables related to tightening of lending and overall credit, during recessions and expansions on non-financial firms in the USA. Their findings suggest that despite heterogeneity in issuance behaviour of investment and non-investment grade firms, overall evidence suggests that bank loans are pro-cyclical and bond issuances are counter-cyclical.

Becker and Ivashina (2014) is one of the very recent papers about the impact of an increase in the macroeconomic uncertainty on the likelihood of issuance of bank loans

versus bonds. Using the macro variables from the Senior Loan Officer Opinion Survey about the lending practices of the banks by Federal Reserve and information about bank loans and bonds issuance of non-financial firms, authors find that when firms are faced with tightening of the lending standards, they substitute their external financing mix from bank loans to the bonds. Most importantly, authors only retain the issuer firms in their sample because these firms have non-zero positive demand for the credit. Following these authors, we also exclude all such firms that do not issue any security during the entire sample period i.e. from 2003-2014. We also use firm fixed effects in spirit of these authors to control for the (unobserved) firm's demand for the credit. The first hypothesis that we will be testing in this paper follows directly from the above discussion;

Hypothesis 1: "An increase in the downside macroeconomic uncertainty after the financial crisis should decrease (increase) the probability of issuance of banks loans (bonds). An increase in the upside uncertainty after the crisis should not influence the probability of issuance of either bank loans or bonds. The impact of an increase in the downside uncertainty on the probability of banks loans (bonds) should be observed only in bank-oriented (market-oriented) countries."

4.2.3.2 Macroeconomic Uncertainty and Equity Issuance

Equity issuance is a very important source for raising external financing and stock markets around the world have seen an increase in issuance volumes during last couple of decades. Initial models of substitution between external finance focussed only on the bank loans and bonds (see Bernanke and Gertler (1990), Kiyotaki and Moore (1997) and Bernanke et al. (1999)). According to Fama and French (2005), firms often issue equity which is quantitatively important while analysing the financial frictions for firms during different phases of business cycles. Therefore, many recent models also shed light on the cyclicality of equity issuance during different stages of the business cycles. Interestingly, the evidence about the equity issuance is mixed. For example, the empirical evidence (for USA) and theoretical evidence, respectively in Covas and Den Haan (2011), (2012) suggest that the equity issuance is pro-cyclical (counter-cyclical) for smaller (larger) firms. This difference in the cyclicality of the equity issuances varies according to the size of the firm, where larger firms have better access to the equity markets. Similarly Erel et al. (2012) suggest that for non-financial

firms in USA, equity is pro-cyclical (no relationship) for investment (non-investment) grade firms. In another related study focussing on non-financial firms in USA, Karabarbounis et al. (2014) find that for small firms (large firms) equity issuance is more pro-cyclical (country-cyclical). They also find evidence that dividend payouts influence cyclical properties of equity more than gross issuance of equities.

In very recent evidence, similar in focus to our study, Bergbrant et al. (2017) investigate the impact of a bank lending shock on the volume of IPOs in USA. Their main variable of interest is "changes in aggregate bank lending" as reported in "Senior Loan Office Opinion Survey in bank lending practices" conducted by Federal Reserve. Authors find that after a tightening of the bank lending standards, the volume of IPOs falls considerably. Moreover, this effect is considerably stronger for the firms that are more dependent on external finance. It is pertinent to mention that tightening of bank lending standards is a proxy of an increased macroeconomic uncertainty. Apart from this proxy, authors also use the macroeconomic uncertainty index (EPU) developed by Baker et al. (2016), and find that after an increase in the EPU index, the volume of IPO declines as well.

Another recent contribution among the capital structure theories the Market Timing Theory by Baker and Wurgler (2002). This theory suggests that market timing is one of the most important determinants of equity issuance. Firms issue equity when market valuations are high. Even though the evidence about Market Timing Theory is mixed but it is still considered an important advancement in explaining the capital structure behaviour of the firms. Upside uncertainty in our study refers to a situation when the realized value of GDP is greater than its forecasted (expected) value. The evidence about the impact of higher GDP and stock market volume is mixed in the literature (see Levine (2002) and Hassapis and Kalyvitis (2002). Keeping in view all this evidence, we expect upside uncertainty to play a significant role only for the likelihood of equity issuance of non-financial firms.

In line with all the above discussion about the impact of an increase of the macroeconomic uncertainty on the equity issuance decisions of the firms, our next hypothesis is as follows;

Hypothesis 2: "We expect that with an increase in the downside (upside) macroeconomic uncertainty after the financial crisis, the probability of equity issuance should decrease (increase). Moreover, we also expect that the impact of an increase in the downside and upside uncertainty on the probability of equity issuance should be observed only in market-oriented countries".

4.2.4 Capital Market Financing and Firm Heterogeneity

Consolidating the expectations in above mentioned hypothesis 1 and 2, we expect that an increase in the downside uncertainty after the financial crisis will decrease (increase) the probability of bank loans and equity (bonds) issuance. Moreover, we also expect that an increase in upside uncertainty after the crisis will increase the probability of equity issuance. Therefore, we expect firms to issue more capital market securities (as compared to bank loans) when faced with an increase in the downside macroeconomic uncertainty. We interpret this shift in the financing mix as a substitution effect from bank loans to capital market securities (bonds and equities). We define capital market security issuance as a situation when firms only issue a bond and/or equity and do not issue a bank loan in a given period. The next hypothesis that we test is described below;

Hypothesis 3: "An increase in the downside (upside) uncertainty after the financial crisis should increase (have no impact) on the probability of capital market security issuance."

Cross sectional heterogeneity of the firms and its impact on the capital structure is very well documented in the literature. Various studies have investigated different subgroups of the firms and their heterogeneous behaviour regarding security issuance. For example, while investigating the cyclicality of different securities, Covas and Den Haan (2011), (2012), Karabarbounis et al. (2014) and Begenau and Salomao (2016) focus over differential behaviour of large and small firms, Erel et al. (2012) investigate investment vs. non-investment grade firms and Becker and Ivashina (2014) concentrates on high and low leverage firms. In this paper, we instead focus on groups of firms, which have gained more attention in recent year i.e. foreign vs. domestic firms and firms with low and high asymmetric information costs. Our motivations stems from a very recent study by Lee et al. (2016). Authors provide suggest that using

the institutional channel through foreign asset positions (foreign and domestic firms) and informational channel through cross-listing on various stock exchanges in the world with more strict disclosure requirements (firms with low and high asymmetric information costs), firms reduce their overall riskiness, as measured by CDS spreads. These results hold even after controlling for a host of firm fundamentals and macroeconomic variables. This suggests that foreign presence of the firms (institutional presence) and mechanisms to reduce the asymmetric information costs (informational channel) helps the firms to reduce their overall riskiness beyond the fundamentals of the firm and the country. This reduction in the firm's riskiness should provide additional benefits (competitive edge) to these firms over their peers e.g. regarding capital structure and investment decisions.

We identify all such firms in our sample who have foreign presence (either in form of foreign assets or sales or distribution network or branch offices) and we call these firms foreign firms. There are total of 3,656 foreign firms in our sample and remaining 12,556 are domestic firms. Next, we identify all those firms who are followed by an analyst or a brokerage firm (all firms are listed firms in our sample). There are total of 6,105 such firms and we categorize them as "firms with low asymmetric information costs" and remaining 10,107 firms as "firms with high asymmetric information costs". Our main motivations behind both these groups of firms is to identify those firms which should have comparative advantage over their peers while they access capital markets (or banks) for security issuance. We argue that after the financial crisis, foreign firms as compared to domestic firms should have greater opportunities for issuing capital market securities. In a similar fashion, firms with low asymmetric information costs should also have a similar advantage. Therefore, our final hypothesis is as follows;

Hypothesis 4: "An increase in the downside (upside) uncertainty after the financial crisis should increase (have no impact) on the probability of issuance of capital market securities by foreign firms. Furthermore, an increase in the downside (upside) uncertainty after the financial crisis should increase (have no impact) on the probability of issuance of capital market securities by firms with lower asymmetric information costs."

4.3 Empirical Methodology

This section explains the empirical methodology, estimation equation and our main variables of interest. We are mainly interested in investigating the impact of an increase in the downside and upside macroeconomic uncertainty after the financial crisis, on the probability of issuance of bank loans, bonds and equity. Instead of using non-linear models such as Logit or Probit, we choose linear probability model (LPM) which is estimated using OLS. The rationale for choosing OLS is explained after we describe the main equations below.

Equation 4. 1:

$$Security_{ijskt} = \beta_0 + \beta_1\, Crisis\_Dum_t + \beta_2\, GDP\_Down_{kt-2} + \mathbf{\beta_3\, (Crisis\_Dum_t * GDP\_Down_{kt-2})} + \beta_4\, (Rossi\_Index\_Control_{kt}) + \beta_5\, (Security\_Controls_{ijskt}) + \beta_6\, (Firm\_Controls_{iskt-1}) + \beta_7\, (Country\_Controls_{kt-1}) + \mu_i + \lambda_t + \varepsilon_{ijskt} \quad (1)$$

Equation 4. 2:

$$Security_{ijskt} = \beta_0 + \beta_1\, Crisis\_Dum_t + \beta_2\, GDP\_Up_{kt-2} + \mathbf{\beta_3\, (Crisis\_Dum_t * GDP\_Up_{kt-2})} + \beta_4\, (Rossi\_Index\_Control_{kt}) + \beta_5\, (Security\_Controls_{ijskt}) + \beta_6\, (Firm\_Controls_{iskt-1}) + \beta_7\, (Country\_Controls_{kt-1}) + \mu_i + \lambda_t + \varepsilon_{ijskt} \quad (2)$$

In equations 4.1 and 4.2 above, a firm "i" issues a security "j" (bank loan or bond or equity), in sector "s", country "k" and quarter "t". In all the above equations, $Crisis\_Dum_t$ is a dummy variable equal to 1, if year is greater than 2008 and zero otherwise. We estimate equation 4.1 (4.2) for investigating the impact of downside (upside) uncertainty on the probability of issuance of bank loans, bonds and equity. In both the equations above, the dependent variable ($Security_{ijskt}$) is always a dummy

variable equal to 1 or zero. In case of bank loans, this dependent variable is equal to 1 if a firm issued a bank loan and zero otherwise. Similarly, when we investigate the probability of issuance of bonds (equity) issuance, we replace the dependent variable with a dummy variable equal to 1 if the firm issued a bond (equity). Finally, while investigating the probability of issuance of capital market securities, we replace dependent variables in equations 4.1 & 4.2 with a dummy variable equal to 1, if a firm only issued a bond or an equity (or both) in a particular quarter (and not a bank loan at all) and zero otherwise.

There is enough evidence in the literature that macroeconomic variables e.g. interest rate shocks, impact the economy and financial markets with a lag. Following Goodhart and Hofmann (2001), Bjørnland and Jacobsen (2010) and Mohanty (2012), we allow a lag of 2 quarters for macroeconomic uncertainty to influence the capital structure decisions of non-financial firms. Therefore, GDP_Down_{kt-2} (GDP_Up_{kt-2}) is the two quarter lagged value of GDP Downside (Upside) uncertainty from the quarter of the issuance of a bank loan or a bond or an equity. For example, if a firm issues a bank loan (or a bond or an equity) during second quarter of 2014 (1st Apr to 30th Jun 2014), we use the GDP Downside (and Upside) index as on 31st Dec 2013. Our main interest in both equations is β_3, which is the coefficient for double interaction ($Crisis\_Dum_t$ * GDP_Down_{kt-2} and $Crisis\_Dum_t$ * GDP_Up_{kt-2}). The coefficient on this double interaction informs us about the impact of an increase in the GDP downside (and upside) macroeconomic uncertainty after the crisis, on the probability of issuance of bank loans, bonds and equity. We also control for a host of variables in both the equations 4.1 & 4.2. Rossi_Index_Controls includes first quarter lags of GDP (Downside and Upside) and Inflation (Downside and Upside) uncertainty indices. Security_Controls include dummy variables for foreign issued securities, listed securities, investment grade bonds and long term loans. Firm_Controls include tangibility, Tobin's Q, size, profitability, financial constraint index, total leverage, current ratio, debt capacity and age of the firms. Finally, Country_Controls include natural log of GDP, proxies for volume of issuance in stock market, syndicated loan and bond markets, banking sector proxies and overall lending rate in the country.

We lag all our firm and country level variables by one period. By lagging these independent variables, we are not using the lagged values as internal instruments (or 2SLS). The rationale of lagging all our firm and country level independent variables is as follows. If accounting close of the firm (the date on which firm closes its annual accounts) is 31st Dec 2012 and this firm issues a bond on 5th June 2013 (let's call 5th June 2013 as time "t"), then we do not observe yearly profits, leverage, current ratio and debt capacity etc. at time "t" but only for time "t-1". Same rationale applies for the macroeconomics variables as well. This means that in year 2013, we only observe firm (and country) level variables for 2012 and not 2013. Therefore, we lag all our firm and country level independent variables by 1 year. Another implicit assumption while we lag our firm level independent variables is that investors do not have inside information. If investors have inside information and they know about profits and sales of the firms at time "t", then profits and sales at time "t" should be included in the regression equation as compared to profits and sales at time "t-1". Therefore, we assume in this study, that investors do not have inside information. Investigation of insider information is out of the scope of this study. Using pre-determined values (at time "t-1") of independent variable may also help in avoiding any potential endogeneity arising from inside information but we do not emphasize it very much here. Finally, because of potential endogeneity arising from reverse causality (simultaneity issues), we caution our readers not to interpret our results as causal.

We also split our overall sample into bank-oriented and market-oriented countries and estimate both the above equations separately for each sub sample (please see section 4.4.3 for the methodology used in categorizing countries as bank-oriented or market-oriented economies). We summarize our expectations about the impact of downside and upside uncertainty on the probability of issuance of bank loans, bonds and equity, in the below table;

Table 4.1: Expectations and Actual Results:

Dependent Variables	Equation	Coefficient	Expectation	Actual Outcome
GDP Downside Uncertainty				
Bank Loans	4.1	β_3	-ve	-ve
Bonds	4.1	β_3	+ve	+ve
Equity	4.1	β_3	-ve	-ve
GDP Upside Uncertainty				
Bank Loans	4.2	β_3	Insignificant	Insignificant
Bonds	4.2	β_3	Insignificant	Insignificant
Equity	4.2	β_3	+ve	+ve

Based on the discussion in section 4.2.2, we expect all the above mentioned results about bank loans (bonds and equity) to hold only in bank-oriented (market-oriented) countries. Moreover, in spirit of Becker and Ivashina (2014), we also include fixed effects (μ_i) in all the above equations. These firm fixed effects control for unobserved time invariant factors including the firm's demand for credit. Moreover, we also restrict our sample to only issuer firms i.e. all firms which issue at least a bank loan or a bond or equity (or a combination) from 2003-2014. This ensures that all firms have a positive demand for credit, otherwise we cannot differentiate that whether a firm has not issued a security because of supply side or demand side effects. By only including the issuer firms in our sample and controlling for the firm's demand for credit, we make sure that our results are driven by supply side effects of credit on capital structure decision of the firms. λ_t are the quarter fixed effects to control for any time trends which vary across quarter and ε_{ijskt} is the error term, clustered at firm-quarter level to control for the variation arising from each firm-quarter pair.

Once again following Becker and Ivashina (2014), we use OLS to estimate equations 4.1 & 4.2. Our dependent variable in all the above equations is a dummy variable equal to 1 and 0 and an obvious choice is to use non-linear models such as Logit or Probit models. Equations 4.1 & 4.2 above include double interaction of Crisis Dummy with GDP Downside and Upside Uncertainty and this double interaction is our main variable of interest. In case of using any non-linear model (Logit or Probit), we will

have to interpret our variables in a Logit or Probit model in the presence of interactions. Ai and Norton (2003) and Greene (2010) have provided enough evidence that the magnitude of interaction term in nonlinear models is not equal to the marginal effects of the interaction effect. The marginal effect can also be of opposite-sign and standard statistical softwares cannot calculate the statistical significance of these marginal effects. Therefore, standard tests about the interaction terms in non-linear (Logit and Probit) models are not necessarily informative. These authors also suggest solutions to overcome these problems, but they involve graphical illustrations instead of relying on coefficients of interactions or marginal effects. Therefore, to overcome all these problems, we will use OLS to estimate equations 4.1 & 4.2 in in our study. Our model will be a Linear Probability Model (LPM) and the coefficients obtained from LPM are the marginal effects themselves. LPM is a model where we use OLS to estimate regressions when the dependent variable takes the value of either zero or one.

We should also bear in mind that LPM suffers from heteroskedastic errors and it also produces predicted probabilities, which are less than zero and greater than one. As we do not aim to forecast the probabilities of security issuances in this paper (especially out of the sample forecasting), therefore we keep our attention on the sign of the coefficient obtained through LPM, instead of the magnitude of coefficient. In other words, we are more interested in whether an increase in the downside and upside macroeconomic uncertainty increases or decreases the probability of the bank loan, bond and equity issuance. Moreover, keeping in view the advice of Ai and Norton (2003) and Greene (2010), we prefer using LPM over non-linear probit and logit models. Using a probit and logit model and obtaining incorrect marginal effects on our interactions will be a greater problem as compared to using LPM and considering only the sign of the coefficient and not the magnitude of the coefficient.

At the same time, we should not ignore that LPM produces heteroskedastic errors and any statistical inference in presence of heteroskedastic errors will not be valid. Therefore, we carefully deal with this problem in light of Stock and Watson (2008). These authors show that if time period is greater than 2 (T>2), then the conventional heteroskedasticity robust variance estimator (typically, available in Stata with a robust option) is inconsistent for a fixed effects panel data model. Instead, authors show that if errors can be classified as low order MA series and time period is moderately large,

then we can get rid of the inconsistency by imposing an MA structure over the error term. If we place no restrictions on the structure of serial correlation of the errors and T>2, then researcher should use cluster robust standard errors. These cluster robust standard errors are also heteroskedastic robust and available in Stata with a vce (cluster) option. Keeping in view the above discussion, we use cluster robust standard errors in all our estimations and these standard errors control for any intra group correlation among errors and heteroskedasticity among errors as well. We also observe that these cluster robust standard errors impose a greater penalty in our estimations i.e. these cluster robust standard errors, as compared to simple robust standard errors (without clustering), inflate the standard errors more and thus impose a stricter condition for hypothesis testing and significance of coefficients.

For hypothesis 4, we create a dummy variable "Foreign Firm Dummy" which is equal to 1 if the firm has a foreign presence and zero otherwise. Similarly, we also create a dummy variable "Low Information Cost Firm Dummy" which is equal to 1 if a firm is followed by an analyst (as per the information provided by Osiris) and zero otherwise. We use the former dummy to investigate any heterogeneous behaviour of capital issuance securities between foreign and domestic firms. The latter dummy is used for differentiating the behaviour of issuing capital securities, between firms facing lower and higher asymmetric information costs.

4.4 Data and Statistics

This section explains how we construct the data for this study. The sample consists of firm level data from Osiris matched with transactional level (bank loans, bonds and equity) data from Thomson Reuters Eikon. We will explain about both sources below and steps taken to construct the final sample for this study.

4.4.1 Firm Level Data

We use Osiris (by Bureau van Dijk – hereafter called BvD) for obtaining firm-level information. Osiris is one of the most comprehensive databases for listed firms across the globe. Financial information in Osiris is highly harmonized across different countries and is very helpful in controlling for the heterogeneity in accounting standards in different countries (IFRS vs. local accounting standards, GAAP etc.). BvD collects the data from local Chambers of Commerce and various other sources

which makes the coverage better, especially for emerging and developing countries. This broad coverage minimizes the chances of any selection bias. We use the March 2015, online version of Osiris to extract the data for this study and restrict our sample to listed non-financial firms. Based on the coverage of non-financial firms, we draw our sample of firms starting from 2003 to 2014. This provides us with 5 years of data before the Global Financial Crisis of 2007. Our initial sample consists of 50,104 non-financial firms from 77 different countries. These countries include a mix of developed and emerging economies. As standard in the literature, we drop all observations if total sales, cash or total assets of the firm is negative. We only retain active firms in our sample. We trim all our variables below 1% and above 99% to drop any outliers but if we take the natural log of any variables (for example sales of firm or amount of bond issued by the firm), we do not trim this variable.

Firm-level control variables include tangibility, Tobin's Q, natural log of net sales, profitability, SA index for financial constraints, total leverage, current ratio, debt capacity and age of the firm. Table C.2 includes detailed definitions of all these variables and Table C.3 provides the summary statistics of all variables for the whole sample and for bank-oriented and market-oriented countries separately. We also include the correlation matrix of all independent variables used in this study in Table C.5. The highest correlation is 0.85 between natural log of net sales and SA index. This is not surprising because SA index is a linear combination of total assets and age of the firm and therefore we expect SA index to be highly correlated with size proxies of the firm such as assets and sales. Other highly correlated variables are natural log of GDP and outstanding domestic private debt securities to GDP ratio (correlation coefficient is 0.79) and stock market capitalization to GDP ratio and syndicated loans to GDP ratio (correlation coefficient is 0.76). High correlation between these macroeconomic variables is expected as with an increase in GDP, stock market capitalization and domestic private debt securities issuance (including bonds) increase in 46 countries in our sample.

4.4.2 Bank Loans, Bonds and Equity Issuance Data

We draw our sample of syndicated bank loans, bonds and equity issuance data from Thomson Reuters Eikon database. Eikon contains transactional level information about syndicated bank loans, bonds and equity issuances. Eikon is a very similar

database to Thomson Reuters LoanConnector and Security Data Corporation (SDC) Platinum database (see Didier et al. (2015) for a recent example). Choice of the database (Eikon as compared to LoanConnector or SDC Platinum) is based on the availability of the database. Nevertheless we cross check information about issuance of syndicated bank loans and bonds in Eikon with Global Financial Development Database (GFDD) which is developed by Martin et al. (2012) and updated yearly by the authors. We compare Eikon with GFDD because we do not have access to SDC Platinum but syndicated bank loans and bonds issuance information in GFDD is compiled using most comprehensive Global Syndicated Loans and Bonds Databases of the World Bank i.e. Loan Analytics Database, Dealogic and FinDebt. GFDD contains information about newly issued syndicated loans and bonds in each country two variables named "Syndicated loan issuance volume to GDP (%)" and "Corporate bond issuance volume to GDP (%)". We multiply both the variables with GDP of their respective countries in USD and obtain new variables which are newly issued syndicated loans and bonds each year. We then sum the data for newly issued bank loans and bonds for each country and year using our database (Eikon). We can now compare the information across Eikon and GFDD. A correlation matrix between yearly issuance data of bank loans and bonds obtained from GFDD and Eikon (our data) is presented in presented in Table C.4. We can see that the correlation coefficient for the bank loans (bonds) issuance between GFDD and Eikon is 0.98 (0.93). These high correlations assure us that the coverage of Eikon is comparable with one of the most comprehensive databases in the World.

We download the information about syndicated bank loans, bonds and equity issued by non-financial firms from Eikon from 2003 to 2014, matching the time period of transactional data with the firm level data from Osiris. Eikon contains rich information about each transaction ranging from nature of the security (bank loan or bond or equity), amount and currency of the issue, country of the issue, main country of the issuer firm, maturity and interest rate (in case of bank loans and bonds), listing status etc. It is pertinent to mention here that issue amount of the security is not relevant in our study because we are interested in the probability of the issued security (bank loan, bond and equity) irrespective of the amount of the security. Definitions of all the transactional and firm level variables is mentioned in Table C.2. We drop all bank loans and bonds with a maturity of less than one year. Usually equity issuances do not

have a maturity but if we have information about the maturity of equity issuances, we also drop all equity securities with a maturity of less than one year. We drop all short term securities because our main variable of interest is the two quarter lagged value of GDP Downside and Upside uncertainty. Therefore, including any short term securities may result in the security maturing within 2 quarters. Moreover, we want to concentrate over bond issuances instead of commercial papers (notes), thus dropping all short term securities.

One of the biggest hurdles is to match the firms between Eikon and Osiris, when the names of the firms is not unique across both the databases and there is no unique identifier available as well. To overcome this problem, we hand-match[22] names of firms across Eikon and Osiris. Out of the total 50,104 firms in Osiris, we are able to match 17,024 firms between Eikon and Osiris. After dropping all short term securities, we are left with 16,212 firms from 2003-2014. Following Becker and Ivashina (2014), we drop all such quarters in which firms do not issue any security (bank loan, bond or equity) at all. We drop all such quarters to keep only those firm-quarters in which firms have positive demand for credit. Therefore, our final sample is an unbalanced panel and consists of 16,212 with 93,327 observations across 46 countries from 2003-2014.

It is pertinent to mention that our final matched sample (between Osiris and Eikon) consists of relatively larger firms among all listed firms, as compared to those firms which we could not match between both these databases. Our bank loans information is about syndicated bank loans and usually larger firms in the market avail these syndicated bank loans. Matched firms, as compared to unmatched firms, have higher market capitalization, employees, cash, total leverage, Tobin's Q and sales. Therefore, our results are suggestive for larger firms in the economy and we do not generalize our results for all kinds of firms, especially smaller ones.

[22] We used an add-in of Microsoft Excel called "Fuzzy Lookup" to match names of "BANKER" across Osiris and Bankscope. Fuzzy Lookup matches non-identical strings using a Fuzzy code, already built in the Microsoft Excel. This provides a Similarity Score which ranges from 0 to 1, where a score of 1 means an exact match. As our starting point, we use Fuzzy Lookup and then hand-match all those bank names who have Similarity Score greater than 0.75 and less than 1. Any Similarly Score less than 0.75 is not a match at all (an observation based on repeated experience).

4.4.3 Bank-Oriented and Market-Oriented Countries

One of the objectives of this study is to investigate the impact of heterogeneous financial architecture of the country on the security issuance behaviour of the firms operating in bank-oriented and market-oriented countries. Therefore, in this section, we explain in detail about our methodology for dividing the countries into bank-oriented and market-oriented economies. There is no single matrix which can provide a unique solution to divide any set of countries into either bank-oriented or market-oriented groups. In bank-oriented countries, bank lending dominates the overall financing to all the sectors and capital market financing provides a major proportion of overall lending in market-oriented countries. We take help from two prominent papers who have already divided various countries into either of these groups. The methodology used by both these papers is complementary, therefore we take help from both these papers simultaneously and carefully divide the countries in our sample into either bank-oriented or market-oriented category.

Our main source for the classification is Gambacorta et al. (2014). These authors, using comprehensive macro data from World Bank and BIS, plot the ratio of bank credit to the bank credit plus total bond and equity market capitalization from 1991-2000 and 2001-2011 separately. This comparison of ratios for two different periods of data helps to identify if countries have become more or less market-oriented over time. If the ratio of bank credit is higher (lower), then the country is considered as a bank-oriented (market-oriented) country. Authors do not use any cut-off of this ratio, but we select 50% as the cut off. All countries having the bank credit ratio above 50% are classified as bank-oriented countries and below 50% as market-oriented economies. It is also pertinent to mention that if any country has this ratio lower than 50%, but the country has become more bank-oriented from 1991-2000 to 2001-2011, we classify that country as bank-oriented. For example, bank credit ratio for Sweden for the period 1991-2000 (2001-2011) is 25% (42%). Similarly, for Denmark this ratio is 22% (45%) in 1991-2000 (2001-2011). United Kingdom also falls in this category. The bank credit ratio for United Kingdom is 45% (53%) from 1991-2000 (2001-2011). Belgium and Malaysia are couple of other countries classified as bank-oriented because of the similar reason.

We also verify our classification of the countries using Didier et al. (2015). These authors construct the average (from 2003 to 2011) of the total bank lending claims on private sector to equity market capitalization for almost 31 countries. If the average of this ratio for any country is above the sample median, authors classify that country as bank-oriented and if the ratio is below median sample, then they categorize the country as market-oriented. Our classification is in line with Didier et al. (2015) as well, other than United Kingdom, which is classified as market-oriented by these authors but we categorize United Kingdom as bank-oriented country (explanation given above). Our results do not change, even if we classify United Kingdom as market-oriented country. If there is no information about any country in Gambacorta et al. (2014), for example Greece and Bulgaria, we look for the classification in Didier et al. (2015). If there is no information available for any country in both the above mentioned paper, for example Croatia, Nigeria and Romania, we look for bank loans, bonds and equity issuance data from central banks of these countries. These three countries are classified as bank-oriented based on our search.

Our final sample includes Argentina, Australia, Brazil, Canada, Chile, Finland, France, Greece, Hong Kong, Indonesia, Mexico, Peru, Russia, Saudi Arabia, Singapore, South Africa, Switzerland and United States as market-oriented countries and Austria, Belgium, Bulgaria. China, Colombia, Croatia, Cyprus, Denmark, Egypt, Germany, Ireland, Israel, Italy, Japan, Malaysia, Netherlands, Nigeria, Norway, Philippines, Poland, Portugal, Romania, Spain, Sri Lanka, Sweden, Thailand, Turkey and United Kingdom as bank-oriented countries.

4.4.4 Descriptive Statistics

This section explains the summary statistics for the variables used in this study. Before describing the summary statistics, we will shed light on the nature (suitability) of the data. As explained in section 4.2.1, we select Rossi Index because of its highest coverage for 46 countries (data provided by the authors on request). On the other hand, data for EPU index (by Baker et al. (2016)) is only available for 22 countries (mostly advanced) and only for 5 countries in case of Scotti Index (by Scotti (2016)). Our firm level data from Osiris consisted of 50,104 firms from 77 countries. We obtain bank loans, bonds and equity issuance information from Eikon (a database by Thomson Reuters). After merging the security issuance information from Eikon with firm level

information from Osiris, we are left with 16,212 firms across 46 countries from 2003-2014. Selection of 46 countries and 16,212 firms is a direct outcome of matching firm's information across Eikon and Osiris. Therefore, this is the largest possible sample, which we could create after merging firm level and transactional level information. These 46 countries contain a good mix of developed (26) and developing (20) countries. Moreover, our final sample consists of 28 bank-oriented and 18 market-oriented countries. Therefore, in our opinion, the final sample consists of a balanced mix of countries, most importantly a good mix of bank-oriented and market-oriented countries, which is important for the purpose of investigating hypothesis 1 & 2 of this study.

However, we emphasize our readers here that matched and unmatched sample (between Osiris & Eikon) differ from each other. Table C.3 presents summary statistics for matched and unmatched sample. We can see that matched firms have more employees than unmatched firms. Moreover, matched firms have higher cash and higher loans as well. Market value and Tobin's Q of matched firms is also higher. Finally, matched firms, as compared to unmatched firms have higher fixed assets and higher sales as well. Therefore, our final sample for this study, consists of larger firms (in terms of assets, sales, employees, cash etc.) and therefore we do not generalize our results for all kinds of firms. Our results are only representative of larger firms.

Table C.3 also presents summary statistics for the overall sample and for bank-oriented and market-oriented countries. We present summary statistics for Rossi Index for GDP (overall index, upward and downward index), firm level variables and macro variables. Looking at the statistics for the overall sample, we find that in the overall sample, Rossi GDP Downside Index (0.63) is greater than GDP Upside Index (0.60). This shows that on average, GDP downside (negative) uncertainty remains higher than upside (positive). Similar patterns are observed for Inflation Downside (0.66) uncertainty as compared to Inflation Upside (0.59) uncertainty.

At the firm level, we observe that average Tobin's Q of the firms is 2.16, which shows that, on average, investors do recognize the future growth opportunities of the firms, hence market (replacement) value of the firms is almost 2.6 times higher than their book value. On average, firms obtain loans amounting to 50% of their total asset value,

which is quite high. This implies that firms are highly levered in our sample. It is interesting to observe that firms in our sample have average negative profitability i.e. -0.13. We measure profitability as earnings before interest and taxes (EBIT) divided by total assets of the firms. This implies that on average, firms have negative EBIT and thus negative profitability. In a similar fashion, total debt capacity (debt service capacity) is also negative. We measure debt capacity as total cash from operating activities divided by short term liabilities of the firm. This suggests that on average, firms in our sample have negative cash from operating activities.

Summary statistics for macroeconomic variables also reveal some interesting results. Countries in our sample have deep and liquid stock markets (101.54% stock market capitalization as a percentage of GDP) but syndicated bank loans to GDP ratio (7.63) and bonds issuance to GDP (2.86) remain very low. This shows that stock markets play a greater role as compared to syndicated bank loans and bonds issuance. Statistics from our data also corroborate these statistics. We find that 16,212 firms in our sample issue 25,871 bank loans, 19,951 bonds and 42,468 equity securities during the entire sample period i.e. from 2003-2014.

Table C.3 also presents summary statistics for bank-oriented and market-oriented countries separately. We find that on average, market-oriented countries face higher GDP Downside (negative) uncertainty (0.64) as compared to bank-oriented countries (0.63). On the other hand, market oriented countries face lower GDP upside uncertainty (0.58), as compared to bank-oriented countries (0.63). This suggests, that on average, market-oriented countries have higher risks in terms of GDP uncertainty. We observe similar trends in Inflation Downside uncertainty, between bank-oriented and market-oriented countries.

For firm level variables, we observe that firms in market-oriented countries (as compared to bank-oriented countries) have higher Tobin's Q, which is a direct outcome of market-oriented countries having deep and liquid capital markets. Regarding profitability and debt capacity, we observe opposite trends. Firms in bank-oriented countries have positive profitability (0.04), whereas firms in market-oriented countries have negative profitability (-0.2). Similarly, firms in bank-oriented countries have greater capacity to pay debt (0.37), as compared to firms in market-oriented countries,

which have negative debt capacity (-1.06). Even though, we do not have a direct measure of firm's riskiness, but these averages suggest that firms in market-oriented countries are riskier, as compared to bank-oriented firms.

Finally, market-oriented countries have higher stock market capitalization to GDP ratio (116.57), higher syndicated banks loans to GDP ratio (9.17) and higher bonds issuance to GDP ratio (3.2) as compared to bank-oriented countries. It is also interesting to observe that the average interest rate in market-oriented countries is higher (4.42) as compared to bank-oriented countries (3.36).

4.5 Empirical Results

In this section, we present all the results in support of all four hypotheses mentioned above. Section 4.5.1 (4.5.2) presents the results (robustness results) for hypothesis 1 and 2. Section 4.5.3 discuss the results for hypothesis 3 and 4.

4.5.1 Main Results

This section presents the discussion about hypothesis 1 and 2 mentioned in section 4.2.3.1 and 4.2.3.2 above. We expect that with an increase in the GDP Downside (Upside) uncertainty, the probability of bank loan (bond) issuance should decrease (increase). Moreover, we also expect that an increase in the upside uncertainty will not affect the likelihood of issuance of both bank loans and bonds. Finally, we expect that these results about bank loans (bonds) issuance will be observable only in bank oriented (market-oriented) countries. An increase in the GDP downside uncertainty includes, but not limited to, tightening in the lending standards and the supply of credit and after controlling for the firm's demand for credit, we are confident that all our results point towards supply side effects.

Table 4.2 below shows results in support of hypothesis 1. We estimate Column 1 (4) in Table 4.2 below by using equation 4.1 (4.2) and replacing the dependent variable with the bank loan dummy. Columns 2 and 3 (5 and 6) are estimated using equation 4.1 (4.2) and splitting the sample into bank-oriented and market-oriented countries respectively.

Table 4.2: Downside (Upside) Uncertainty and Bank Loans Issuance: (Hypothesis 1)

Dep Var = Bank Loan Dummy	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
	GDP Down	GDP Down	GDP Down	GDP Up	GDP Up	GDP Up
	All Sample	Bank-Oriented	Market-Oriented	All Sample	Bank-Oriented	Market-Oriented
UNCERTAINTY INDICES						
Crisis_Dum	0.300†	0.127**	0.325†	0.141†	-0.066	0.335†
	[8.05]	[2.31]	[5.81]	[3.87]	[-1.18]	[5.52]
L2.GDP_Down_Ind	0.206†	0.086	0.124**	0.070†	-0.062*	0.098†
	[5.82]	[1.22]	[2.53]	[3.15]	[-1.85]	[2.99]
Crisis_Dum # L2.GDP_Down_Ind	**-0.214†**	**-0.210†**	**-0.070**			
	[-5.64]	**[-2.89]**	**[-1.32]**			
L2.GDP_Up_Ind	0.091†	-0.029	0.055	0.058	-0.089	0.070
	[4.16]	[-1.09]	[1.48]	[1.58]	[-1.64]	[1.03]
Crisis_Dum # L2.GDP_Up_Ind				**0.052**	**0.104***	**-0.007**
				[1.35]	**[1.76]**	**[-0.09]**
UNCERTAINTY INDICES CONTROLS						
L1.GDP_Down_Ind	0.036	0.025	0.055	0.037	0.021	0.077**
	[1.61]	[0.90]	[1.62]	[1.62]	[0.69]	[2.10]
L1.GDP_Up_Ind	-0.085†	0.036	-0.021	-0.085†	0.029	-0.017
	[-4.08]	[1.42]	[-0.62]	[-4.03]	[1.06]	[-0.46]
L2.INF_Down_Ind	0.151†	0.197†	0.032	0.150†	0.232†	0.047*
	[8.74]	[7.88]	[1.39]	[8.57]	[8.73]	[1.80]
L2.INF_UP_Ind	0.089†	0.157†	-0.017	0.085†	0.165†	-0.008
	[4.19]	[5.32]	[-0.60]	[4.03]	[5.08]	[-0.26]
TRANSACTION LEVEL CONTROLS						
Foreign Loan	0.801†	0.742†	0.766†	0.801†	0.831†	0.862†
	[129.80]	[98.28]	[70.29]	[129.46]	[121.00]	[84.93]
Long Term Loan		0.238†	0.446†			
		[27.13]	[53.28]			
FIRM CONTROLS						
Tangibility	-0.073†	-0.067**	-0.056**	-0.072†	-0.060**	-0.061**
	[-3.58]	[-2.54]	[-2.54]	[-3.53]	[-2.08]	[-2.45]
Tobin's Q	-0.000	-0.004*	0.000	-0.000	-0.005*	-0.000
	[-0.62]	[-1.85]	[0.29]	[-0.49]	[-1.86]	[-0.42]
ln (Net Sales)	0.017†	0.012**	0.013†	0.017†	0.014**	0.014†
	[5.39]	[2.52]	[4.09]	[5.47]	[2.57]	[3.84]
Profitability	-0.007*	-0.002	-0.009†	-0.007**	-0.002	-0.009**
	[-1.96]	[-0.19]	[-2.84]	[-2.02]	[-0.14]	[-2.37]
SA Index	0.009	-0.004	0.015**	0.009	-0.008	0.019**
	[1.54]	[-0.58]	[2.16]	[1.44]	[-1.01]	[2.40]
Total Leverage	-0.002	-0.011	-0.005	-0.002	-0.001	-0.002
	[-0.45]	[-0.75]	[-1.28]	[-0.56]	[-0.08]	[-0.53]

MACRO CONTROLS						
ln (GDP)	-0.134†	-0.133†	0.010	-0.129†	-0.142†	-0.037
	[-7.60]	[-5.52]	[0.33]	[-7.10]	[-5.17]	[-1.10]
Syndicated Loans to GDP	0.009†	0.005†	0.003	0.010†	0.006†	0.004
	[6.49]	[2.92]	[1.17]	[8.08]	[3.47]	[1.53]
Domestic Pvt Debt Sec to GDP	-0.002†	-0.001*	-0.002†	-0.002†	-0.001*	-0.002†
	[-6.51]	[-1.84]	[-3.93]	[-5.95]	[-1.86]	[-4.53]
Bond Issuance to GDP	-0.016†	-0.014†	0.000	-0.017†	-0.020†	-0.002
	[-3.97]	[-2.80]	[0.03]	[-4.29]	[-3.46]	[-0.28]
Interest Rate	0.001	0.011**	0.003	0.001	0.016†	0.003
	[0.73]	[2.47]	[1.60]	[0.74]	[3.18]	[1.17]
Constant	3.652†	3.621†	-0.363	3.591†	3.985†	1.014
	[7.15]	[5.26]	[-0.41]	[6.69]	[4.98]	[1.01]
Observations	48,620	17,552	31,068	48,620	17,552	31,068
Adjusted R-squared	0.58	0.85	0.50	0.58	0.83	0.44
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
Country-Sector-Year FE	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Dependent Variable is Dummy variable equal to 1 if a firm issues a Bank Loan and zero otherwise. For a complete list of all the variables, please see Table C.2. L2.GDP_Down_Ind is the two quarter lagged value of GDP Downside Uncertainty Index (Rossi Index). All firm and macro controls are lagged one year, to control for endogeneity. Crisis_Dum is a dummy variable equal to 1, if year is greater than 2008 and zero otherwise. We use OLS (LPM) to derive all the results in the above table and cluster the errors at firm-quarter level to control for the variation arising from each firm-quarter pair. All regressions include firm fixed effects to control firm's demand for credit and time-invariant unobservables across firms. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Column 1 (4) presents the results for the impact of an increase in the GDP downside (upside) uncertainty after the crisis on the probability of issuance of bank loans. Columns 2 and 3 (5 and 6) split our overall sample into bank-oriented and market-oriented countries for downside (upside) uncertainty. Our main interest in columns 1, 2 & 3 (4, 5 and 6) is the coefficient for double interaction Crisis_Dum # L2.GDP_Down_Ind (Crisis_Dum # L2.GDP_Up_Ind). A negative and significant coefficient for double interaction in column 1 (-0.214) provides support to the fact that with an increase in the GDP downside uncertainty after the crisis, the probability of issuance of bank loans decreases. Furthermore, when we split our data into bank-oriented and market-oriented countries in column 2 and 3, we find that the probability of bank loans only decreases in bank-oriented countries and there is no impact in market-oriented economies (negative and significant coefficient for double interaction in column 2 (-0.210) and insignificant in column 3 (-0.070)). These results show that

when the macroeconomic environment becomes more uncertain, firms issue less bank loans but only in bank-oriented countries. In market-oriented economies, we do not observe a decrease in the bank lending because capital markets (bonds and equity) provide additional sources of financing in market-oriented countries. Finally, we can observe that an increase in the upside uncertainty after the financial crisis, has no impact on the likelihood of bank loans issuance except a weak support in bank-oriented countries, as coefficient for double interaction in column 5 is only significant at 10% (0.104). Therefore, we do not emphasize this result any further. Overall, these results provide support in favour of our first hypothesis (see section 4.2.3.1)

Regarding the likelihood of bonds issuance, as discussed in hypothesis 1 (section 4.2.3.1), we expect that with an increase in the downside (upside) macroeconomic uncertainty after the financial crisis, the probability of issuance of bonds should increase (remain unchanged) and this effect should only be visible in market-oriented countries and not in bank-oriented economies. We estimate Column 1 (4) in Table 4.3 below by using equation 4.1 (4.2) and replacing the dependent variable with the bond dummy. Columns 2 and 3 (5 and 6) are estimated using equation 4.1 (4.2) and splitting the sample into bank-oriented and market-oriented countries respectively.

Table 4.3: Downside (Upside) Uncertainty and Bonds Issuance: Hypothesis 1

Dep Var = Bond Dummy	**Column 1**	**Column 2**	**Column 3**	**Column 4**	**Column 5**	**Column 6**
	GDP Down	**GDP Down**	**GDP Down**	**GDP Up**	**GDP Up**	**GDP Up**
	All Countries	**Bank-Oriented**	**Market-Oriented**	**All Countries**	**Bank-Oriented**	**Market-Oriented**
UNCERTAINTY INDICES						
Crisis_Dum	0.017	-0.022	-0.077*	0.080**	0.070*	0.012
	[0.51]	[-0.59]	[-1.65]	[2.32]	[1.78]	[0.13]
L2.GDP_Down_Ind	-0.063**	-0.029	-0.108*	-0.016	-0.013	-0.013
	[-2.16]	[-0.66]	[-1.82]	[-0.77]	[-0.45]	[-0.33]
Crisis_Dum # L2.GDP_Down_Ind	**0.079****	**0.064**	**0.164****			
	[2.27]	**[1.32]**	**[2.45]**			
L2.GDP_Up_Ind	-0.004	0.039	0.021	0.011	0.066	0.039
	[-0.16]	[1.36]	[0.40]	[0.35]	[1.50]	[0.64]
Crisis_Dum # L2.GDP_Up_Ind				**-0.025**	**-0.048**	**0.063**
				[-0.71]	**[-1.03]**	**[0.71]**
UNCERTAINTY INDICES CONTROLS						
L1.GDP_Down_Ind	-0.013	0.004	0.027	-0.013	-0.002	0.035
	[-0.62]	[0.16]	[0.64]	[-0.62]	[-0.05]	[0.75]

L1.GDP_Up_Ind	0.008	-0.038	0.012	0.009	-0.050	0.044
	[0.35]	[-1.44]	[0.26]	[0.36]	[-1.59]	[0.90]
L2.INF_Down_Ind	-0.014	-0.048**	0.065*	-0.012	-0.066†	0.060
	[-0.80]	[-2.13]	[1.81]	[-0.69]	[-2.60]	[1.60]
L2.INF_UP_Ind	0.034	-0.024	0.153†	0.035	-0.046	0.156†
	[1.37]	[-0.87]	[3.44]	[1.39]	[-1.38]	[3.39]
TRANSACTION LEVEL CONTROLS						
Foreign Bond	0.302†	0.334†	0.314†	0.302†	0.288†	0.301†
	[32.27]	[17.06]	[34.56]	[32.27]	[13.86]	[29.14]
Listed Bond	-0.410†	-0.181†	-0.462†	-0.410†	-0.199†	-0.484†
	[-43.86]	[-12.63]	[-48.16]	[-43.89]	[-12.90]	[-45.56]
Investment Grade Bond	0.526†	0.641†	0.473†	0.526†	0.657†	0.458†
	[66.80]	[47.41]	[51.86]	[66.84]	[49.15]	[44.65]
FIRM CONTROLS						
Tangibility	-0.024	0.006	0.004	-0.025	0.009	-0.028
	[-1.12]	[0.27]	[0.14]	[-1.15]	[0.39]	[-0.98]
Tobin's Q	0.000	0.001	-0.000	0.000	0.002	-0.000
	[0.19]	[1.06]	[-0.24]	[0.15]	[1.10]	[-0.40]
ln (Net Sales)	0.005	-0.001	0.014†	0.005	-0.003	0.004
	[1.13]	[-0.30]	[2.78]	[1.12]	[-0.52]	[0.81]
Profitability	0.003	0.013	0.008	0.003	0.018	0.002
	[0.45]	[0.83]	[0.89]	[0.47]	[1.00]	[0.40]
SA Index	0.018†	0.016**		0.019†	0.014**	0.017**
	[3.31]	[2.50]		[3.35]	[2.09]	[2.24]
Total Leverage	-0.008*	-0.009	-0.017**	-0.008*	-0.013	-0.009*
	[-1.93]	[-1.11]	[-2.35]	[-1.88]	[-1.44]	[-1.84]
Current Ratio	0.001	0.000	0.002	0.001	0.000	0.001
	[1.20]	[0.58]	[1.28]	[1.20]	[0.54]	[1.24]
Debt Capacity Ratio			-0.000			
			[-1.10]			
MACRO CONTROLS						
ln (GDP)	0.046**	0.071†	-0.105**	0.047**	0.050**	-0.057
	[2.44]	[3.77]	[-2.02]	[2.46]	[2.45]	[-1.01]
Stock Market Cap to GDP	-0.001†	-0.000	-0.000	-0.001†	-0.000	-0.001
	[-2.73]	[-0.16]	[-0.90]	[-2.70]	[-0.16]	[-1.17]
Syndicated Loans to GDP	0.001	-0.002	0.006**	0.000	-0.003*	0.010†
	[0.71]	[-1.29]	[2.26]	[0.25]	[-1.65]	[2.82]
Bank Return on Equity	-0.001**	0.000	0.000	-0.001**	0.000	0.001
	[-2.21]	[0.18]	[0.33]	[-2.08]	[0.57]	[0.82]
Bank Net Interest Margin	0.006	0.011	-0.018	0.007	0.009	-0.012
	[0.84]	[1.53]	[-1.45]	[0.97]	[1.13]	[-0.93]
Domestic Pvt Debt Sec to GDP	0.001†			0.001†	0.001†	0.002**
	[5.01]			[4.82]	[4.00]	[2.29]
Interest Rate	0.004*	-0.003	-0.000	0.004	-0.002	0.006*
	[1.65]	[-0.75]	[-0.15]	[1.64]	[-0.39]	[1.83]
Constant	-1.005*	-1.725†	3.421**	-1.049*	-1.133*	1.882
	[-1.80]	[-3.17]	[2.22]	[-1.88]	[-1.90]	[1.13]

Observations	44,196	18,924	29,646	44,196	17,358	26,838
Adjusted R-squared	0.64	0.78	0.61	0.64	0.77	0.59
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
Country-Sector-Year FE	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
	Robust t-statistics in brackets					
	† p<0.01, ** p<0.05, * p<0.1					

Dependent Variable is Dummy variable equal to 1 if a firm issues a Bond and zero otherwise. For a complete list of all the variables, please see Table C.2. L2.GDP_Down_Ind is the two quarter lagged value of GDP Downside Uncertainty Index (Rossi Index). All firm and macro controls are lagged one year, to control for endogeneity. Crisis_Dum is a dummy variable equal to 1, if year is greater than 2008 and zero otherwise. We use OLS (LPM) to derive all the results in the above table and cluster the errors at firm-quarter level to control for the variation arising from each firm-quarter pair. All regressions include firm fixed effects to control firm's demand for credit and time-invariant unobservables across firms. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Column 1 (4) investigates the impact of an increase in the GDP downside (upside) uncertainty after the financial crisis on the likelihood of bonds issuance and columns 2 and 3 (5 and 6) divide our overall sample into bank-oriented and market-oriented countries for downside (upside) uncertainty. Our main interest in column 1, 2 and 3 (4, 5 and 6) is the coefficient for the double interaction Crisis_Dum # L2.GDP_Down_Ind (Crisis_Dum # L2.GDP_Up_Ind). A positive and significant coefficient for this double interaction in column 1 (0.079) shows that with an increase in the downside uncertainty after the financial crisis, the probability of issuance of bonds increases. Furthermore, we observe that after splitting our overall sample into bank-oriented and market-oriented countries, the coefficient for this double interaction is insignificant for bank-oriented countries (0.064 in column 2) and positive and significant for market-oriented countries (0.164 in column 3). Combining the evidences in column 1, 2 and 3, we find support that with an increase in the downside uncertainty after the financial crisis, the likelihood of bonds issuance increases but only in market-oriented countries, whereas there is no impact on the probability of bonds issuance in bank oriented economies. Similarly, all the coefficients for double interactions in column 4, 5 and 6 are insignificant, which shows that any increase in the upside uncertainty after the crisis has no effect on the probability of bonds issuance (in overall sample and in bank oriented and market-oriented countries separately as well). Overall, these results provide support in favour of our first hypothesis (section 4.2.3.1).

Section 4.2.3.2 mentions our second hypothesis which states that with an increase in the downside (upside) uncertainty after the crisis, we expect that probability of equity issuance should decrease (increase) and we also expect that increase is only observable in market-oriented countries. We estimate Column 1 (4) of Table 4.4 below using equation 4.1 (4.2) and replacing the dependent variable with the equity issuance dummy. Moreover columns 2 and 3 (5 and 6) are estimated using equation 4.1 (4.2) and splitting our sample into bank-oriented and market-oriented countries respectively.

Table 4.4: Downside (Upside) Uncertainty and Equity Issuance: Hypothesis 3

Dep Var = Equity Dummy	**Col 1**	**Col 2**	**Col 3**	**Col 4**	**Col 5**	**Col 6**
	GDP Down	**GDP Down**	**GDP Down**	**GDP Up**	**GDP Up**	**GDP Up**
	All Sample	**Bank-Oriented**	**Market-Oriented**	**All Sample**	**Bank-Oriented**	**Market-Oriented**
UNCERTAINTY INDICES						
Crisis_Dum	-0.095†	-0.224†	-0.051	-0.219†	-0.112*	-0.235†
	[-3.14]	[-3.41]	[-1.21]	[-6.32]	[-1.79]	[-4.78]
L2.GDP_Down_Ind	0.026	-0.156*	0.054	-0.036*	-0.054	-0.042
	[0.75]	[-1.74]	[1.06]	[-1.73]	[-1.21]	[-1.47]
Crisis_Dum # L2.GDP_Down_Ind	**-0.091****	**0.137**	**-0.123****			
	[-2.34]	**[1.45]**	**[-2.32]**			
L2.GDP_Up_Ind	-0.031	-0.012	-0.074**	-0.114†	0.022	-0.206†
	[-1.43]	[-0.30]	[-2.14]	[-2.83]	[0.31]	[-3.63]
Crisis_Dum # L2.GDP_Up_Ind				**0.116†**	**-0.050**	**0.179†**
				[2.73]	**[-0.66]**	**[2.89]**
UNCERTAINTY INDICES CONTROLS						
L1.GDP_Down_Ind	-0.015	-0.048	-0.005	-0.017	-0.048	-0.010
	[-0.74]	[-1.16]	[-0.16]	[-0.84]	[-1.15]	[-0.34]
L1.GDP_Up_Ind	-0.025	-0.089**	0.059*	-0.018	-0.093**	0.063**
	[-1.17]	[-2.28]	[1.87]	[-0.87]	[-2.35]	[1.98]
L2.INF_Down_Ind	0.028*	0.055*	-0.001	0.024	0.048	-0.007
	[1.79]	[1.65]	[-0.03]	[1.53]	[1.46]	[-0.29]
L2.INF_UP_Ind	-0.008	-0.009	0.012	-0.007	-0.011	0.018
	[-0.44]	[-0.21]	[0.48]	[-0.38]	[-0.25]	[0.73]
TRANSACTION LEVEL CONTROLS						
Foreign Equity	0.267†	0.364†	0.156†	0.267†	0.365†	0.155†
	[20.37]	[19.26]	[9.22]	[20.32]	[19.28]	[9.21]
FIRM CONTROLS						
Tangibility	0.037†	0.143†	0.021*	0.037†	0.143†	0.021*
	[2.98]	[3.55]	[1.65]	[3.01]	[3.55]	[1.67]

Tobin's Q	0.001†	0.003	0.001**	0.001†	0.003	0.001**
	[3.06]	[1.46]	[2.49]	[3.11]	[1.45]	[2.48]
Profitability	-0.011†	-0.004	-0.011†	-0.011†	-0.004	-0.011†
	[-4.58]	[-0.36]	[-4.64]	[-4.57]	[-0.35]	[-4.62]
Current Ratio	0.001†	0.003†	0.001†	0.001†	0.003†	0.001†
	[3.95]	[2.60]	[2.78]	[3.94]	[2.62]	[2.75]
MACRO CONTROLS						
ln (GDP)	0.146†	0.161†	0.197†	0.143†	0.159†	0.194†
	[6.39]	[4.45]	[5.14]	[6.24]	[4.38]	[5.05]
Syndicated Loans to GDP	-0.005†	-0.011†	-0.010†	-0.005†	-0.012†	-0.009†
	[-3.88]	[-4.06]	[-3.88]	[-3.47]	[-4.22]	[-3.73]
Bank Net Interest Margin	-0.007	-0.051†	0.006	-0.007	-0.051†	0.004
	[-1.48]	[-4.07]	[1.01]	[-1.45]	[-4.04]	[0.69]
Bond Issuance to GDP	0.001	-0.013	0.000	0.002	-0.012	0.004
	[0.31]	[-1.59]	[0.03]	[0.35]	[-1.46]	[0.49]
Interest Rate	0.005**	0.010	0.006**	0.004**	0.011	0.006**
	[2.24]	[1.47]	[2.45]	[1.99]	[1.55]	[2.20]
Constant	-3.642†	-3.948†	-5.180†	-3.472†	-3.956†	-4.961†
	[-5.52]	[-3.84]	[-4.62]	[-5.21]	[-3.81]	[-4.40]
Observations	71,987	22,292	49,695	71,987	22,292	49,695
Adjusted R-squared	0.63	0.60	0.64	0.63	0.60	0.64
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
Country-Sector-Year FE	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Dependent Variable is Dummy variable equal to 1 if a firm issues an Equity and zero otherwise. For a complete list of all the variables, please see Table C.2. L2.GDP_Down_Ind is the two quarter lagged value of GDP Downside Uncertainty Index (Rossi Index). All firm and macro controls are lagged one year, to control for endogeneity. Crisis_Dum is a dummy variable equal to 1, if year is greater than 2008 and zero otherwise. We use OLS (LPM) to derive all the results in the above table and cluster the errors at firm-quarter level to control for the variation arising from each firm-quarter pair. All regressions include firm fixed effects to control firm's demand for credit and time-invariant unobservables across firms. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Column 1 (4) explores the impact of an increase in downside (upside) uncertainty after the financial crisis, on the probability of equity issuance and columns 2 and 3 (5 and 6) divide our sample into bank-oriented and market-oriented countries for the impact of increase in downside (upside) uncertainty on likelihood of equity issuance. Our main interest in columns 1, 2 and 3 (4, 5 and 6) is the coefficient for double interaction Crisis_Dum # L2.GDP_Down_Ind (Crisis_Dum # L2.GDP_Up_Ind). A negative and significant coefficient for double interaction in column 1 (-0.091) provide strong empirical support in favour of second hypothesis that with an increase in the downside

uncertainty after the crisis, the probability of equity issuance decreases. Moreover, we can also see in Table 4.4 that when we split our data into bank-oriented and market-oriented economies, the probability of equity issuance only decreases in market-oriented countries (negative and significant coefficient (-0.123) in column 3) and remains unaffected in bank-oriented economies (insignificant coefficient (0.137) in column 2). These results again provide support in favour of our second hypothesis.

Column 4, 5 and 6 provide evidence regarding the impact of upside uncertainty on the likelihood of equity issuance. It is also pertinent to mention that upside uncertainty only plays a significant role in security issuance decisions of non-financial firms. A positive and significant coefficient for double interaction in column 4 (0.116) provides evidence in support of the second hypothesis that with an increase in the upside uncertainty after the financial crisis, the probability of equity issuance increases. Hypothesis 2 also states that the impact of upside uncertainty on equity issuance will only be observable in market-oriented countries. A non-significant coefficient for bank-oriented countries (-0.050 in column 5) and significant and positive coefficient for market-oriented countries (0.179 in column 6) confirms these expectations as well. Overall, we find strong empirical support in favour of our second hypothesis about probability of equity issuance by non-financial firms.

Combining the results for hypothesis 1 & 2, we find that with an increase in the downside uncertainty after the financial crisis, firms issue less bank loans and equity and more bonds. Whereas, an increase in the upside uncertainty after the financial crisis only increases the probability of equity issuance by non-financial firms. Moreover, the impact of macroeconomic uncertainty on issuance of bank loans (bonds and equity) is only observable in bank-oriented (market-oriented) countries.

4.5.2 Robustness Tests

In order to be certain that it is the financial architecture of the country driving our above mentioned results instead of other macroeconomic variables, we restrict our sample only to OECD countries and re-estimate all the results mentioned in section 4.5.1 above (hypothesis 1 and 2). We call the results obtained for OECD countries as robustness results in support of our main results. These robustness results are presented

in Table 4.5, 4.6 & 4.7 below. We use equations 4.1 & 4.2 (as discussed in section 4.5.1 above) to estimate all the results in tables below.

Table 4.5: Downside (Upside) Uncertainty and Bank Loans Issuance (OECD) - Robustness Results for Hypothesis 1

Dep Var = Bank Loan Dummy (OECD)	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
	GDP Down	GDP Down	GDP Down	GDP Up	GDP Up	GDP Up
	All OECD Countries	OECD & Bank-Oriented	OECD & Market-Oriented	All OECD Countries	OECD & Bank-Oriented	OECD & Market-Oriented
UNCERTAINTY INDICES						
Crisis_Dum	0.123	0.486†	-0.086	-0.041	0.101	0.035
	[1.27]	[3.55]	[-0.69]	[-0.41]	[0.73]	[0.28]
L2.GDP_Down_Ind	0.106**	0.305†	0.021	0.022	0.015	0.062
	[2.28]	[2.93]	[0.27]	[0.67]	[0.23]	[1.24]
Crisis_Dum # L2.GDP_Down_Ind	**-0.145†**	**-0.456†**	**0.058**			
	[-2.69]	**[-4.14]**	**[0.70]**			
L2.GDP_Up_Ind	0.028	-0.089	0.132**	-0.052	-0.182**	0.223†
	[0.80]	[-1.46]	[2.20]	[-0.98]	[-2.07]	[2.59]
Crisis_Dum # L2.GDP_Up_Ind				**0.128****	**0.189***	**-0.147**
				[2.18]	**[1.95]**	**[-1.51]**
Constant	1.335	5.605†	-6.069†	1.197	5.354†	-6.282†
	[1.06]	[3.03]	[-2.69]	[0.95]	[2.89]	[-2.79]
Observations	42,783	13,513	29,270	42,783	13,513	29,270
Adjusted R-squared	0.40	0.49	0.35	0.40	0.49	0.35
Uncertainty Index Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Transaction Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Macro Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
Country-Sector-Year FE	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Dependent Variable is Dummy variable equal to 1 if a firm issues a Bank Loan and zero otherwise. All regressions include Uncertainty Index, Transaction, Firm and Macro level control variables. For a complete list of all the variables, please see Table C.2. L2.GDP_Down_Ind is the two quarter lagged value of GDP Downside Uncertainty Index (Rossi Index). All firm and macro controls are lagged one year, to control for endogeneity. Crisis_Dum is a dummy variable equal to 1, if year is greater than 2008 and zero otherwise. We use OLS (LPM) to derive all the results in the above table and cluster the errors at firm-quarter level to control for the variation arising from each firm-quarter pair. All regressions include firm fixed effects to control firm's demand for credit and time-invariant unobservables across firms. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Table 4.6: Downside (Upside) Uncertainty and Bonds Issuance (OECD) - Robustness Results for Hypothesis 1

Dep Var = Bond Dummy (OECD)	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
	GDP Down	GDP Down	GDP Down	GDP Up	GDP Up	GDP Up
	All OECD Countries	OECD & Bank-Oriented	OECD & Market-Oriented	All OECD Countries	OECD & Bank-Oriented	OECD & Market-Oriented
UNCERTAINTY INDICES						
Crisis_Dum	0.094*	-0.010	0.106	0.143**	0.011	0.240†
	[1.69]	[-0.28]	[1.39]	[2.50]	[0.30]	[2.82]
L2.GDP_Down_Ind	-0.046*	-0.000	-0.147†	-0.005	0.014	-0.066*
	[-1.69]	[-0.01]	[-3.01]	[-0.25]	[0.55]	[-1.67]
Crisis_Dum # L2.GDP_Down_Ind	**0.070****	**0.022**	**0.151****			
	[2.19]	**[0.51]**	**[2.49]**			
L2.GDP_Up_Ind	0.005	0.035	-0.027	0.016	0.043	0.009
	[0.21]	[1.26]	[-0.55]	[0.54]	[1.16]	[0.17]
Crisis_Dum # L2.GDP_Up_Ind				**-0.020**	**-0.013**	**-0.088**
				[-0.60]	**[-0.34]**	**[-1.24]**
Constant	1.779**	-1.269	6.853†	1.836**	-1.237	6.381†
	[2.07]	[-1.48]	[3.50]	[2.13]	[-1.44]	[3.28]
Observations	46,242	14,270	31,972	46,242	14,270	31,972
Adjusted R-squared	0.62	0.76	0.58	0.62	0.76	0.58
Uncertainty Index Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Transaction Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Macro Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
Country-Sector-Year FE	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Dependent Variable is Dummy variable equal to 1 if a firm issues a Bond and zero otherwise. All regressions include Uncertainty Index, Transaction, Firm and Macro level control variables. For a complete list of all the variables, please see Table C.2. L2.GDP_Down_Ind is the two quarter lagged value of GDP Downside Uncertainty Index (Rossi Index). All firm and macro controls are lagged one year, to control for endogeneity. Crisis_Dum is a dummy variable equal to 1, if year is greater than 2008 and zero otherwise. We use OLS (LPM) to derive all the results in the above table and cluster the errors at firm-quarter level to control for the variation arising from each firm-quarter pair. All regressions include firm fixed effects to control firm's demand for credit and time-invariant unobservables across firms. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Table 4.7: Downside (Upside) Uncertainty and Equity Issuance (OECD) Robustness Results for Hypothesis 2

Dep Var = Equity Dummy (OECD)	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
	GDP Down	GDP Down	GDP Down	GDP Up	GDP Up	GDP Up
	All OECD Countries	OECD & Bank-Oriented	OECD & Market-Oriented	All OECD Countries	OECD & Bank-Oriented	OECD & Market-Oriented
UNCERTAINTY INDICES						
Crisis_Dum	-0.091†	-0.131†	-0.089**	-0.248†	-0.142†	-0.314†
	[-4.42]	[-3.26]	[-2.56]	[-7.58]	[-2.88]	[-5.97]
L2.GDP_Down_Ind	0.016	-0.046	0.034	-0.012	0.018	-0.018
	[0.67]	[-0.89]	[1.14]	[-0.76]	[0.54]	[-0.95]
Crisis_Dum # L2.GDP_Down_Ind	**-0.049***	**0.080**	**-0.086****			
	[-1.74]	**[1.41]**	**[-2.45]**			
L2.GDP_Up_Ind	-0.027*	0.004	-0.030*	-0.161†	-0.058	-0.225†
	[-1.82]	[0.14]	[-1.67]	[-4.57]	[-1.04]	[-4.44]
Crisis_Dum # L2.GDP_Up_Ind				**0.169†**	**0.076**	**0.236†**
				[4.72]	**[1.33]**	**[4.58]**
Constant	-4.666†	-2.512*	-6.875†	-4.803†	-2.535*	-7.147†
	[-5.96]	[-1.83]	[-4.61]	[-6.10]	[-1.84]	[-4.80]
Observations	66,114	18,280	47,834	66,114	18,280	47,834
Adjusted R-squared	0.64	0.61	0.64	0.64	0.61	0.64
Uncertainty Index Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Transaction Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Macro Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	No	No	No	No	No
Sector FE	No	No	No	No	No	No
Country-Sector-Year FE	No	No	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Dependent Variable is Dummy variable equal to 1 if a firm issues an Equity and zero otherwise. All regressions include Uncertainty Index, Transaction, Firm and Macro level control variables. For a complete list of all the variables, please see Table C.2. L2.GDP_Down_Ind is the two quarter lagged value of GDP Downside Uncertainty Index (Rossi Index). All firm and macro controls are lagged one year, to control for endogeneity. Crisis_Dum is a dummy variable equal to 1, if year is greater than 2008 and zero otherwise. We use OLS (LPM) to derive all the results in the above table and cluster the errors at firm-quarter level to control for the variation arising from each firm-quarter pair. All regressions include firm fixed effects to control firm's demand for credit and time-invariant unobservables across firms. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

We confirm that our robustness results for hypothesis 1 and 2, mentioned in Table 4.5, 4.6 & 4.7 above confirm our main results in Table 4.2, 4.3 & 4.4. After restricting our sample only to OECD countries, we get strong empirical support that the probability of issuance of bank loans and equity (bonds) decrease (increase), after an increase in the downside uncertainty after the financial crisis. Moreover, these effects are observable only in bank-oriented (market-oriented) countries for bank loans (bonds and equity). The impact of an increase in upside uncertainty on the issuance behaviour of bonds and equity remains exactly similar. The only difference which we observe in these robustness tests as compared to our main results is that with an increase in the upside uncertainty after the financial crisis, we get strong empirical support that firms issue more bank loans (significant coefficient for double interaction (0.128) in column 4 of Table 4.5). Moreover, we also get moderate support that this effect is observable only in bank-oriented countries (coefficient for double interaction (0.189) in column 5 of Table 4.5 is only significant at 10%).

Overall our main results (Table 4.2, 4.3 & 4.4) and our robustness tests (Table 4.5, 4.6 & 4.7) provide support in favour of our first and second hypothesis.

4.5.3 Capital Market Switching and Firm Heterogeneity

Section 4.2.4 discusses third and fourth hypothesis of this study. In hypothesis 3, we expect that with an increase in the downside (upside) uncertainty after the financial crisis, the probability of capital market security issuance should increase (have no impact). Similarly, in hypothesis 4 we expect that with an increase in the downside (upside) uncertainty after the financial crisis, the probability of issuance of capital market securities by foreign firms and such firms which have lower asymmetric information costs, should increase (have no impact)". Table 4.8 below presents results in support of hypothesis 3. We obtain results in Table 4.8 by estimating equation 4.1 (4.2) for results in column 1 (2), which represent the impact of an increase in the downside (upside) uncertainty after the financial crisis on the probability of issuance of capital market securities.

Table 4.8: Downside (Upside) Uncertainty and Capital Market Switching (All Firms): Hypothesis 3

Dep Var = Capital Market Dummy	Col 1	Col 2
	GDP Down	GDP Up
	All Countries	All Countries
	All Firms	All Firms
UNCERTAINTY INDICES		
Crisis_Dum	-0.012	0.066
	[-0.18]	[0.96]
L2.GDP_Down_Ind	-0.089†	0.005
	[-2.62]	[0.22]
Crisis_Dum # L2.GDP_Down_Ind	**0.145†**	
	[3.84]	
L2.GDP_Up_Ind	-0.057**	-0.062*
	[-2.37]	[-1.65]
Crisis_Dum # L2.GDP_Up_Ind		**0.008**
		[0.19]
UNCERTAINTY INDICES CONTROLS		
L1.GDP_Down_Ind	-0.030	-0.033
	[-1.35]	[-1.49]
L1.GDP_Up_Ind	0.028	0.028
	[1.19]	[1.17]
L2.INF_Down_Ind	-0.113†	-0.115†
	[-6.50]	[-6.53]
L2.INF_UP_Ind	-0.068†	-0.071†
	[-3.00]	[-3.14]
TRANSACTION LEVEL CONTROLS		
Foreign Bond	0.410†	0.410†
	[56.37]	[56.37]
Foreign Loan	-0.544†	-0.543†
	[-72.75]	[-72.31]
Long Term Loan	-0.350†	-0.350†
	[-62.49]	[-62.53]
Foreign Equity	0.077†	0.078†
	[6.43]	[6.48]
FIRM CONTROLS		
Tangibility	0.020	0.018
	[1.12]	[1.03]
Tobin's Q	0.002†	0.002†
	[3.11]	[3.05]
Profitability	-0.010†	-0.010†
	[-3.22]	[-3.26]
SA Index	0.037†	0.037†
	[7.25]	[7.31]
Current Ratio	0.003†	0.003†
	[6.18]	[6.21]
Firm Age	-0.021†	-0.021†
	[-3.41]	[-3.42]

MACRO CONTROLS		
ln (GDP)	0.249†	0.244†
	[12.49]	[12.09]
Stock Market Cap to GDP	0.001†	0.001†
	[4.77]	[4.17]
Syndicated Loans to GDP	-0.010†	-0.010†
	[-6.89]	[-7.51]
Bank Return on Equity	0.001†	0.001†
	[3.66]	[3.71]
Bank Net Interest Margin	-0.006	-0.003
	[-0.95]	[-0.43]
Bond Issuance to GDP	0.022†	0.024†
	[5.23]	[5.58]
Interest Rate	0.005**	0.004*
	[2.09]	[1.79]
Constant	-6.198†	-6.094†
	[-10.46]	[-10.08]
Observations	57,255	57,255
Adjusted R-squared	0.60	0.60
Country FE	No	No
Sector FE	No	No
Country-Sector-Year FE	No	No
Firm FE	Yes	Yes
Year FE	Yes	Yes
Robust t-statistics in brackets		
† p<0.01, ** p<0.05, * p<0.1		

Dependent Variable is Dummy variable equal to 1, if a firm only issued a bond or an equity (or both) in a particular quarter (and not a bank loan at all) and zero otherwise. For a complete list of all the variables, please see Table C.2. L2.GDP_Down_Ind is the two quarter lagged value of GDP Downside Uncertainty Index (Rossi Index). All firm and macro controls are lagged one year, to control for endogeneity. Crisis_Dum is a dummy variable equal to 1, if year is greater than 2008 and zero otherwise. We use OLS (LPM) to derive all the results in the above table and cluster the errors at firm-quarter level to control for the variation arising from each firm-quarter pair. All regressions include firm fixed effects to control firm's demand for credit and time-invariant unobservables across firms. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Our main interest in Table 4.8 above is the coefficient for double interaction i.e. Crisis_Dum # L2.GDP_Down_Ind (Crisis_Dum # L2.GDP_Up_Ind) in column 1 (2). A positive and significant coefficient in column 1 (0.145) provides strong empirical evidence that with an increase in the macroeconomic uncertainty after the financial crisis, firms issue more capital market securities (bonds or equities or both) as compared to bank loans. These results point out to substitution effects in the financing mix of the non-financial firms, from bank loans to bonds and equity. These results are in line with Adrian et al. (2013), Becker and Ivashina (2014) and Shin (2014), where all these authors argue that financial crisis is a shock to the bank lending. As a result of this decrease in the supply of capital by the banks, firms substitute their financing

towards non-bank modes of financing and increased bond and equity financing makes up for the decline in the bank lending after the crisis.

After establishing the switching behaviour of the firms towards capital market securities as compared to bank loans, in Table 4.8 above (hypothesis 3), we now investigate whether foreign firms are better positioned to switch to capital market financing, as compared to domestic firms (hypothesis 4) and we present these results in Table 4.9 below. Column 1 and 2 (3 and 4) in Table 4.9 below present the results for the impact of an increase in the downside (upside) uncertainty on the issuance of capital market securities by foreign firms. We obtain results in column 1 and 2 (3 and 4) by estimating equation 4.1 (4.2) and replacing the dependent variable in equation 4.1 (4.2) with the capital market dummy. We also replace the crisis dummy and its interaction with GDP downside (upside) uncertainty index in equation 4.1 (4.2), with the dummy for foreign firms and its interaction with GDP downside (upside) uncertainty index. We estimate equation 4.1 & 4.2 separately for pre-crisis and post-crisis periods.

Table 4.9: Downside (Upside) Uncertainty and Capital Market Switching (Foreign Firms): Hypothesis 4

Dep Var = Capital Market Dummy	**Col 1**	**Col 2**	**Col 3**	**Col 4**
	GDP Down	**GDP Down**	**GDP Up**	**GDP Up**
	All Sample	**All Sample**	**All Sample**	**All Sample**
	Before Crisis	**After Crisis**	**Before Crisis**	**After Crisis**
UNCERTAINTY INDICES				
L2.GDP_Down_Ind	0.012	0.028	-0.016	0.044
	[0.24]	[1.02]	[-0.37]	[1.62]
L2.GDP_Up_Ind	-0.106*	0.040	-0.096	0.044
	[-1.75]	[1.37]	[-1.52]	[1.45]
Forn_Firm_Dum # L2.GDP_Down_Ind	**-0.091**	**0.061****		
	[-1.64]	**[2.12]**		
Forn_Firm_Dum # L2.GDP_Up_Ind			**-0.022**	**-0.019**
			[-0.36]	**[-0.64]**
UNCERTAINTY INDICES CONTROLS				
L1.GDP_Down_Ind	0.116**	-0.019	0.112**	-0.019
	[2.22]	[-0.71]	[2.14]	[-0.70]
L1.GDP_Up_Ind	0.118**	-0.005	0.118**	-0.007
	[2.13]	[-0.18]	[2.12]	[-0.24]

L2.INF_Down_Ind	-0.046	-0.126†	-0.047	-0.124†
	[-1.38]	[-5.41]	[-1.42]	[-5.35]
L2.INF_UP_Ind	-0.138**	-0.043	-0.135**	-0.043
	[-2.50]	[-1.62]	[-2.44]	[-1.62]
TRANSACTION LEVEL CONTROLS				
Foreign Bond	0.411†	0.423†	0.412†	0.423†
	[26.26]	[44.86]	[26.26]	[44.84]
Foreign Loan	-0.608†	-0.550†	-0.608†	-0.550†
	[-46.36]	[-53.00]	[-46.33]	[-53.04]
Long Term Loan	-0.323†	-0.333†	-0.323†	-0.333†
	[-35.30]	[-40.58]	[-35.30]	[-40.57]
Foreign Equity	0.025	0.081†	0.025	0.081†
	[1.07]	[5.43]	[1.08]	[5.45]
FIRM CONTROLS				
Tangibility	0.029	-0.001	0.029	-0.000
	[0.87]	[-0.03]	[0.86]	[-0.01]
Tobin's Q	0.000	0.002*	0.000	0.002**
	[0.18]	[1.96]	[0.25]	[1.97]
Profitability	-0.005	-0.009*	-0.005	-0.009*
	[-0.88]	[-1.86]	[-0.86]	[-1.86]
SA Index	0.017	0.074†	0.016	0.074†
	[1.53]	[8.48]	[1.48]	[8.51]
Current Ratio	0.003†	0.003†	0.003†	0.003†
	[3.67]	[2.97]	[3.70]	[2.98]
Firm Age	-0.025**	-0.083†	-0.026**	-0.083†
	[-2.45]	[-3.77]	[-2.48]	[-3.79]
MACRO CONTROLS				
ln (GDP)	0.243†	0.541†	0.241†	0.544†
	[4.39]	[15.59]	[4.36]	[15.72]
Stock Market Cap to GDP	0.001	0.002†	0.001	0.002†
	[1.45]	[4.42]	[1.50]	[4.46]
Syndicated Loans to GDP	-0.004	-0.002	-0.004	-0.002
	[-1.23]	[-0.72]	[-1.23]	[-0.66]
Bank Return on Equity	0.006†	0.000	0.005†	0.000
	[6.99]	[0.28]	[6.88]	[0.28]
Bank Net Interest Margin	-0.057†	-0.000	-0.057†	-0.000
	[-2.97]	[-0.06]	[-2.96]	[-0.01]
Bond Issuance to GDP	0.021	0.012**	0.021	0.013**
	[1.60]	[2.38]	[1.61]	[2.43]
Interest Rate	-0.045†	0.003	-0.045†	0.003
	[-3.08]	[1.15]	[-3.06]	[1.08]
Constant	-5.703†	-13.463†	-5.642†	-13.547†
	[-3.59]	[-11.75]	[-3.55]	[-11.84]
Observations	22,871	34,384	22,871	34,384
Adjusted R-squared	0.59	0.63	0.59	0.63
Country FE	No	No	No	No
Sector FE	No	No	No	No

Country-Sector-Year FE	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
	Robust t-statistics in brackets			
	† p<0.01, ** p<0.05, * p<0.1			

Dependent Variable is Dummy variable equal to 1, if a firm only issued a bond or an equity (or both) in a particular quarter (and not a bank loan at all) and zero otherwise. For a complete list of all the variables, please see Table C.2. L2.GDP_Down_Ind is the two quarter lagged value of GDP Downside Uncertainty Index (Rossi Index). All firm and macro controls are lagged one year, to control for endogeneity. Crisis_Dum is a dummy variable equal to 1, if year is greater than 2008 and zero otherwise. We use OLS (LPM) to derive all the results in the above table and cluster the errors at firm-quarter level to control for the variation arising from each firm-quarter pair. All regressions include firm fixed effects to control firm's demand for credit and time-invariant unobservables across firms. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Our main interest in all the columns in Table 4.9 above are the double interactions Forn_Firm_Dum # L2.GDP_Down_Ind and Forn_Firm_Dum # L2.GDP_Up_Ind. These double interactions inform us about the impact of an increase of downside and upside uncertainty respectively, on the probability of issuance of capital market securities by foreign firms before and after the crisis (columns 1 and 3 before crisis and columns 2 and 4 after the crisis). A positive and significant coefficient (0.061) only for the double interaction of downside uncertainty (Forn_Firm_Dum # L2.GDP_Down_Ind) in column 2 provides strong empirical support in favour of hypothesis 4 that foreign firms have higher propensity of switching to capital market financing, only when downside uncertainty increases after the crisis. We do not find any evidence that foreign firms have higher probability of capital market switching before the crisis. On the other hand, an increase in upside uncertainty has no impact on the probability of switching, either for foreign or domestic firms. These results provide support in favour of hypothesis 4.

Our final set of results refer to capital market switching and heterogeneous behaviour of firms with high and low asymmetric information costs (hypothesis 4). We expect that with an increase in the downside (upside) uncertainty after the financial crisis, the probability of issuance of capital market securities by firms with lower asymmetric information costs should increase (have no impact). We present results in support of our hypothesis 4 in Table 4.10 below. We obtain results in column 1 and 2 (3 and 4) by estimating equation 4.1 (4.2) and replacing the dependent variable in equation 4.1 (4.2) with the capital market dummy. We also replace crisis dummy and its interaction with GDP downside (upside) uncertainty index in equation 4.1 (4.2), with the dummy for firms with low information costs and its interaction with GDP downside (upside)

uncertainty index. We estimate equation 4.1 & 4.2 separately for pre-crisis and post-crisis periods.

Table 4.10: Downside (Upside) Uncertainty and Capital Market Switching (High & Low Asymmetric Information Costs): Hypothesis 4

Dep Var = Capital Market Dummy	Col 1	Col 2	Col 3	Col 4
	GDP Down	GDP Down	GDP Up	GDP Up
	All Sample	All Sample	All Sample	All Sample
	Before Crisis	After Crisis	Before Crisis	After Crisis
UNCERTAINTY INDICES				
L2.GDP_Down_Ind	-0.138**	-0.033	-0.099**	0.038
	[-2.41]	[-1.06]	[-1.99]	[1.27]
L2.GDP_Up_Ind	-0.083	-0.054**	-0.068	0.037
	[-1.30]	[-1.96]	[-0.93]	[1.02]
Low_Inf_Cost_Firms_Dum # L2.GDP_Down_Ind	**0.030**	**0.056****		
	[0.50]	**[2.22]**		
Low_Inf_Cost_Firms_Dum # L2.GDP_Up_Ind			**0.012**	**-0.023**
			[0.20]	**[-0.78]**
UNCERTAINTY INDICES CONTROLS				
L1.GDP_Down_Ind	0.151†	-0.029	0.176†	0.006
	[2.73]	[-1.02]	[3.08]	[0.18]
L1.GDP_Up_Ind	0.158†	0.005	0.175†	0.032
	[2.59]	[0.20]	[2.82]	[1.03]
L2.INF_Down_Ind	-0.104†	-0.153†	-0.095**	-0.147†
	[-2.82]	[-6.65]	[-2.44]	[-5.56]
L2.INF_UP_Ind	-0.263†	-0.095†	-0.285†	-0.057*
	[-4.28]	[-3.87]	[-4.49]	[-1.85]
TRANSACTION LEVEL CONTROLS				
Foreign Bond	0.446†	0.442†	0.447†	0.455†
	[26.99]	[46.58]	[26.89]	[45.09]
Foreign Loan	-0.681†	-0.660†	-0.688†	-0.663†
	[-48.35]	[-67.03]	[-48.78]	[-60.56]
Foreign Equity	0.036	0.090†	0.036	0.104†
	[1.21]	[6.66]	[1.18]	[6.60]
FIRM CONTROLS				
Tangibility	0.104**	-0.008	0.101**	-0.017
	[2.18]	[-0.30]	[2.14]	[-0.48]
Tobin's Q	0.000	0.003†	0.000	0.004†
	[0.11]	[5.02]	[0.13]	[4.62]
Profitability	-0.002	-0.008**	-0.002	-0.018†
	[-0.29]	[-2.15]	[-0.21]	[-2.90]
SA Index	0.008	0.053†	0.006	0.064†
	[0.54]	[5.76]	[0.42]	[5.98]
Current Ratio	0.006†	0.003†	0.005†	0.005†
	[3.00]	[2.86]	[2.90]	[3.78]

Firm Age	-0.026**	-0.100†	-0.026**	-0.089†
	[-2.17]	[-3.84]	[-2.13]	[-3.43]
ln (Net Sales)	-0.009	0.003	-0.010	0.009*
	[-0.97]	[0.67]	[-0.99]	[1.80]
MACRO CONTROLS				
ln (GDP)	0.118**	0.596†	0.140†	0.625†
	[2.37]	[17.97]	[2.71]	[16.48]
Stock Market Cap to GDP			0.002†	0.002†
			[3.34]	[4.83]
Syndicated Loans to GDP	-0.005	0.004*	-0.006	0.001
	[-1.35]	[1.85]	[-1.56]	[0.35]
Bank Return on Equity	0.006†	0.001	0.006†	0.000
	[7.40]	[1.64]	[6.96]	[0.54]
Bond Issuance to GDP			0.044†	0.013**
			[3.19]	[2.34]
Interest Rate	-0.012**	-0.002	-0.009*	0.003
	[-2.48]	[-0.88]	[-1.81]	[1.11]
Constant	-2.004	-14.301†	-2.978*	-16.006†
	[-1.35]	[-12.65]	[-1.95]	[-12.52]
Observations	20,762	35,767	20,666	30,966
Adjusted R-squared	0.53	0.60	0.53	0.59
Country FE	No	No	No	No
Sector FE	No	No	No	No
Country-Sector-Year FE	No	No	No	No
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Robust t-statistics in brackets

† p<0.01, ** p<0.05, * p<0.1

Dependent Variable is Dummy variable equal to 1, if a firm only issued a bond or an equity (or both) in a particular quarter (and not a bank loan at all) and zero otherwise. For a complete list of all the variables, please see Table C.2. L2.GDP_Down_Ind is the two quarter lagged value of GDP Downside Uncertainty Index (Rossi Index). All firm and macro controls are lagged one year, to control for endogeneity. Crisis_Dum is a dummy variable equal to 1, if year is greater than 2008 and zero otherwise. We use OLS (LPM) to derive all the results in the above table and cluster the errors at firm-quarter level to control for the variation arising from each firm-quarter pair. All regressions include firm fixed effects to control firm's demand for credit and time-invariant unobservables across firms. t-statistics are in brackets and statistical significance and p-values are displayed as † p<0.01, ** p<0.05, * p<0.1

Our main interest in all the columns in the above table is the coefficient for double interaction i.e. Low_Inf_Cost_Firms_Dum # L2.GDP_Down_Ind and Low_Inf_Cost_Firms_Dum # L2.GDP_Up_Ind. The coefficient for this double interaction is insignificant in column 1, 3 and 4 (0.030, 0.012 and -0.023). The only significant coefficient is in column 2 (0.056) which is the impact of an increase in the downside uncertainty after the crisis, on the probability of capital market securities issuances by firms with low asymmetric information costs. A positive and significant coefficient provides strong support in favour of hypothesis 4 that with an increase in the downside uncertainty after the crisis, firms with lower asymmetric information

costs issue more capital market securities. These firms enjoy greater opportunities to issue capital market securities because analysts and brokers follow these firms and investors can better form their opinion about future performance of these firms. These results once again provide support in favour of hypothesis 4.

4.6 Conclusion

Economic theory suggests that macroeconomic downturns are associated with tightening of credit and lending standards and rise in risk premia, especially by the banks. Therefore, an immediate aftermath of an increase in the macroeconomic uncertainty is a shock to the supply of capital (even more from the banking sector). Global Financial crisis in 2007 is a clear manifestation of a shock to the banking sector followed by a contraction in the bank lending and tightening of lending standards. These events had a visible impact on the capital structure decisions of non-financial firms. Those firms which had access to the capital markets made up for the reduction in the bank lending by issuing more bonds and equity. This paper is a comprehensive study which investigates the impact of an increase in the macroeconomic uncertainty after the financial crisis, on the security issuance behaviour of non-financial firms in a cross country context.

Using one of the most recent macroeconomic uncertainty index (Rossi Index) which distinguishes between downside (negative/bad) and upside (positive/good) uncertainty and treating financial crisis as an exogenous shock to the supply of bank lending, we unfold some of the interesting facts about the security issuance decisions of non-financial firms. We find that an increase in the downside uncertainty after the financial crisis, decrease (increase) the probability of bank loans and equity (bonds) issuances. On the other hand, an increase in the upside uncertainty after the crisis causes an increase in the likelihood of equity issuance and has no impact on bank loans and bonds issuances. We also find strong empirical evidence that when downside uncertainty increases after the crisis, firms have a higher propensity to switch to capital market financing. Among the whole sample, foreign firms and firms with lower asymmetric information costs, as compared to domestic firms and firms with higher asymmetric information costs, have a greater likelihood of issuing capital market securities after the financial crisis, when faced with an increase in the downside uncertainty.

We also investigate the impact of heterogeneous financial architecture of the country on the probability of issuance of bank loans, bonds and equity, after controlling for a host of transaction, firm and country level controls. Our findings suggest that the impact of an increase in the downside and upside macroeconomic uncertainty on bank loans (bonds and equity) is only visible in bank-oriented (market-oriented) countries. Banks are the main lenders in the bank-oriented countries (e.g. Germany), whereas firms in market-oriented countries have greater availability of the sources of the external finance, especially from capital market (e.g. USA). Therefore, firms in market-oriented countries are able to off-set any shock to the bank lending by increasing their bonds and equity financing. We also control firm's demand for credit, therefore we are confident that our results point to the supply side effects.

Appendix C:

Table C.1: Sample Coverage

Country	Bank-Oriented	Market-Oriented	Total
Argentina	0	126	126
Australia	0	2,036	2,036
Austria	156	0	156
Belgium	265	0	265
Brazil	0	1,143	1,143
Bulgaria	17	0	17
Canada	0	19,096	19,096
Chile	0	394	394
China	2,932	0	2,932
Colombia	127	0	127
Croatia	41	0	41
Cyprus	66	0	66
Denmark	246	0	246
Egypt	123	0	123
Finland	0	238	238
France	0	2,118	2,118
Germany	1,929	0	1,929
Greece	0	131	131
Hong Kong	0	65	65
Indonesia	0	707	707
Ireland	133	0	133
Israel	328	0	328
Italy	898	0	898
Japan	10,614	0	10,614
Malaysia	285	0	285
Mexico	0	556	556
Netherlands	761	0	761
Nigeria	29	0	29
Norway	659	0	659
Peru	0	250	250
Philippines	289	0	289
Poland	423	0	423
Portugal	85	0	85
Romania	24	0	24
Russia	0	60	60
Saudi Arabia	0	26	26
Singapore	0	744	744

South Africa	0	54	54
Spain	452	0	452
Sri Lanka	33	0	33
Sweden	1,238	0	1,238
Switzerland	0	551	551
Thailand	842	0	842
Turkey	196	0	196
United Kingdom	5,743	0	5,743
United States	0	36,098	36,098
Total	**28,934**	**64,393**	**93,327**

Table C.2: Definition of All Variables

Dependent Variables		
Name	**Definition**	**Source**
Loan (Dummy Variable)	Dependent variable equal to 1 if a firm has issued a syndicated bank loan and zero otherwise. If firm has issued 2 syndicated bank loans in the first quarter of 2014 (i.e. from Jan 14 to Mar 14), dependent variable will take value of 1 each time.	Thomson Reuters Eikon
Bond (Dummy Variable)	Dependent variable equal to 1 if a firm has issued a bond and zero otherwise. If a firm has issued 2 bonds in the first quarter of 2014 (i.e. from Jan 14 to Mar 14), dependent variable will take value of 1 each time.	Thomson Reuters Eikon
Equity (Dummy Variable)	Dependent variable equal to 1 if a firm has issued equity and zero otherwise. If firm has issued equity 2 times in the first quarter of 2014 (i.e. from Jan 14 to Mar 14), dependent variable will take value of 1 each time.	Thomson Reuters Eikon
Cap Mark Fin (Dummy Variable)	Dependent variable is a dummy variable which is equal to 1, if firm only issued a bond or equity and/or in a given quarter (and not a bank loan at all) and zero otherwise	Thomson Reuters Eikon

Rossi Index of (Macroeconomic Uncertainty Index)		
Name	**Definition**	**Source**
GDP_Down_Ind	GDP Downside Uncertainty (quarterly level) Index, which ranges from 0.5 to 1. A higher value of the index shows higher downside GDP uncertainty in the economy	Rossi and Sekhposyan (2015), (2017)
GDP_Up_Ind	GDP Upside Uncertainty (quarterly level) Index, which ranges from 0.5 to 1. A higher value of the index shows higher upside GDP uncertainty in the economy	Rossi and Sekhposyan (2015), (2017)
INF_Down_Ind	Inflation Downside Uncertainty (quarterly level) Index, which ranges from 0.5 to 1. A higher value of the index shows higher downside Inflation uncertainty in the economy	Rossi and Sekhposyan (2015), (2017)
INF_Up_Ind	Inflation Upside Uncertainty (quarterly level) Index, which ranges from 0.5 to 1. A higher value of the index shows higher upside Inflation uncertainty in the economy	Rossi and Sekhposyan (2015), (2017)

Transaction Level Variables (Control Variables)		
Name	**Definition**	**Source**
Foreign Bond	Dummy variable equal to 1, if Eikon identifies the marketplace of the issuance of bond as "Yes" or if the market area of the issuance is "Global" or "International" and zero otherwise	Thomson Reuters Eikon
Listed Bond	Dummy variable equal to 1, if Eikon identifies the Exchange of Listing of the bond as "No Listing" and zero otherwise	Thomson Reuters Eikon
Investment Grade Bond	Dummy variable equal to 1, if Eikon identifies the issuing company of the bond as "Investment Grade Corporation" and zero otherwise	Thomson Reuters Eikon
Foreign Loan	Dummy variable equal to 1, if Eikon identifies the issuance of bank loan as "Foreign" and zero otherwise	Thomson Reuters Eikon
Foreign Equity	Dummy variable equal to 1, if Eikon identifies the Foreign Market Indicator of the equity issuance as "Yes" and zero otherwise	Thomson Reuters Eikon
Long Term Loan	Dummy variable equal to 1, if Eikon identifies the issuance of bank loan as "Long Term Loan" i.e. maturity greater than 1 year, and zero otherwise	Thomson Reuters Eikon

Firm Level Variables (Control Variables)		
Name	**Definition**	**Source**
Crisis_Dum	Dummy variable equal to one if year>2008	Own Calculation
Country Dummy	Dummy variable equal to one if the country is a market-oriented country and zero if bank-oriented.	Gambacorta et al. (2014)
Tangibility	Inventory plus total fixed assets divided by total assets. This variable is a proxy of total collaterable assets of the company	Osiris
Tobin's Q (Proxy of Growth Opportunities)	Sum of the market value of equity plus the book value of total liabilities divided by total assets. Higher values of Tobin's Q indicate that firms have higher future growth opportunities which are recognized by the market investors	Osiris
Ln (Net Sales)	Natural log of net sales of the firm.	Osiris
Firm_Profit	Earnings before taxes divided by total assets of the firm. This variable is a proxy of a firm's profitability	Osiris
SA_Index (Proxy of Financial Constraints)	Financial Constraints Index calculated using the methodology described in Hadlock and Pierce (2010) SA_Index = (-0.737 * ln (Total Assets) +	Own Calculations

	(0.043 * ((ln (Total Assets)) ^ 2) – (0.040 * Age of the Firm)	
Total Leverage	Sum of Short and Long term loans (funded debt) divided by Total Assets of the firm	Osiris
Current Ratio (Proxy for Liquidity)	The current ratio which is defined as total current assets divided by total current liabilities of the firm. A firm with a higher current ratio will be considered as more solvent. There is no strict cut-off defined for defining more or less solvent firms, but a natural cut-off can be a current ratio of one	Osiris
Debt_Capacity (Proxy for Solvency)	Cash from Operating Activities divided by Total Short-term liabilities.	Osiris
Age	Number of year since incorporation of the firm	Osiris

Country Level Variables (Macro Control Variables)		
Name	**Definition**	**Source**
ln (GDP)	Percentage yearly growth in GDP	World Bank (GFDD)
Stock Market Cap to GDP	Total value of all listed shares in a stock market as a percentage of GDP.	World Bank (GFDD)
Syndicated Loans to GDP	Ratio of new syndicated borrowing volume by private entities in industries other than finance, holding companies and insurance to GDP.	World Bank (GFDD)
Bank Return on Equity (Country level)	Commercial banks' after-tax net income to yearly averaged equity.	World Bank (GFDD)
Bank Net Interest Margin (Country level)	Accounting value of bank's net interest revenue as a share of its average interest-bearing (total earning) assets.	World Bank (GFDD)
Domestic Pvt Debt Sec to GDP	Total amount of domestic private debt securities (amount outstanding) issued in domestic markets as a share of GDP. It covers data on long-term bonds and notes, commercial paper and other short-term notes.	World Bank (GFDD)
Bond Issuance to GDP	Ratio of new corporate bond issuance volume by private entities in industries other than finance, holding companies and insurance to GDP.	World Bank (GFDD)
Interest Rate (Country level)	Bank or Government Lending rate of the country	World Bank

Global Financial Development Database is developed and yearly updated by Martin et al. (2012)

Table C.3: Summary Statistics for the Whole Sample and Bank and Market-Oriented Countries

Variable	All Countries			Bank-Oriented			Market-Oriented		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Uncertainty Indices									
GDP_Ind	93,171	0.73	0.14	28,829	0.76	0.15	64,342	0.72	0.14
GDP_Down_Ind	93,171	0.63	0.16	28,829	0.63	0.17	64,342	0.64	0.16
GDP_Up_Ind	93,171	0.60	0.15	28,829	0.63	0.17	64,342	0.58	0.13
Inf_Ind	91,075	0.76	0.15	28,901	0.75	0.15	62,174	0.76	0.15
INF_Down_Ind	91,075	0.66	0.17	28,901	0.67	0.17	62,174	0.66	0.18
INF_UP_Ind	91,075	0.59	0.15	28,901	0.58	0.14	62,174	0.60	0.15
Firm Level Variables									
Tangibility	84,962	0.60	0.27	26,147	0.55	0.24	58,815	0.62	0.28
Tobin's Q	84,431	2.16	3.92	26,067	1.44	1.61	58,364	2.48	4.55
ln (Net Sales)	70,742	20.58	3.81	25,177	22.30	3.72	45,565	19.63	3.52
Profitability	84,111	-0.13	0.78	25,932	0.04	0.33	58,179	-0.20	0.90
SA Index	82,021	2.21	3.26	24,443	4.03	3.43	57,578	1.43	2.85
Total Leverage	84,532	0.47	0.71	26,090	0.43	0.30	58,442	0.48	0.83
Current Ratio	84,847	2.98	5.74	26,115	2.19	3.85	58,732	3.34	6.37
Debt Capacity Ratio	66,120	-0.55	7.56	23,469	0.37	5.56	42,651	-1.06	8.41
Country Level Variables									
ln (GDP)	93,327	29.03	1.27	28,934	28.51	1.10	64,393	29.26	1.27
Stock Market Cap to GDP	77,426	101.54	38.45	27,036	73.52	27.28	50,390	116.57	35.00
Syndicated Loans to GDP	92,844	7.63	3.67	28,784	4.20	2.54	64,060	9.17	3.00
Bank Return on Equity	92,937	13.36	8.42	28,804	10.15	10.45	64,133	14.80	6.86
Bank Net Interest Margin	92,349	2.64	1.16	28,783	1.72	0.95	63,566	3.06	1.00
Domestic Pvt Debt Sec to GDP	76,170	61.09	36.37	24,236	48.29	23.84	51,934	67.06	39.53
Bond Issuance to GDP	92,570	2.86	1.19	28,331	2.08	1.28	64,239	3.20	0.97
Interest Rate (Country)	93,327	4.09	4.79	28,934	3.36	2.17	64,393	4.42	5.55

Summary Statistics for the Matched and Unmatched Sample

Variable	Matched Sample			Unmatched Sample		
	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev
No. of Employees	129,671	6,498	31,613	115,401	4,173	19,868
Total Cash	124,407	1.62E+10	2.37E+11	186,543	4.37E+09	7.05E+10
Total Loans	192,830	4.40E+10	1.08E+12	244,965	1.76E+10	3.90E+11
Market Value of Firm	193,460	1.65E+11	3.42E+12	248,898	5.21E+10	1.42E+12
Tangibility	192,704	0.608	0.252	246,358	0.587	0.282
ln (Net Sales)	174,066	20.13	3.442	210,003	19.22	3.449
Tobin's Q	192,364	98.42	21107	245,805	95.41	7607

Table C.4: Correlation between Global Financial Development Database and Our Sample (Eikon)

Bonds Issuance				
	Bonds (GFDD)	**ln (Bonds (GFDD))**	**Bonds (Our)**	**ln (Bonds (Our))**
Bonds (GFDD)	1			
ln (Bonds (GFDD))	0.54	1		
Bonds (Our)	**0.93**	0.54	1	
ln (Bonds (Our))	0.51	**0.81**	0.58	1

Loans Issuance				
	Loans (GFDD)	**ln (Loans (GFDD))**	**Loans (Our)**	**ln (Loans (Our))**
Loans (GFDD)	1			
ln (Loans (GFDD))	0.49	1		
Loans (Our)	**0.98**	0.51	1	
ln (Loans (Our))	0.46	**0.95**	0.50	1

Table C.5: Correlation Matrix

	GDP _Down _Ind	GDP _Up _Ind	INF _Down _Ind	INF _Up _Ind	Tangi-bility	Tobi-n's Q	ln (Net Sales)	Profit-ability	SA Index	Total Lever-age
GDP_Down _Ind	1.00									
GDP_Up _Ind	-0.60	1.00								
INF_Down _Ind	-0.08	0.05	1.00							
INF_Up _Ind	0.37	-0.17	-0.58	1.00						
Tangibility	0.06	-0.04	0.01	0.01	1.00					
Tobin's Q	0.03	-0.03	0.01	0.02	-0.14	1.00				
ln (Net Sales)	-0.02	0.07	-0.06	0.00	0.02	-0.26	1.00			
Profitability	-0.04	0.03	-0.02	-0.02	0.15	-0.49	0.36	1.00		
SA Index	-0.01	0.05	-0.05	0.00	0.13	-0.22	**0.85**	0.26	1.00	
Total Leverage	0.02	-0.01	0.01	0.01	0.04	0.37	-0.08	-0.48	-0.05	1.00
Current Ratio	-0.01	-0.01	0.02	0.00	-0.36	0.03	-0.21	-0.01	-0.14	-0.20
Debt Capacity Ratio	-0.03	0.02	0.00	-0.02	0.02	-0.08	0.19	0.26	0.12	-0.05
ln (GDP)	0.17	-0.15	0.15	0.00	0.01	0.09	-0.04	-0.05	-0.01	0.05
Stock Market Cap to GDP	-0.03	-0.16	0.14	-0.07	0.13	0.09	-0.32	-0.06	-0.30	0.01
Syndicated Loans to GDP	0.05	-0.22	0.15	-0.10	0.16	0.13	-0.35	-0.07	-0.34	0.03
Bank Return on Equity	-0.16	-0.11	-0.10	-0.22	0.00	-0.02	-0.16	0.03	-0.11	-0.03
Bank Net Interest Margin	0.08	-0.12	0.01	0.02	0.12	0.08	-0.29	-0.03	-0.21	0.03
Domestic Pvt Debt Sec to GDP	0.17	-0.14	0.13	0.11	0.08	0.09	-0.04	-0.06	-0.03	0.06
Bond Issuance to GDP	0.25	-0.19	-0.07	0.17	0.10	0.12	-0.33	-0.05	-0.28	0.02
Interest Rate (Country)	-0.04	-0.02	-0.09	-0.02	0.03	-0.01	-0.11	0.02	-0.08	0.00

	Current Ratio	Debt Capacity Ratio	ln (GDP)	Stock Market Cap to GDP	Synd-icated Loans to GDP	Bank Return on Equity	Bank Net Interest Margin	Dom Pvt Debt Sec to GDP	Bond Issuance to GDP	Int Rate (Coun-try)
GDP_Down _Ind										
GDP_Up _Ind										
INF_Down _Ind										
INF_Up _Ind										
Tangibility										
Tobin's Q										
ln (Net Sales)										
Profitability										
SA Index										
Total Leverage										
Current Ratio	1.00									
Debt Capacity Ratio	-0.04	1.00								
ln (GDP)	0.07	-0.03	1.00							
Stock Market Cap to GDP	0.05	-0.04	0.25	1.00						
Syndicated Loans to GDP	0.05	-0.05	0.41	**0.76**	1.00					
Bank Return on Equity	0.05	0.03	-0.06	0.14	0.10	1.00				
Bank Net Interest Margin	0.09	-0.02	0.29	0.16	0.15	0.38	1.00			
Domestic Pvt Debt Sec to GDP	0.06	-0.04	**0.79**	0.42	0.49	-0.14	0.32	1.00		
Bond Issuance to GDP	0.06	-0.03	0.40	0.31	0.32	0.12	0.43	0.32	1.00	
Interest Rate (Country)	0.01	0.00	-0.21	-0.15	-0.19	0.25	**0.50**	-0.25	-0.06	1.00

Chapter 5

General Conclusion

5.1 Conclusion

The most important contribution of this thesis is to investigate the impact of financial architecture of the country on vapours capital structure and investment decisions of non-financial firms. We proxy the financial architecture of the country as bank-oriented or a market-oriented country. Firms have greater opportunities of obtaining external finance through capital markets (bonds and equity) in market-oriented countries (USA) whereas the banks are the main lenders in bank-oriented countries (Germany). Firms also differ across various dimensions namely size, profitability, riskiness etc. We also differentiate between higher and lower growth firms as measured by Tobin's Q. Firms with higher values of Tobin's Q have higher future growth responsibilities. Investors duly recognize the future growth potential of these firms and should be willing to extend credit to these firms, even during distress times. We also treat Global Financial crisis of 2007 as an exogenous shock to the supply of capital. After controlling for the financial health of lenders (banks) and borrowers (firms) and host of other control variables, we find that financial architecture is one of the most important determinants of leverage and investment by non-financial firms. Higher growth firms operating in market-oriented countries do not suffer a decrease in overall leverage and the level of investment after the financial crisis. Moreover, these higher growth firms face lower cost of debt (bond spreads) and higher intensive and extensive margins of bond financing. We find that the probability of bank loans and equity (bonds) issuance decrease (increase), after an increase in the downside uncertainty after the financial crisis. On the other hand, an increase in the upside uncertainty after the crisis causes an increase in the likelihood of equity issuance and has no impact on bank loans and bonds issuances.

Chapter 2 investigates the role of financial architecture of the country on the overall leverage and the level of investment by non-financial firms. Our most important contribution to the literature, while we investigate this question, is to control for the observable characteristics of the lenders (banks) and borrowers (firms) along with the

firm's demand for credit and any productivity shocks as well. We proxy market riskiness of the banks using Value at Risk (VaR) of the banks of the firms. After controlling for the risk of banks and firms, along with the firm's demand for the credit and any shocks to the productivity of the firms as well, we find that an increase in the market riskiness of the banks causes a decline in the overall leverage and investment of non-financial firms. Higher growth firms annul this bank lending shock because the future growth potential of these firms is duly recognized by the investors and therefore these higher growth firms enjoy a competitive edge over their peers for obtaining external finance at favourable terms, during distress.

Most importantly, we find that after an increase in the market riskiness of the banks of the firms, lowest growth firms suffer a negative shock to their leverage and investment only in bank-oriented countries. There is no impact of this increased market riskiness of the banks on the capital structure and investment of non-financial firms in market-oriented countries. We also find similar patterns for firms operating in developing and developed countries as well, where the behaviour of firms operating in bank-oriented economies is similar to the firms in developing countries.

Third chapter also investigates the impact of financial architecture of various bonds issuance decisions of non-financial firms, after controlling for the financial health of lenders (banks) and borrowers (firms). Our main proxy for the financial architecture is whether the main country of the firm is bank-oriented or a market-oriented country. We once again differentiate between the behaviour of higher and lower growth firms and also treat financial crisis as an exogenous shock to the supply of capital. The central finding of the second chapter is that the financial architecture of any country is one of the most important determinants of capital structure. An increase in the market riskiness of the banks of the firm can have a heterogeneous impact on higher growth firms after the financial crisis depending on the financial orientation of the country. An increase in the market risk of the banks is a shock to the financial health of the banks and therefore they may reduce the credit supply to the firms or make marginal credit more expensive. Therefore, we interpret our results in this paper through the substitution channel of credit i.e. what happens when firms located in countries with heterogeneous financial architecture issue bonds and the banks of these firms have a high market risk.

We find strong support that when market risk of the banks increases after the global financial crisis, firms with average (higher) growth opportunities face higher (lower) cost of debt (bond spreads) and face an increase in the intensive margins of bond financing but not in extensive margins. Most importantly, we find that higher growth firms operating in market-oriented countries (and not in bank-oriented countries) after the financial crisis, as compared to lower growth firms before the crisis, face a relatively lower cost of debt (bond spreads). These higher growth firms in market-oriented countries also issue bonds with higher amounts (higher intensive margins) and also issue higher number of bonds (higher extensive margins).

We also find similar results about higher growth firms operating in developed (and in not developing) and in Asian (and not in Non-Asian) countries. We characterize market-oriented, Asian and developed countries with deep, liquid and well-functioning credit markets (especially bond markets) and higher growth firms in these countries have greater options of obtaining external finance from these capital markets. We also observe that when the market risk of the banks of the firms is higher, any substitution to the bond financing comes at a higher cost only for firms with average growth opportunities. Firms with higher future growth still have lower cost of debt. These higher growth firms have a competitive advantage over their peers because their future growth opportunities are recognized by the investors and they have a higher probability of obtaining external funding at favorable terms. Our results hold after controlling for firm's demand for credit and any shock to the firm's productivity as well, which is essential so that we are confident that we observe supply side effects which are the focus of this paper.

Fourth chapter of this thesis explores the impact of downside (negative) and upside (good) macroeconomic uncertainty on security issuance (bank loans, bonds and equity) behaviour of non-financial firms. Once again, this chapter involves pre and post crisis analysis, as we treat financial crisis as an exogenous shock to the supply of credit. Using one of the most recent macroeconomic uncertainty index (Rossi Index) which distinguishes between downside (negative/bad) and upside (positive/good) uncertainty and treating financial crisis as an exogenous shock to the supply of bank lending, we unfold some of the interesting facts about the security issuance decisions

of non-financial firms. We find that probability of bank loans and equity (bonds) issuance decrease (increase) after an increase in the downside uncertainty after the financial crisis. On the other hand, an increase in the upside uncertainty after the crisis causes an increase in the likelihood of equity issuance and has no impact on bank loans and bonds issuances. We also find strong empirical evidence that when downside uncertainty increases after the crisis, firms have a higher propensity to switch to capital market financing. Among the whole sample, foreign firms and firms with lower asymmetric information costs, as compared to domestic firms and firms with higher asymmetric information costs, have a greater likelihood of issuing capital market securities after the financial crisis, when faced with an increase in the downside uncertainty.

We also investigate the impact of heterogeneous financial architecture of the country on the probability of issuance of bank loans, bonds and equity, after controlling for a host of transaction, firm and country level controls. Our findings suggest that the impact of an increase in the downside and upside macroeconomic uncertainty on bank loans (bonds and equity) is only visible in bank-oriented (market-oriented) countries. Banks are the main lenders in the bank-oriented countries (e.g. Germany), whereas firms in market-oriented countries have greater availability of the sources of the external finance, especially from capital market (e.g. USA). Therefore, firms in market-oriented countries are able to off-set any shock to the bank lending by increasing their bonds and equity financing. We also control firm's demand for credit, therefore we are confident that our results point to the supply side effects.

It is pertinent to mention that we always control firm's demand for credit in all three chapters of this thesis. In the second chapter, we use GDP of the country of the firm and industry-country averages of fixed assets and profitability of the firms to control firm's demand for credit. In our third chapter, we use sector-country-year and firm fixed effects. Finally, we use only firm fixed effects to control for the demand of credit by the firms in our fourth chapter. Therefore, all the results in this thesis point towards the supply side effects of credit.

5.2 Limitations

This thesis is an attempt to investigate the impact of financial architecture of the country on various capital structure and investment decisions of non-financial firms, when market risk of the banks of the firms increases (Chapter 2 & 3) or firms face higher macroeconomic uncertainty (Chapter 4). Even though, we have tried to be prudent at each and every step of the analysis, every piece of research comes with few limitations which are either theoretical in nature of imposed by the data constraints. This section discusses all such limitations of this thesis, which, nevertheless, do not undermine the findings of this thesis.

In chapter 2 and 3, where we construct firm-bank linkages data and try to investigate the impact of financial architecture (bank-oriented or market-oriented countries) of the country on total leverage and capital investment decisions (chapter 2) and cost of debt and intensive and extensive margins of bond financing (chapter 3), we only know about the names of the banks of the firm. We do not have information about the amount of loans, firm obtains from each bank, in case of multiple banks. It is very much possible that if one of the banks of the firm becomes riskier, firm can substitute the financing from other banks (something very common in corporate finance literature). Therefore, one of the limitations of Chapter 2 (and this thesis) is that we cannot control for firms substituting their financing between different banks, in an event of a shock to the supply of credit. But this limitation is an outcome of constraints we face, while collecting the data for this research (thesis). Osiris (firm level database used in this thesis) contains only the names of the banks of firms but does not inform us about the proportions of total financing from each bank. Therefore, we are not able to investigate if firms substitute their lending between banks.

We use 1 year lags of firm level and bank level control variables in chapter 3 and 1 year lags of firm level and country level variables in chapter 4. Our main assumption for using these lagged independent variables is that investors do not have inside information about the firm. If investors have inside information about profits and sales and riskiness of the firm, then we should not use lagged values of independent variables. But as very much standard in the literature of corporate finance and financial intermediation, we use lagged values of firm, bank and country level control variables in this study. But we are fully aware that this is one of the limitations of this study.

One of the most important information, from the perspective of this study, is the name of banks of the firm in Osiris. This is a static information in Osiris, which means that when we download the firm level information from Osiris in May 2015, we only observe the names of the banks of the firms at that particular time i.e. in May 2015. We assume, taking the support from the existing literature, that these firm-bank linkages remain the same throughout our sample period i.e. 2004-2014. Even though, there is enough support in the literature that firm-bank linkages (relationships) remain sticky but still, it is an assumption and a potential limitation of this study at the same time.

Finally, when we match firm-bank linkages data with bonds issuance data from Bloomberg (Chapter 3) and security issuance data (from Eikon) with firm level information (from Osiris) for Chapter 4, we drop many firms, which issued bonds and other securities, but were not a part of the final sample because they could not be matched. Our final sample, both for second and third chapter consists of only issuer firms and these are usually larger firms (supported by our data as well). Therefore, another limitation of our analysis is that we cannot generalize our results for all kind of firms. Rather our results hold only for those firms which issue bonds and other securities and which are larger in size.

Most of the limitations mentioned above, stem from the data constraints we face, while collecting the data for this study. There are various rich datasets used in the existing literature but we could only use those, which were available to us, at the time of this research. Therefore, the limitations mentioned above do not undermine the results of this study.

5.3 Further Research Prospects and Policy Recommendations

This section highlights some of the potential future research areas, while improving upon the work of this thesis. Moreover, we also mention some of the policy recommendations, especially in light of the Global Financial Crisis and/or in event of a shock to the supply of credit.

While investigating the impact of financial architecture on the capital structure and investment decisions of non-financial firms, we do not take into account the fact that firms may substitute borrowing from other banks, in case of a shock to the supply of capital. Therefore, it will be interesting to see, if the effect of financial architecture is still significant, after we take into account that firms substitute borrowing between banks and taking more loans from healthier banks and moving away from risky banks in the event of a shock to the supply of credit. For controlling the share of borrowing from different banks, we need to obtain data at the loan transaction level. We could not investigate these substitution effects due to the data constraints, therefore this thesis can be extended to investigate the substitution effects of the firms in bank-oriented and market-oriented countries.

Moreover, it will also be an interesting question to conduct more causal analysis, trying to segregate the effects of financial architecture and economic development on the capital structure and investment decisions of the firms. This is a challenging task from an econometric perspective and therefore, we leave it for future research. Collecting data for longer periods of time will allow us to use dynamic macro econometric models and thus controlling for spill over effects as well.

In terms of the policy recommendations, the most important finding of this thesis is to show that despite a shock to the supply of credit (after the financial crisis), higher growth firms in market-oriented countries perform better in terms of their overall leverage and capital investment. These higher growth firms also outperform lower growth firms in terms of cost of bonds issued and intensive and extensive margins of bond financing. We arrive at these results after carefully controlling for firm's demand for credit and any productivity shocks to the firms as well.

For formulating policies for the private sector, especially during the downturn of business cycles (or post crisis period), more attention should be given to the financial architecture of the country. In light of the analysis of this thesis, a single policy may not be equally efficient for a bank-oriented and market-oriented country. Bank-oriented countries may require policies geared towards removing inefficiencies in the interbank market, where a good policy in market-oriented countries should focus on removing arbitrage opportunities in the capital markets.

Similarly, we also find that higher growth firms outperform their peers, after the financial crisis. This shows that a bank lending shock matters more for lower growth firms, whereby these firms reduce their total leverage (and investment) and are not able to obtain financing at similar terms (cost and volume of bonds) as higher growth firms. In our opinion, in case of a crisis or a shock to the supply of capital, policies should be formulated such that these lower growth firms (and small and less diversified (domestic) firms) are also able to have a fair access to the sources of external financing. Small and medium sized firms (and lower growth) make a large percentage of the total firms in any economy (e.g. Germany) and these firms generate a lot of employment as well. Therefore, business cycle policies should provide sufficient incentives to small (and medium sized) and lower growth firms, in any event of a shock to the supply of capital or a financial crisis. Especially, during downturns of the business cycle, availability of external finance for these firms will minimize the losses to the economies. Funding for Lending Scheme by the Bank of England is one example, where special lending facilities is provided to businesses and households for an extended period of time and is sometimes linked with the firm's performance as well.

References

Abel, A. B. & Eberly, J. C. 1994. A unified model of investment under uncertainty. *American Economic Review,* 84**,** 1369-1384.

Adelino, M. & Ferreira, M. A. 2016. Bank ratings and lending supply: Evidence from sovereign downgrades. *Review of Financial Studies*.

Adrian, T., Colla, P. & Shin, H. S. 2013. Which financial frictions? Parsing the evidence from the financial crisis of 2007 to 2009. *NBER Macroeconomics Annual,* 27**,** 159-214.

Adrian, T. & Shin, H. S. 2010. Liquidity and leverage. *Journal of financial intermediation,* 19**,** 418-437.

Adrian, T. & Shin, H. S. 2014. Procyclical leverage and value-at-risk. *Review of Financial Studies,* 27**,** 373-403.

Afonso, G., Kovner, A. & Schoar, A. 2011. Stressed, not frozen: The federal funds market in the financial crisis. *The Journal of Finance,* 66**,** 1109-1139.

Ai, C. & Norton, E. C. 2003. Interaction terms in logit and probit models. *Economics Letters,* 80**,** 123-129.

Allayannis, G., Brown, G. W. & Klapper, L. F. 2003. Capital structure and financial risk: Evidence from foreign debt use in East Asia. *Journal of Finance,* 58**,** 2667-2709.

Allen, F. & Gale, D. 1995. A welfare comparison of intermediaries and financial markets in Germany and the US. *European Economic Review,* 39**,** 179-209.

Allen, F. & Gale, D. 1997. Financial markets, intermediaries, and intertemporal smoothing. *Journal of political Economy,* 105**,** 523-546.

Allen, F. & Gale, D. 1999. Diversity of opinion and financing of new technologies. *Journal of Financial Intermediation,* 8**,** 68-89.

Allen, F. & Gale, D. 2000. *Comparing financial systems*, MIT press.

Almeida, H., Campello, M., Laranjeira, B. & Weisbenner, S. 2012. Corporate debt maturity and the real effects of the 2007 credit crisis. *Critical Finance Review,* 1**,** 3-58.

Altunbaş, Y., Kara, A. & Marques-Ibanez, D. 2010. Large debt financing: Syndicated loans versus corporate bonds. *The European Journal of Finance,* 16**,** 437-458.

Amiti, M. & Weinstein, D. E. 2011. Exports and financial shocks. *The Quarterly Journal of Economics,* 126**,** 1841-1877.

Anderson, A. & Gupta, P. P. 2009. A cross-country comparison of corporate governance and firm performance: Do financial structure and the legal system matter? *Journal of Contemporary Accounting & Economics,* 5**,** 61-79.

Antoniou, A., Guney, Y. & Paudyal, K. 2006. The determinants of debt maturity structure: Evidence from France, Germany and the UK. *European Financial Management,* 12**,** 161-194.

Antoniou, A., Guney, Y. & Paudyal, K. 2008. The determinants of capital structure: Capital market-oriented versus bank-oriented institutions. *The Journal of Financial and Quantitative Analysis,* 43**,** 59-92.

Arellano, M. & Bond, S. 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies,* 58**,** 277-297.

Arellano, M. & Bover, O. 1995. Another look at the instrumental variable estimation of error-components models. *Journal of econometrics,* 68**,** 29-51.

Ayala, D., Nedeljkovic, M. & Saborowski, C. 2017. What slice of the pie? The corporate bond market boom in emerging economies. *Journal of Financial Stability,* 30**,** 16-35.

Baker, M. 2009. Capital market-driven corporate finance. *Annual Review of Financial Economics,* 1**,** 181-205.

Baker, M. & Wurgler, J. 2002. Market timing and capital structure. *The Journal of Finance,* 57**,** 1-32.

Baker, S. R., Bloom, N. & Davis, S. J. 2016. Measuring economic policy uncertainty. *The Quarterly Journal of Economics,* 131**,** 1593-1636.

Balduzzi, P., Brancati, E. & Schiantarelli, F. 2017. Financial markets, banks' cost of funding, and firms' decisions: Lessons from two crises. *Journal of Financial Intermediation*.

Baltagi, B. 2008. *Econometric analysis of panel data*, John Wiley & Sons.

Baumann, U., Hoggarth, G. & Pain, D. 2005. The substitution of bank for non-bank corporate finance: Evidence for the United Kingdom. *Bank of England. Quarterly Bulletin,* 45**,** 381.

Beck, T. & Levine, R. 2000. External dependence and industry growth: Does financial structure matter? *World Bank*.

Beck, T. & Levine, R. 2002. Industry growth and capital allocation:: Does having a market- or bank-based system matter? *Journal of Financial Economics,* 64**,** 147-180.

Beck, T. & Levine, R. 2004. Stock markets, banks, and growth: Panel evidence. *Journal of Banking & Finance,* 28**,** 423-442.

Becker, B. & Ivashina, V. 2014. Cyclicality of credit supply: Firm level evidence. *Journal of Monetary Economics,* 62**,** 76-93.

Becker, B. O. & Ivashina, V. 2015. Reaching for yield in the bond market. *The Journal of Finance,* 70**,** 1863-1902.

Begenau, J. & Salomao, J. 2016. Firm financing over the business cycle.

Bergbrant, M. C., Bradley, D. & Hunter, D. M. 2017. Does bank loan supply affect the supply of equity capital? Evidence from new share issuance and withdrawal. *Journal of Financial Intermediation,* 29**,** 32-45.

Bernanke, B. & Gertler, M. 1990. Financial fragility and economic performance. *The Quarterly Journal of Economics,* 105**,** 87-114.

Bernanke, B. S., Gertler, M. & Gilchrist, S. 1999. The financial accelerator in a quantitative business cycle framework. *Handbook of macroeconomics,* 1**,** 1341-1393.

Berrospide, J. M. & Edge, R. M. 2010. The effects of bank capital on lending: What do we know, and what does it mean? *International Journal of Central Banking*.

Berton, F., Mocetti, S., Presbitero, A. F. & Richiardi, M. 2018. Banks, Firms, and Jobs. *The Review of Financial Studies,* 31**,** 2113-2156.

Billett, M. T., King, T. H. D. & Mauer, D. C. 2007. Growth opportunities and the choice of leverage, debt maturity, and covenants. *The Journal of Finance,* 62**,** 697-730.

Bjørnland, H. C. & Jacobsen, D. H. 2010. The role of house prices in the monetary policy transmission mechanism in small open economies. *Journal of Financial Stability,* 6**,** 218-229.

Bloom, N. 2009. The Impact of Uncertainty Shocks. *Econometrica,* 77**,** 623-685.

Blundell, R. & Bond, S. 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics,* 87**,** 115-143.

Bodnaruk, A., Loughran, T. & Mcdonald, B. 2015. Using 10-k text to gauge financial constraints. *Journal of Financial and Quantitative Analysis,* 50**,** 623-646.

Boe 2008. Financial Stability Report.

Bolton, P., Chen, H. U. I. & Wang, N. 2011. A unified theory of Tobin's q, corporate investment, financing, and risk management. *The Journal of Finance,* 66**,** 1545-1578.

Bond, S. R., Klemm, A., Newton-Smith, R., Syed, M. & Vlieghe, G. W. 2004. The roles of expected profitability, Tobin's Q and cash flow in econometric models of company investment.

Bose, U., Macdonald, R. & Tsoukas, S. 2018. Policy initiatives and firms' access to external finance: Evidence from a panel of emerging Asian economies. *Journal of Corporate Finance*.

Buca, A. & Vermeulen, P. 2015. Corporate investment and bankdependent borrowers during the recent financial crisis. *European Central Bank*.

Campello, M., Graham, J. R. & Harvey, C. R. 2010. The real effects of financial constraints: Evidence from a financial crisis. *Journal of Financial Economics,* 97**,** 470-487.

Campello, M. & Hackbarth, D. 2012. The firm-level credit multiplier. *Journal of Financial Intermediation,* 21**,** 446-472.

Campello, M. & Larrain, M. 2016. Enlarging the contracting space: Collateral menus, access to credit, and economic activity. *The Review of Financial Studies,* 29**,** 349-383.

Chakraborty, S. & Ray, T. 2006. Bank-based versus market-based financial systems: A growth-theoretic analysis. *Journal of Monetary Economics,* 53**,** 329-350.

Chan, E., Chui, M. K., Packer, F. & Remolona, E. M. 2012. Local currency bond markets and the Asian Bond Fund 2 initiative. *BIS Papers***,** 1-35.

Cingano, F., Manaresi, F. & Sette, E. 2016. Does credit crunch investment down? New evidence on the real effects of the bank-lending channel. *The Review of Financial Studies,* 29**,** 2737-2773.

Claessens, S. & Laeven, L. 2003. Financial development, property rights, and growth. *The Journal of Finance,* 58**,** 2401-2436.

Covas, F. & Den Haan, W. J. 2011. The cyclical behavior of debt and equity finance. *The American Economic Review,* 101**,** 877-899.

Covas, F. & Den Haan, W. J. 2012. The role of debt and equity finance over the business cycle. *The Economic Journal,* 122**,** 1262-1286.

De Jong, A., Kabir, R. & Nguyen, T. T. 2008. Capital structure around the world: The roles of firm- and country-specific determinants. *Journal of Banking & Finance,* 32**,** 1954-1969.

Degryse, H., De Jonghe, O., Jakovljević, S., Mulier, K. & Schepens, G. 2017. The impact of bank shocks on firm-level outcomes and bank risk-taking. *Available at SSRN*.

Demirgüç-Kunt, A., Feyen, E. & Levine, R. 2013. The evolving importance of banks and securities markets. *The World Bank Economic Review,* 27**,** 476-490.

Demirgüç-Kunt, A. & Maksimovic, V. 2002. Funding growth in bank-based and market-based financial systems: Evidence from firm-level data. *Journal of Financial Economics,* 65**,** 337-363.

Diamond, D. W. 1984. Financial intermediation and delegated monitoring. *The Review of Economic Studies,* 51**,** 393-414.

Didier, T., Levine, R. & Schmukler, S. L. 2015. Capital market financing, firm growth, firm size distribution. National Bureau of Economic Research.

Didier, T. & Schmukler, S. L. 2013. The financing and growth of firms in China and India: Evidence from capital markets. *Journal of International Money and Finance,* 39**,** 111-137.

Ecb 2009. Recent development in the retail bank interest rate pass-through in the Euro Area. *ECB Monthly Bulletin,* August**,** 93-105.

Ecb 2010. The ECB's response to the financial crisis. *ECB Monthly Bulletin,* October**,** 59-74.

Ecb 2012. Changes in bank financing patterns.

Erel, I., Julio, B., Kim, W. & Weisbach, M. S. 2012. Macroeconomic conditions and capital raising. *Review of Financial Studies,* 25**,** 341-376.

Erickson, T. & Whited, T. M. 2012. Treating measurement error in Tobin's q. *Review of Financial Studies,* 25**,** 1286-1329.

Fama, E. F. & French, K. R. 2002. Testing trade-off and pecking order predictions about dividends and debt. *Review of Financial Studies,* 15**,** 1-33.

Fama, E. F. & French, K. R. 2005. Financing decisions: Who issues stock? *Journal of Financial Economics,* 76**,** 549-582.

Fan, J. P. H., Titman, S. & Twite, G. 2012. An international comparison of capital structure and debt maturity choices. *Journal of Financial and Quantitative Analysis,* 47**,** 23-56.

Favara, G., Morellec, E., Schroth, E. & Valta, P. 2017. Debt enforcement, investment, and risk taking across countries. *Journal of Financial Economics,* 123**,** 22-41.

Feunou, B., Jahan-Parvar, M. R. & Tédongap, R. 2013. Modeling market downside volatility. *Review of Finance,* 17**,** 443-481.

Flannery, M. J. & Hankins, K. W. 2013. Estimating dynamic panel models in corporate finance. *Journal of Corporate Finance,* 19**,** 1-19.

Franklin, J., Rostom, M. & Thwaites, G. 2015. The banks that said no: Banking relationships, credit supply and productivity in the United Kingdom.

Gambacorta, L., Yang, J. & Tsatsaronis, K. 2014. Financial structure and growth. *BIS Quarterly Review March*.

Giannetti, M. & Ongena, S. 2012. "Lending by example": Direct and indirect effects of foreign banks in emerging markets. *Journal of International Economics,* 86**,** 167-180.

Gilchrist, S., Himmelberg, C. P. & Huberman, G. 2005. Do stock price bubbles influence corporate investment? *Journal of Monetary Economics,* 52**,** 805-827.

Goel, A. M., Song, F. & Thakor, A. V. 2014. Correlated leverage and its ramifications. *Journal of Financial Intermediation,* 23**,** 471-503.

Goodhart, C. & Hofmann, B. Asset prices, financial conditions, and the transmission of monetary policy. Conference on Asset Prices, Exchange Rates, and Monetary Policy, Stanford University, 2001.

Greene, W. 2010. Testing hypotheses about interaction terms in nonlinear models. *Economics Letters,* 107**,** 291-296.

Gulen, H. & Ion, M. 2016. Policy uncertainty and corporate investment. *Review of Financial Studies,* 29**,** 523-564.

Hadlock, C. J. & Pierce, J. R. 2010. New evidence on measuring financial constraints: Moving beyond the KZ index. *Review of Financial studies,* 23**,** 1909-1940.

Hamilton, J. D. 1994. *Time series analysis,* Princeton university press Princeton.

Hassapis, C. & Kalyvitis, S. 2002. Investigating the links between growth and real stock price changes with empirical evidence from the G-7 economies. *The Quarterly Review of Economics and Finance,* 42**,** 543-575.

Hayashi, F. 1982. Tobin's marginal q and average q: A neoclassical interpretation. *Econometrica: Journal of the Econometric Society***,** 213-224.

Holmstrom, B. & Tirole, J. 1993. Market liquidity and performance monitoring. *Journal of Political Economy,* 101**,** 678-709.

Holmstrom, B. & Tirole, J. 1997. Financial intermediation, loanable funds, and the real sector. *the Quarterly Journal of economics***,** 663-691.

Holtz-Eakin, D., Newey, W. & Rosen, H. S. 1988. Estimating vector autoregressions with panel data. *Econometrica: Journal of the Econometric Society***,** 1371-1395.

Illes, A., Lombardi, M. J. & Mizen, P. 2015. Why did bank lending rates diverge from policy rates after the financial crisis? *BIS Working Paper*.

Iyer, R., Peydró, J.-L., Da-Rocha-Lopes, S. & Schoar, A. 2014. Interbank liquidity crunch and the firm credit crunch: Evidence from the 2007–2009 crisis. *Review of Financial Studies,* 27**,** 347-372.

Jiménez, G., Mian, A., Peydró, J.-L. & Saurina, J. 2014a. The real effects of the bank lending channel.

Jiménez, G., Ongena, S., Peydro, J.-L. & Saurina, J. 2014b. Credit demand forever? On the strengths of bank and firm balance-sheet channels in good and crisis times. *European Banking Center Discussion Paper*.

Jurado, K., Ludvigson, S. C. & Ng, S. 2015. Measuring uncertainty. *The American Economic Review,* 105**,** 1177-1216.

Kahle, K. M. & Stulz, R. M. 2010. Financial policies and the financial crisis: How important was the systemic credit contraction for industrial corporations? *NBER Working Paper Series*.

Kahle, K. M. & Stulz, R. M. 2013. Access to capital, investment, and the financial crisis. *Journal of Financial Economics,* 110**,** 280-299.

Kalemli-Ozcan, S., Laeven, L. & Moreno, D. 2018. Debt overhang, rollover risk, and corporate investment: Evidence from the european crisis. *NBER Working Paper Series*.

Karabarbounis, M., Macnamara, P. & Mccord, R. 2014. A business cycle analysis of debt and equity financing. *Economic Quarterly,* 100**,** 51-86.

Kashyap, A. K., Stein, J. C. & Wilcox, D. W. 1993. Monetary policy and credit conditions: Evidence from the composition of external finance. *The American Economic Review,* 83**,** 78-98.

Khwaja, A. I. & Mian, A. 2008. Tracing the impact of bank liquidity shocks: Evidence from an emerging market. *The American Economic Review***,** 1413-1442.

Kiyotaki, N. & Moore, J. 1997. Credit cycles. *The Journal of Political Economy,* 105**,** 211-248.

Lang, L., Ofek, E. & Stulz, R. 1996. Leverage, investment, and firm growth. *Journal of Financial Economics,* 40**,** 3-29.

Leary, M. T. 2009. Bank loan supply, lender choice, and corporate capital structure. *The Journal of Finance,* 64**,** 1143-1185.

Lee, J., Lin, L. & Naranjo, A. 2017. Going abroad in a risky world: Geographic diversification, institutional frictions, and corporate leverage.

Lee, J., Naranjo, A. & Sirmans, S. 2016. Exodus from sovereign risk: Global asset and information networks in the pricing of corporate credit risk. *The Journal of Finance,* 71**,** 1813-1856.

Levine, R. 2002. Bank-based or market-based financial systems: Which is better? *Journal of Financial Intermediation,* 11**,** 398-428.

Mackay, P. & Phillips, G. M. 2005. How does industry affect firm financial structure? *Review of Financial Studies,* 18**,** 1433-1466.

Martin, Č., Demirgüç-Kunt, A., Feyen, E. & Levine, R. 2012. Benchmarking financial systems around the world. *World Bank Policy Research Working Paper,* 6175.

Mizen, P., Packer, F., Remolona, E. & Tsoukas, S. 2018. Original sin in corporate finance: New evidence from Asian bond issuers in onshore and offshore markets.

Mizen, P. & Tsoukas, S. 2010. What effect has bond market development in emerging Asia had on the issuance of corporate bonds?

Mizen, P. & Tsoukas, S. 2012. The response of the external finance premium in Asian corporate bond markets to financial characteristics, financial constraints and two financial crises. *Journal of Banking & Finance,* 36**,** 3048-3059.

Mizen, P. & Tsoukas, S. 2014. What promotes greater use of the corporate bond market? A study of the issuance behaviour of firms in Asia. *Oxford Economic Papers,* 66**,** 227-253.

Modigliani, F. & Miller, M. H. 1958. The cost of capital, corporation finance and the theory of investment. *The American economic review,* 48**,** 261-297.

Modigliani, F. & Miller, M. H. 1963. Corporate income taxes and the cost of capital: A correction. *The American economic review,* 53**,** 433-443.

Mohanty, D. Evidence of interest rate channel of monetary policy transmission in India. Second International Research Conference at the Reserve Bank of India, February, 2012.

Myers, S. C. 1984. The capital structure puzzle. *The journal of finance,* 39**,** 574-592.

Myers, S. C. & Majluf, N. S. 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics,* 13**,** 187-221.

Nickell, S. 1981. Biases in dynamic models with fixed effects. *Econometrica: Journal of the Econometric Society***,** 1417-1426.

Patton, A. J. & Sheppard, K. 2015. Good volatility, bad volatility: Signed jumps and the persistence of volatility. *Review of Economics and Statistics,* 97**,** 683-697.

Popov, A. & Van Horen, N. 2015. Exporting sovereign stress: Evidence from syndicated bank lending during the euro area sovereign debt crisis. *Review of Finance,* 19**,** 1825-1866.

Rajan, R. G. 1992. Insiders and outsiders: The choice between informed and arm's length debt. *The Journal of Finance,* 47**,** 1367-1400.

Rajan, R. G. & Zingales, L. 1995. What do we know about capital structure? Some evidence from international data. *The Journal of Finance,* 50**,** 1421-1460.

Rampini, A. A. & Viswanathan, S. 2010. Collateral, risk management, and the distribution of debt capacity. *The Journal of Finance,* 65**,** 2293-2322.

Ritz, R. A. & Walther, A. 2015. How do banks respond to increased funding uncertainty? *Journal of Financial Intermediation,* 24**,** 386-410.

Roodman, D. 2009. How to do xtabond2: An introduction to difference and system GMM in Stata. *Stata Journal,* 9**,** 86-136.

Rossi, B. & Sekhposyan, T. 2015. Macroeconomic uncertainty indices based on nowcast and forecast error distributions. *American Economic Review,* 105**,** 650-655.

Rossi, B. & Sekhposyan, T. 2017. Macroeconomic uncertainty indices for the euro area and its individual member countries. *Empirical Economics,* 53**,** 41-62.

Ryoo, J. H. 2014. Asian bond markets initiative.

Scotti, C. 2016. Surprise and uncertainty indexes: Real-time aggregation of real-activity macro-surprises. *Journal of Monetary Economics,* 82**,** 1-19.

Segal, G., Shaliastovich, I. & Yaron, A. 2015. Good and bad uncertainty: Macroeconomic and financial market implications. *Journal of Financial Economics,* 117**,** 369-397.

Shin, H. S. 2014. The second phase of global liquidity and its impact on emerging economies. *Volatile Capital Flows in Korea.* Springer.

Song, F. & Thakor, A. V. 2010. Financial system architecture and the co-evolution of banks and capital markets. *The Economic Journal,* 120**,** 1021-1055.

Spiegel, M. M. 2012. Developing asian local currency bond markets: Why and how? *Implications of the Global Financial Crisis for Financial Reform and Regulation in Asia***,** 221.

Stock, J. H. & Watson, M. W. 2008. Heteroskedasticity-Robust standard errors for fixed effects panel data regression. *Econometrica,* 76**,** 155-174.

Windmeijer, F. 2005. A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics,* 126**,** 25-51.

Zoli, E. 2013. Italian sovereign spreads: Their determinants and pass-through to bank funding costs and lending conditions. *IMF Working Papers*, 13.