

Credit Market Conditions and Impact of Access to The Public Debt Market on Corporate Leverage

Amrit Judge¹ and Anya Korzhenitskaya
This draft: 11 April 2011

Economics and Statistics Department, Middlesex University Business School, The Burroughs,
Hendon, London NW4 4BT, UK

Very preliminary draft (Work-in-progress): Please do not quote without prior permission.

ABSTRACT

This study examines the role played by credit ratings in explaining corporate capital structure choice during a period characterized by a major adverse loan supply shock. Recent literature has argued that supply-side factors are potentially as important as demand-side forces in determining corporate leverage. This is based on the premise that debt markets are segmented and that those firms that have access to the private debt markets do not necessarily have access to the public debt markets. The question of access to debt finance has become a major issue for public policy makers in several developed economies during the 2007-2009 financial crisis. The UK economy has been subjected to a period of severe tightening of credit market conditions resulting in a significant reduction in the availability of credit to the corporate sector. An important question is whether the contraction in the flow of bank credit to firms has affected firms equally or whether firms with access to alternative sources of debt finance have been able to mitigate the effect of adverse changes to the cost and availability of bank credit. To investigate this issue, this study employs data over a 20 year period that includes two recessions and two noticeable periods of credit market tightening. Significantly, the first of these periods (2000-2003) of tight credit was not associated with an economic downturn whereas the second period (2007-2009) was. Despite the fact that a severe recession has accompanied the 2007-2009 financial crisis we argue that the underlying forces driving the weakness in bank lending to the corporate sector are mainly supply side rather than demand side factors. In this study we use the possession of a credit rating as an indicator of access to the public debt markets. Our results provide support for the notion that having a rating is associated with higher leverage ratios, even after controlling for demand-side leverage determinants and macroeconomic conditions. More importantly, the study finds that the impact on leverage of having a credit rating varies over our sample period with the effect being greatest in those years when credit market conditions were tightest. The results are robust to the use of an alternative measure for public debt market access, different proxies for measuring the tightness of the credit markets, alternative econometric specifications and various sub-periods within our overall sample period.

KEYWORDS: Capital Structure, Credit Ratings, Bond Market Access, Financial Crisis.

¹ Corresponding author a.judge@mdx.ac.uk

1. Introduction

The seminal work of Modigliani and Miller (1958) assumes that in the absence of market imperfections the supply of capital is perfectly elastic and that the capital structure decision of a firm depends entirely on demand-side considerations and thus is independent of the supply of capital [Lemmon and Roberts (2007)]. The key assumption is that firms can borrow as much as they wish at the same cost of capital. This implies that a firm's capital structure is purely a function of a firm's characteristics that influence its demand for debt capital, such as, size, profitability, asset tangibility, and growth opportunities. The implicit assumption in the prior literature has been that leverage of a company is purely function of the firm's demand for debt. Thus, most of the prior empirical literature concentrates on the demand-side determinants of capital structure while paying little attention to supply-side factors [see Rajan and Zingales (1995) and Frank and Goyal (2007)].

Only recently have researchers recognised the importance of the supply-side as a potential determinant of capital structure. In the real world market frictions such as information asymmetry and investment distortions imply that the supply of capital is inelastic and firms can be rationed by their lenders in terms of both pricing and debt availability [Faulkender and Petersen (2006)]. Faulkender and Petersen (2006) argue that in the presence of information asymmetry firms that can access the public debt capital markets face less financial constraints and are able to borrow more. Conversely, firms that desire to raise funds but are constrained by lack of access to capital markets might be significantly under-levered [Faulkender and Petersen (2006)]. As a result, firms with access to public debt markets are predicted to have higher leverage ratios relative to those that do not have such access.

The importance of supply side factors has come to the fore since the onset of the current financial crisis in the latter half of 2007. During the last three years, banks have attempted to repair their balance sheets and consequently have significantly cut back on their lending commitments to the corporate sector.² The Bank of England's credit conditions survey has reported that between the fourth quarter of 2007 through to the end of 2008 financial market turbulence reduced significantly UK banks' capacity to extend credit to the corporate sector.³ The Bank's credit conditions survey reports that during this period there was a significant tightening of price and non-price terms on loans to the corporate sector. Banks widened their spreads and raised the fees and commissions they charged on loans to firms. In addition banks imposed stricter covenants, raised collateral requirements and reduced maximum credit lines. This has made raising bank loan finance extremely difficult for creditworthy firms since the fourth quarter of 2007 and consequently has limited the availability of debt-based finance for firms that are heavily reliant on banks for their debt capital.

In the U.K. banks have traditionally been the main source of capital for the private sector with 76% of debt being currently provided by banks.⁴ The situation is however likely to change according to a Standard and Poor's (2010) report which indicates that since the events of September 2008, corporate bond issuance by U.K. businesses had increased by £22.1 billion, while U.K. financial institutions have reduced their net lending (both in sterling and foreign currencies) to U.K. companies by £59.1 billion⁵. The report suggests that this makes corporate bond issuance the main provider of new debt financing on a net basis since the third-quarter of 2008.

² Balance sheet repairs may also take the form of injection of new (equity) capital and selling assets.

³ See Credit Conditions Survey 2007 Q3 to 2008 Q4, Bank of England.

⁴ Standard and Poor's, (2010), "Amid the Changing Banking Landscape, U.K. Corporates are Embracing the Capital Markets", September 21, 2010, page 3.

⁵ Standard and Poor's (2010), "Amid the Changing Banking Landscape, U.K. Corporates are Embracing the Capital Markets", September 21, 2010, page 7.

A credit rating by providing access to the public debt markets can offer considerable benefits to a firm. Not only does it widen the investor base and improves debt pricing but also provides an opportunity to enter foreign bond markets and gain international visibility, thereby reducing the reliance on local banks. Faulkender and Petersen (2006), Mitto and Zhang (2008) and Kisgen (2009), find that companies with a rating have access to broader sources of debt finance, and as a result have higher leverage ratios compared to unrated firms. There is also evidence that rated companies suffer less during adverse economic conditions. For example, Chava and Purnanandam (2009) find that in the U.S., bank-dependent firms suffered larger valuation losses and greater subsequent decline in their capital expenditure during and after the Russian crisis of 1998 as compared to their rated counterparts. Similarly, Campello, Giambona, Graham and Harvey (2009) find that the majority of US firms have been adversely affected by the 2008 credit supply shock but the impact has been greatest for financially constrained firms.

Bacon, Grout and O'Donovan (2009) survey chief financial officers and treasurers of UK firms and find that the possession of a credit rating and the resulting access to public debt markets it offers has become especially important during the current financial crisis. Recent trends in lending data from the Bank of England (BoE) (Trends in Lending July 2009) points to rated firms raising capital market debt (bonds) to pay back bank loans and issuing bonds rather accessing new bank loan facilities. The BoE (July 2009) suggest that access to the debt capital markets has enabled rated firms “to mitigate the impact of a shortening in the maturity of bank lending available since the onset of the financial crisis” (July 2009 Trends in Lending). The Bank of England (2009) in August 2009 reported that while companies with bond market access had turned to arm's length sources of finance, smaller businesses without access still remained severely financially constrained. Bacon et al. (2009) report that many firms that did not have a rating during the crisis were seeking to obtain one.

Post the financial crisis the future level of bank lending could be subject to greater restrictions as the the new Basel capital requirements, which will more than double the core Tier 1 capital ratio from 2% to 4.5%, come into force. Standard and Poor's (2010) argue that the forthcoming Basel III requirements will increase the amount of capital banks need to hold to support their corporate lending operations and this will lead to a reduction in lending capacity within the banking system. They anticipate that this will be likely to result in “a longer term structural impetus for rising bond issuance over bank loans”.⁶

Outside the U.S., the U.K. has seen the greatest use of credit ratings, with around 33 per cent of large listed non-financial firms (top 350) possessing a rating.⁷ In September 2008 the U.K. was ranked the third amongst 24 developed countries for international debt securities outstanding.⁸ It follows that given the possession of credit ratings by U.K. issuers and U.K. firms' share of global bond market activity, the UK provides a good setting to investigate the role of access to public debt markets in determining capital structure choice.

⁶ Standard and Poor's report, September 21, 2010, Amid the Changing Banking Landscape, U.K. Corporates are Embracing the Capital Markets, page 9

⁷ Hanafin, S., (2007), “In search of Diversification”, The Treasurer, July/August 2007, page 26.

⁸ Sourced from Table 12C International debt securities – corporate issuers, page A88, BIS Quarterly Review, December 2008.

Adverse economic conditions and distortions in the supply of capital can severely affect firms' leverage and especially those firms that do not have access to alternative sources of finance, such as the public debt markets. The study investigates the role played by access to public debt markets over a twenty year period during which there were three episodes of credit market tightening with increasing severity. The two most recent episodes differ in one key respect in that the most recent period of credit market tightening took place during a severe economic downturn. In this crisis we have witnessed the most severe reduction of bank lending to the UK corporate sector in recent economic history. Financial distress and the severe lack of liquidity in the banking system during the peak of the crisis forced banks to change considerably the terms of their lending to the corporate sector. Commitment fees and interest spreads went up, while maturities went down.⁹ The financial crisis therefore provides a very unique opportunity to investigate the role of access to public debt markets in determining firms' leverage during a period of severe credit market tightening.

The remainder of the paper is organised as follows. Section 2 presents an overview of the literature on credit market conditions and capital structure. Section 3 presents an analysis of the conditions of the UK credit markets between 1998 and 2010. In this section we also examine whether the weakness in bank lending during the financial crisis reflects a reduction in the supply of credit or weaker demand for funds from firms as their investment opportunities have dried up during the recession. We present a robust analysis of the underlying forces driving the reduction in the flow of credit to the corporate sector. Section 4 describes the rating characteristics of our sample. Section 5 presents our empirical analysis and section 6 concludes.

⁹ Campello, Giambona, Graham, Harvey (2009) reports an increase of commitment fees by 14 basis points, mark-ups over LIBOR/Prime rate - by 69 basis points and decline in maturity by 2.6 months from 30 months on average for the U.S.

2. Access to Public Debt Markets, Credit Market Conditions and Capital Structure: Overview of the Empirical Literature

In this section we review the literature on credit market conditions and firms capital structure decisions. Lemmon and Roberts (2007) explore the relationship between a loan supply shock of 1989 and firms' financing decisions. Their findings underline that even large firms with access to public debt market are affected by capital supply shocks. Chava and Purnanandam (2009) examine the shock to the U.S. banking system during the Russian crisis of 1998 using full sample analysis and matching sample techniques. They find that *“bank-dependent firms lost disproportionately higher market value and suffered larger declines in capital investments and growth rates following the crisis as compared to firms with access to the public debt market”* [Chava and Purnanandam (2009), p.30].

Ivashina and Scharfstein (2009) indicate that in the U.S. bank lending dropped considerably across all loans types during the 2007-2009 crisis. They find that new bank loans fell by 47% during the peak of the financial crisis (fourth quarter of 2008) relative to the third quarter. When compared to the peak of the credit boom (second quarter of 2007) they find that bank loans dropped by 79% in the fourth quarter of 2008. The terms and conditions of bank lending have also worsened. Campello, Giambona, Graham, Harvey (2009) report that the tightening of US credit markets during the 2007-2009 financial crisis has manifested itself in the form of an increase of commitment fees by 14 basis points, mark-ups over LIBOR/Prime rate by 69 basis points and decline in maturity by 2.6 months from 30 months on average. Empirical evidence suggests that debt market segmentation has resulted in differential sensitivity to the recent credit market shock. For example, Campello, Graham, and Harvey (2009) provide evidence on how financially constrained and unconstrained US firms manage their investment expenditure during the 2007 financial crisis. In particular they find that the financial crisis has had a severe impact on credit constrained firms, leading to deeper cuts in planned R&D (by 22%), employment (by 11%), and capital spending (by 9%). Furthermore, the inability of these firms to borrow externally has caused many firms to cancel or postpone attractive investment projects, with 86% of CFOs in the U.S. stating that they had to restrict investments in attractive projects during the credit crisis. Similarly, Kisgen (2007) suggests that having access to alternative sources of debt capital can help firms raise funds during adverse economic conditions and prevent underinvestment in positive-NPV projects. All firms have suffered from the credit supply shock but the impact has been greatest on those firms heavily reliant on the banking sector for their funding. It follows that as the flow of credit from the banks has dried up, the possession of a credit rating may have eased firms' financial constraints.

Leary (2009) in a study of the relevance of capital market supply frictions for corporate capital structure decisions following the 1966 credit crunch in the United States finds that larger firms with access to public debt market were less affected by contraction in bank loan supply due to their greater ability to substitute toward arm's length debt financing. Leary (2009) finds that the use of bond debt by firms with access to public debt markets increased, relative to that of small, bank-dependent firms. As a result the leverage of bank-dependent firms significantly declined compared to firms with access to public bond markets. By using firm size as a proxy for debt market access, he finds that following the 1966 loan supply contraction, leverage ratios of small, bank-dependent firms significantly decreased relative to large firms with bond market access. When Leary (2009) expands his sample period to cover the 35 years from 1965 to 2000, he finds the leverage difference between firms with and without public debt market access becomes greater in periods of reduced loan supply and tighter credit markets.

Bacon, Grout and O'Donovan (2009) in their report from in-depth interviews with UK's top 350 quoted businesses on the impact of changed banking and market conditions on the corporate funding plans document that with increased borrowing margins¹⁰ and reduced maturity periods, the availability of funds from the banking sector fell significantly. In addition, if banking market capacity is reduced in the foreseeable future, bond markets are likely to become an alternative source of capital.

Several studies have looked at the effect of macroeconomic conditions on firms' capital structure decisions. Cantillo and Wright (2000) suggest that macroeconomic conditions have a powerful effect on how firms choose their lenders. They find that less constrained companies tend to issue more debt during favorable economic conditions [Cantillo and Wright (2000), Levy (2001), Korajczyk and Levy (2003)]. Levy (2001) investigates how firms' capital structure choice varies with macroeconomic conditions in the presence of agency problem. He finds counter-cyclical patterns for debt issues for firms that access public capital markets. This finding is supported in the later work of Korajczyk and Levy (2003) who point out that capital structure choice varies over time and across firms. By splitting their sample into financial constrained and financial unconstrained firms, they also find that leverage of financially unconstrained firms varies counter-cyclically with macroeconomic conditions. In other words, unconstrained firms time their issue choice to coincide with periods of favorable macroeconomic conditions, while constrained firms do not.

3. Credit Market Conditions in the U.K. 1998-2010

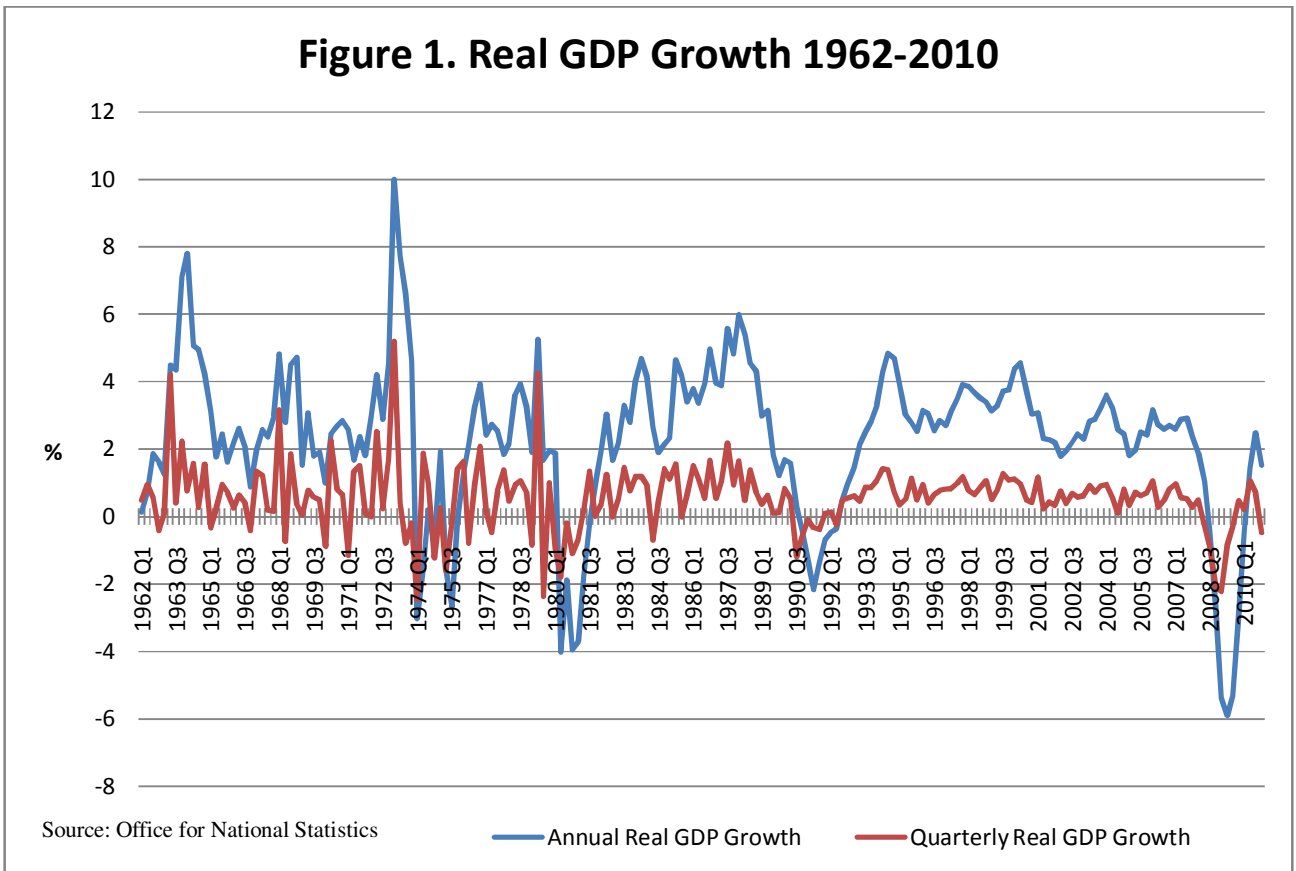
In this section we present an analysis of the conditions of the UK credit markets before and during the financial crisis years. We investigate three aspects of the credit markets: the flow and stock of bank lending to the corporate sector, capital market issuance and pricing of bank loans. We will utilise evidence from these areas to examine whether the observed weakening in bank lending to the corporate sector is an indicator of a reduction in the supply of credit due to a tightening in bank's credit provision or weaker demand for finance from firms as a result of the recession.

Figure 1 shows that between 2008 and 2009 the UK has been mired in the deepest as well as longest postwar recession on record with seven quarters of negative growth.¹¹ The recession began in the second quarter of 2008 and by the end of 2009 the annual rate of decline in GDP reached nearly 5.6% - the biggest fall since records began in 1955.¹²

¹⁰ Bacon, Grout and O'Donovan (2009), p. 4 define borrowing margins as a credit spread over the appropriate benchmark cost.

¹¹ A recession is defined as two or more consecutive quarters of falling real GDP.

¹² Sourced from Office For National Statistics website.



3.1 Bank Lending to the UK Corporate Sector

Figure 2 provides a historical perspective on the annual growth in bank sterling lending to UK firms over the period 1964-2008. The shaded areas indicate periods when the UK economy was in recession (1974 to 1975, 1980 to 1981, 1990 to 1991 and 2008 to 2009). The figure shows that recessions are always associated with decreases in the growth of lending and that growth has become negative in real terms during the last four recessions. The 2008-2009 recession has seen the deepest real terms contraction in bank lending. For example, in July 2009 sterling-only net lending to private non-financial corporations was -£8.4 billion which was the weakest flow since the series began in 1963.¹³ However, it is worth pointing out that a slowdown in bank lending does not always take place in the midst of a recession. Figure 2 shows that there have been two occasions in the last fifteen years where lending has weakened during periods of positive economic growth, these being 1997-1999 and 2002-2003.

¹³ See www.bankofengland.co.uk/statistics/fm4/2009/jul/FM4.pdf. or see Trends in Lending September 2009, page 4.

Figure 2. Sterling Lending to UK PNFCs Year-on-Year Growth 1964 - 2010

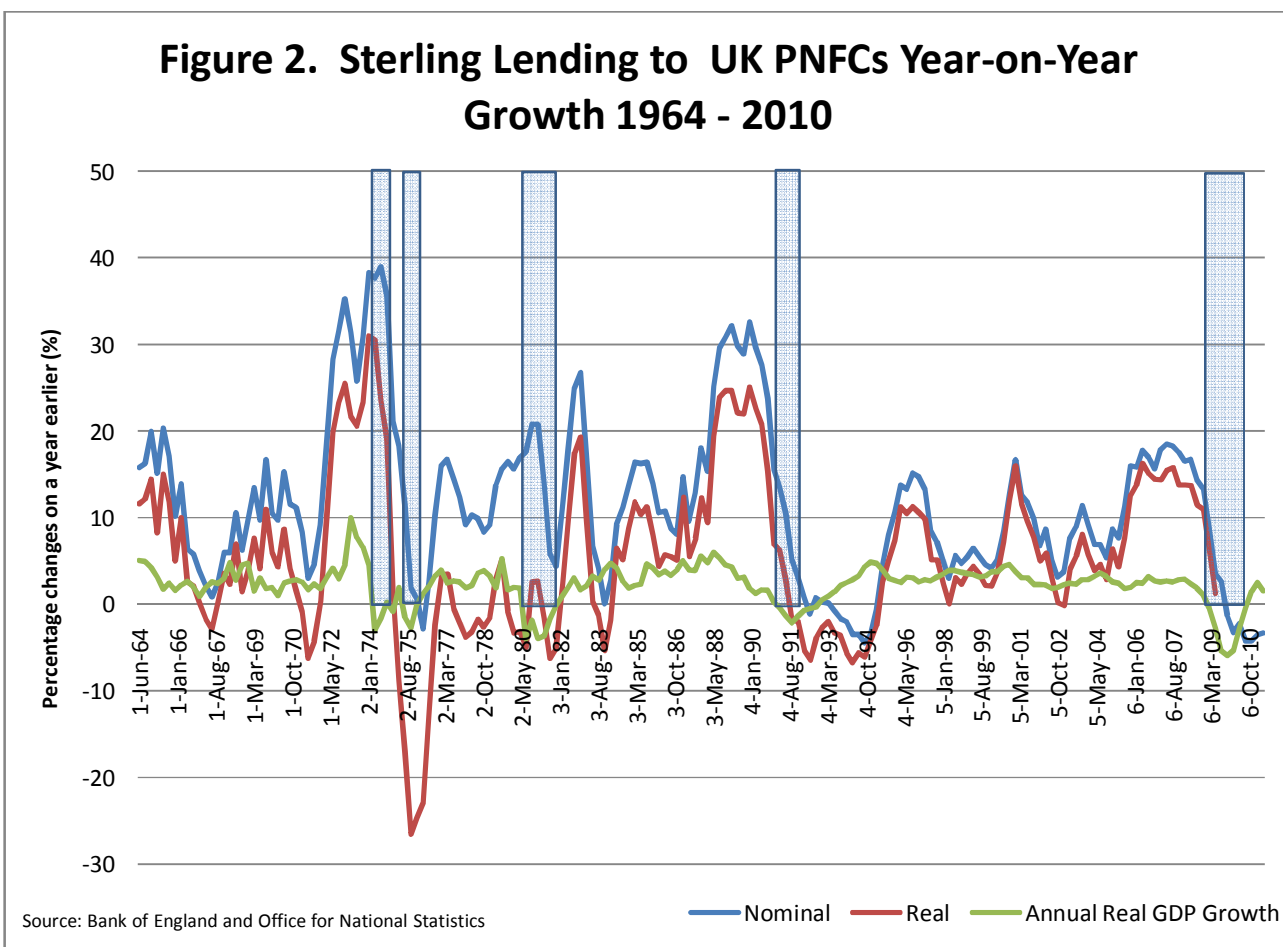


Figure 3 presents Bank of England (BOE) data on net monthly bank lending flows to the UK corporate sector for the period 1998 to 2011 and includes lending in both sterling and foreign currency (expressed in sterling millions). The chart shows that from 1999 through to the end of 2003 net monthly lending flows made several forays into negative territory indicating a net repayment of bank loans in those months. Net monthly lending flows were negative in 17 out of 60 months (28% of months) during this period with an average flow of £1559 million. In stark contrast, during the four year period from 2004 to 2007 lending flows were negative in only 2 months out of 48 (4% of months) and the average net monthly lending flow had nearly tripled to £4634 million. This was then followed by the financial crisis which resulted in the biggest reduction in bank lending to corporates since the BOE started collecting this data in 1998. For the three years between January 2008 and January 2011 the net monthly bank lending flow was negative in 25 out of 37 months (68% of months) with an average net monthly lending flow equal to -£698 million.¹⁴ Over these 37 months the stock of bank lending to non-financial firms shrank by £25.8 billion.

¹⁴ Bank of England data covering lending by all UK-resident banks and building societies showed that there was a net repayment of loans in 21 of the months over the period January 2009 to January 2011.

Figure 3. Monthly changes of monetary financial institutions' sterling and all foreign currency loans (excluding securitisations) to private non-financial corporations (in sterling millions) seasonally adjusted (Net monthly flow of lending to UK firms)

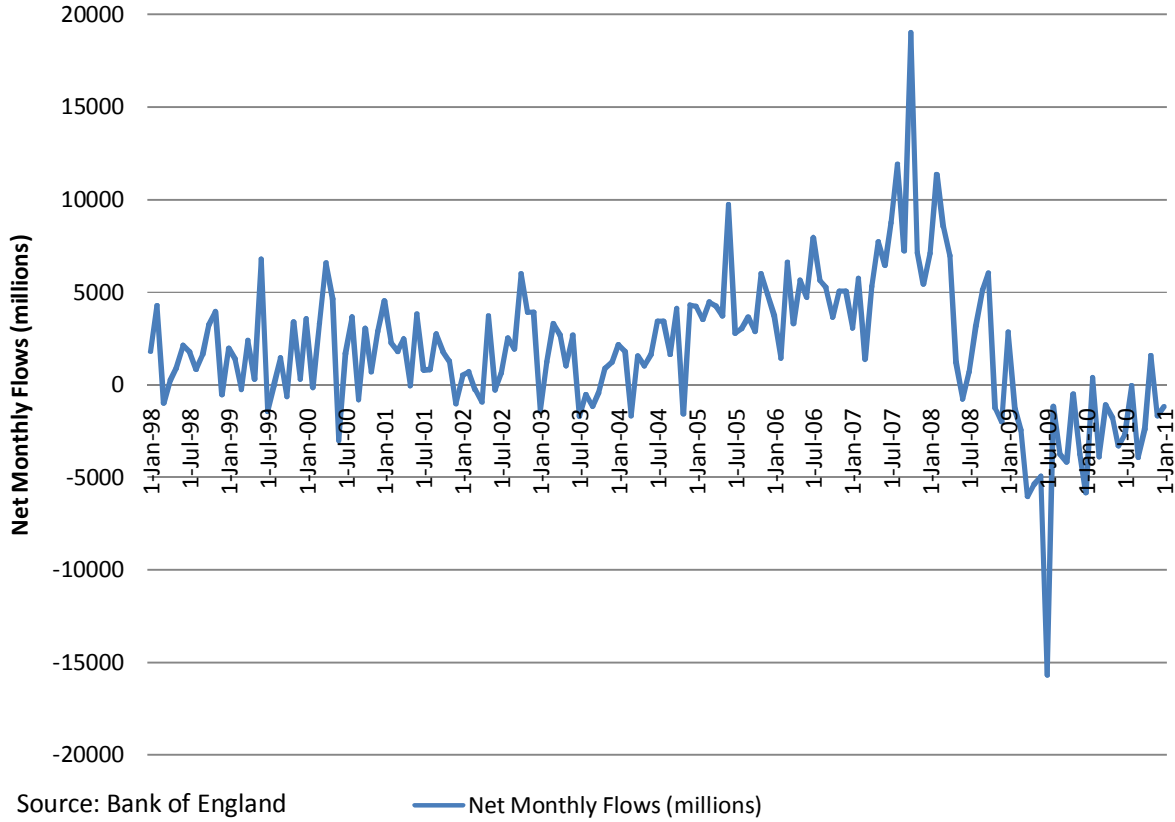


Figure 4. Monthly 12 and 3 month growth rate of monetary financial institutions' sterling and all foreign currency loans (excluding securitisations) to private non-financial corporations (in percent) seasonally adjusted

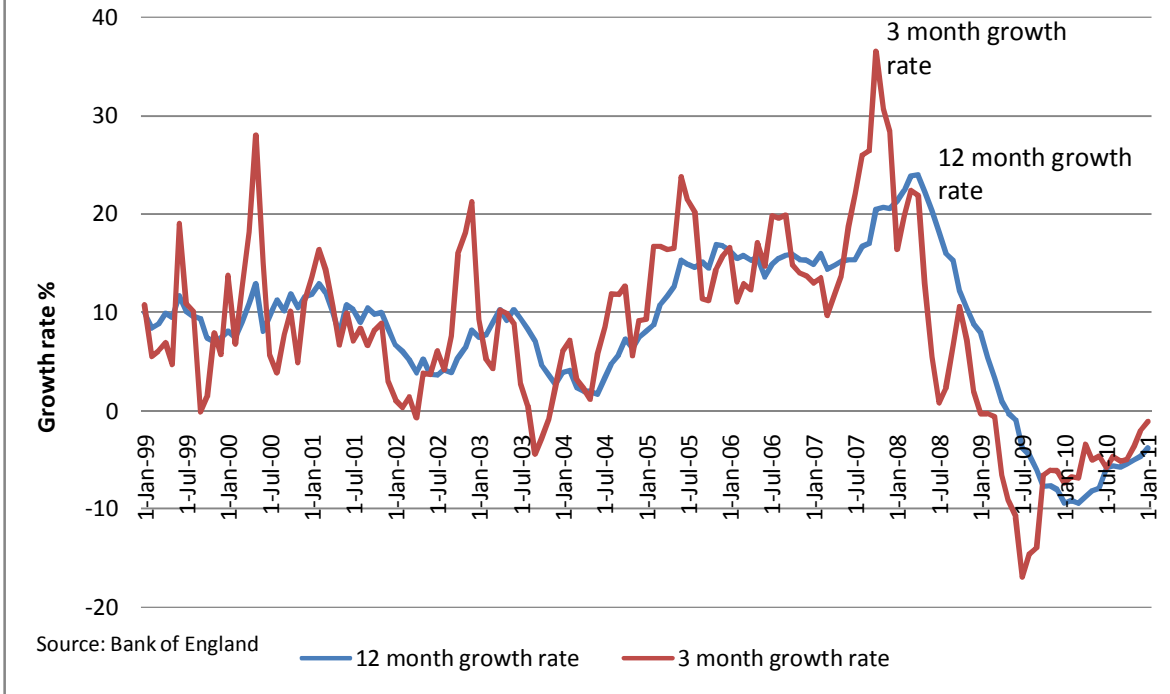


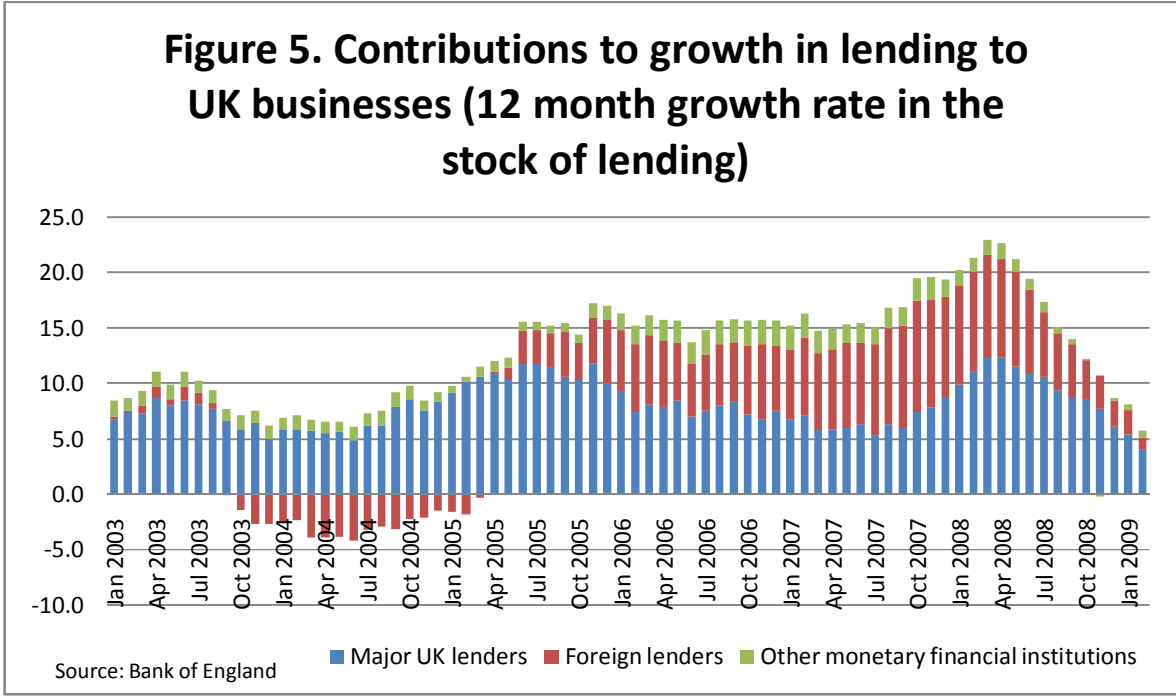
Figure 4 shows the twelve-month and three-month growth rates of the stock of lending over the period January 1999 to January 2011. There was a dip in both growth rates towards the end of 1999, during the first half of 2002 and then again over the second half of 2003 which is consistent with the tightening of credit markets experienced during these years. From the middle of 2004 to the middle of 2005 we see a rapid increase in both growth rates. For a two year period the twelve month growth rate of the stock of lending averages around 15 percent and then it picks up again in the middle of 2007. Twelve month lending growth peaks at 24 percent in April 2008 after which it commenced a rapid decline hitting negative growth in May 2009 for the first time since the monthly series began in 1999.¹⁵ The annual rate of contraction (negative growth rate) of the stock of loans peaked in the first quarter of 2010 and since then the rate of contraction has slowed.

The strong flow and growing stock of lending to the corporate sector shown in figures 3 and 4 during the pre-crisis years of 2004 to 2007 is consistent with the notion that during this period the banks were very proactive in encouraging firms to take on higher levels of debt and most borrowers could not resist the cheap financing facilities available. The Bank of England Trends in Lending report of

¹⁵ The three month growth rate peaks at 36.5% in October 2007.

April 2009 points out that during this period the macroeconomic environment was very favorable, asset prices were rising and interest rates around the world were relatively low which facilitated an increase in the amount of lending to companies in the UK and the rest of the world. Furthermore, before the credit crisis borrowing margins were on the whole at historically low levels and at the peak of the boom in the latter part of 2006 banks were competing aggressively to provide credit on favorable terms.

Figure 5 presents a breakdown of the growth of UK lending by geographical source. During the pre-crisis years 2005 to 2007 there was an increasing contribution by foreign lenders to the growth of UK lending with about half of the growth in lending to private non-financial firms in 2007 being attributed to the activities of foreign lenders. However, with the onset of the financial crisis the balance sheets of banks globally came under severe pressure during the latter part of 2007 and consequently the contribution of those foreign lenders began to fall. This decline gathered momentum in the second half of 2008, as foreign banks cut back on new lending abroad. Figure 5 shows that the growth in lending by UK lenders has also decreased, but their relative contribution to overall growth is now greater than in 2007.



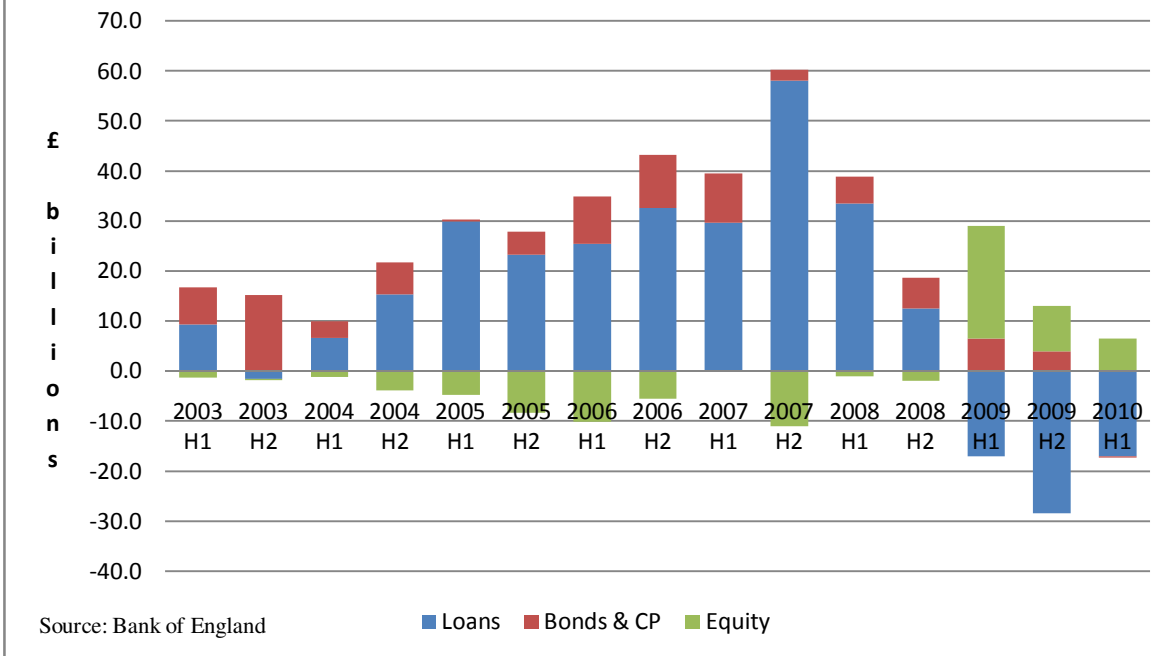
3.2 Capital Market Issuance By UK Firms 2003-2010

Rated firms raise debt funds from public debt capital markets as well as by borrowing from banks. This allows them to diversify their sources of debt finance though in the UK bank lending tends to

be the dominant source of debt funds for private non-financial firms.¹⁶ Firms can also raise equity finance from capital markets. The BOE (June 2009) reported that the average maturity of new lending during the crisis fell relative to before the crisis. Pre-crisis the term premium associated with borrowing over longer periods had been relatively small, and so loan facilities were typically arranged with maturities of five to seven years. However during the crisis, lenders found it very difficult and costly to raise longer-term funding and this was reflected in the prices they charged for longer-term facilities. The BOE (June 2009) suggest that a reluctance by companies to lock in those higher costs over a long period, given uncertainty about future demand contributed to a decline in the maturity of new lending to two to three years. To some extent, large investment-grade companies seeking longer-term facilities were able to borrow in the capital markets given improved market conditions in early 2009. Bond issuance by investment-grade companies was relatively buoyant in the early months of 2009, allowing these companies to mitigate the impact of a shortening in the maturity of bank lending available (see June 2009 *Trends in Lending*). Capital market conditions improved in the early months of 2009, reflected by higher debt and equity issuance (see Figure 6). There was greater equity issuance during the crisis years as firms were seeking to reduce their leverage given the dire economic conditions. Some of the funds raised in capital markets were also used to pay down bank debt. The Deloitte CFO Survey (quarter 2 2009) reported that sentiment among chief financial officers (CFOs) about equity and corporate bond issuance rose in June 2009, to its highest level since the survey started in 2007. And for the first time there was a preference for bond and equity issuance over bank borrowing.

¹⁶ Standard and Poor's, (2010), "Amid the Changing Banking Landscape, U.K. Corporates are Embracing the Capital Markets", September 21, 2010, page 3.

Figure 6. Net Capital Market and Net Bank Loan Funds Raised by UK Firms 2003-2010



S&P (2010) point out that according to Bank of England data, between December 2004 and March 2009 bank lending to the non-bank private sector grew by 71% from £290.9 billion to £507.8 billion¹⁷. However, "... since the events of September 2008, U.K. financial institutions have reduced their net lending (both in sterling and foreign currencies) to U.K. companies by £59.1 billion, while corporate bond issuance by U.K. businesses had increased by £22.1 billion, according to Bank of England figures."¹⁸

The Financial Times (30th August 2010) reports that "The effect of the financial crisis on bank lending is prompting companies to develop other funding channels. In 2009 companies around the world with investment-grade ratings raised record volumes of debt in capital markets, much of it to refinance bank loans. In the US, investment-grade bond issuance by non-financial companies totalled \$512bn (£402bn, £330bn). In Europe – which has a much smaller bond investor base – it hit €218bn and in the UK, £47bn was raised, according to data from Citigroup. Peter Goves, credit

¹⁷ Standard and Poor's (2010), Amid The Changing Banking Landscape, U.K. Corporates Are Embracing The Capital Markets, September 21, page 2.

¹⁸ Standard and Poor's (2010), Amid The Changing Banking Landscape, U.K. Corporates Are Embracing The Capital Markets, September 21, 2010. page 7.

strategist at Citi, says sub-investment grade bond issuance in the first half of this year was also at a record, with companies seeking to refinance the bank loans they used for leveraged buy-outs.”¹⁹

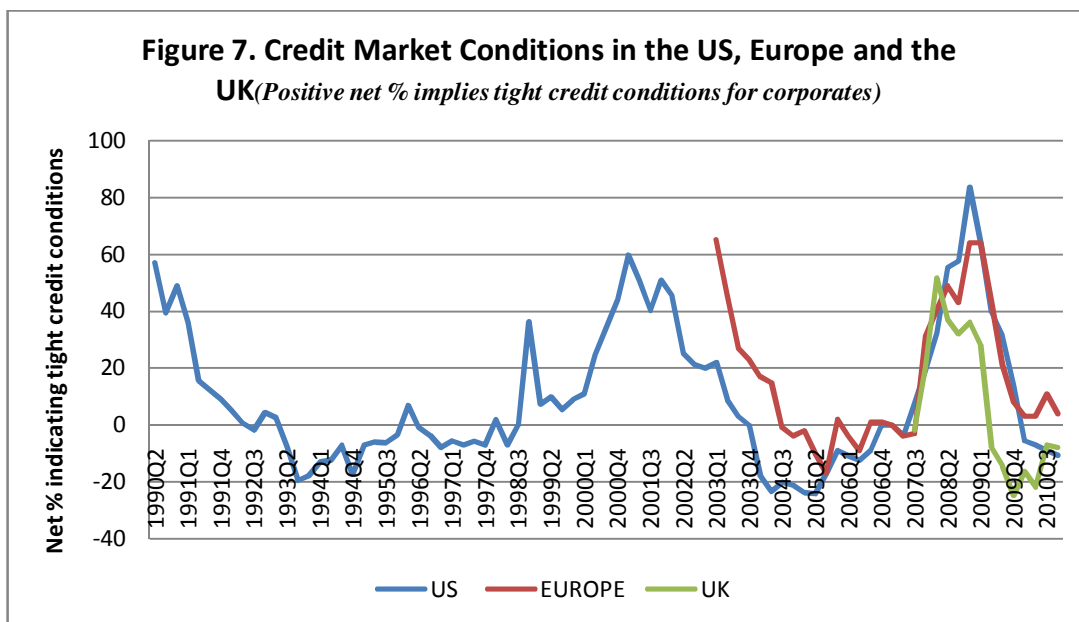
3.3 Measuring Credit Market Conditions: Loan Officer Surveys

The US Federal Reserve Board, European Central Bank (ECB) and the Bank of England (BOE) conduct a quarterly survey of commercial banks under their jurisdiction to measure the extent to which banks are willing to provide loans to the corporate sector. Of the three surveys the US Federal Reserve’s Senior Loan Officer Opinion Survey is the oldest established survey running since 1967, although it was suspended from the first quarter of 1984 through to the second quarter of 1990. The ECB survey started in 2003 and is conducted in each member country by the respective national central bank, and the results are then collated and analysed at the aggregate level. The BOE ran their survey for the first time in 2007 Q2. The BOE survey asks questions about both how bank lending trends have changed over the past three months (relative to the previous three months), and how they are expected to change over the next three months (relative to the latest three months). The survey also asks about changes in the amount of credit lenders are willing to supply and about how both price and non-price terms are changing such as collateral requirements and loan covenants. The latter gives an indication of whether the terms and conditions on which banks are willing to lend have improved or worsened.

To calculate aggregate survey results, the BOE assigns to each lender a score based on their response. Lenders who report that credit conditions have changed ‘a lot’ are assigned twice the score of those who report that conditions have changed ‘a little’. These scores are then weighted by lenders’ market shares. The results are analysed by calculating ‘net percentage balances’ — the difference between the weighted balance of lenders reporting that, for example, terms and conditions were tighter/looser. The net percentage balances are scaled to lie between ± 100 . Positive balances indicate that lenders, on balance, reported/expected credit availability/defaults to be lower than over the previous/current three-month period, or that the terms and conditions on which credit was provided became expensive or tighter respectively.

In this study we use the net percentage balance of respondents to the question “How has the availability of credit provided to the corporate sector overall changed?” to get an overall assessment of the conditions of the UK credit markets, where a positive (negative) net percentage balance indicates an overall tightening (loosening) in the supply of credit. We use the results to the corresponding question in the Federal Reserve and ECB surveys to measure the conditions of the credit markets in the US and Europe, respectively. Figure 7 presents net percentage balance data for the US, European and UK credit condition surveys for the period from 1990 to 2010.

¹⁹ Source: Financial Times, Bank lending: The manager says no, By Sharlene Goff and Norma Cohen, Published: August 30 2010 19:35 | Last updated: August 30 2010 19:35, available at <http://www.ft.com/cms/s/0/b845fb10-b460-11df-8208-00144feabdc0.html#axzz1DO2nPkso>



Source: US Federal Reserve, European Central Bank and Bank of England

Figure 7 indicates that since the middle of 2005 there appears to be some degree of synchronicity in the state of the credit markets in the US, Europe and the UK. Simple correlation analysis confirms that credit market conditions are highly correlated with a correlation coefficient around +0.8, although credit markets in Europe and the UK are a little more closely aligned with each other than with the US. Figure 7 also suggests that the severity of the tightening in credit conditions during the financial crisis was greatest in the UK.

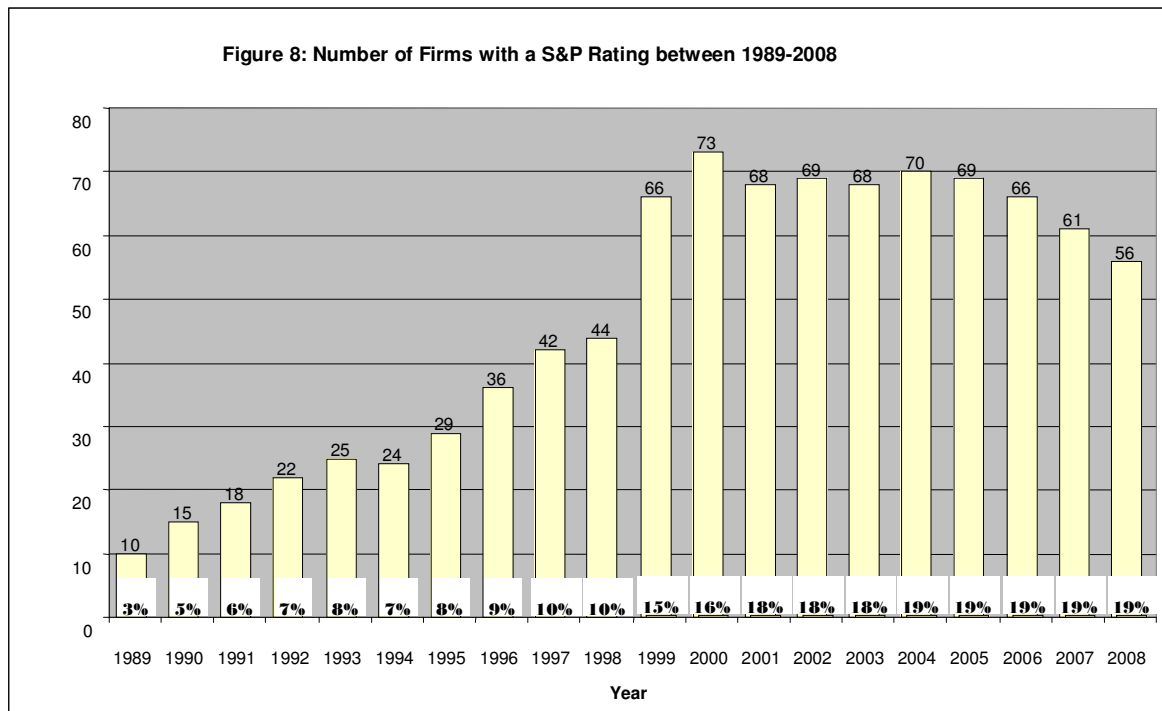
4. Sample Description

Our sample employs data for the top 500 UK listed non-financial firms by market capitalization for the period from 1989 through to 2008. Following previous studies on capital structure [Faulkender and Petersen (2006), Kisgen (2006), Kisgen (2009), Hovakimian et al (2008), Byoun (2008)] we exclude all financial firms from the sample, resulting in a panel of 7258 firm-year observations.

According to Faulkender and Petersen (2006) and Chava and Purnanandam (2009) firms with no debt might be either not able to access debt markets or they might simply not want to have access and prefer to finance themselves with equity. If firms in this category qualify to have access but do not want to obtain a rating, they will be wrongly classified as firms without access. There are 707 of firms (10%) with zero debt in our sample. To avoid any misclassification bias in our analysis we follow Faulkender and Petersen (2006) and Chava and Purnanandam (2009) and exclude all zero-debt firms from the analysis.

This leaves us with a panel of 6,551 firm-years observations. All financial data (leverage and the other firm-level data) is sourced from DataStream. Credit rating data is sourced directly from Standard and Poor's (S&P) and Fitch. For credit rating we use the overall company's long-term corporate credit rating. Data from Fitch covers 11 years period from 1998 – 2008, whereas data obtained from S&P covers 20 years from 1989 – 2008. In our sample 1,010 (15.4%) of firms possess a rating (either S&P or Fitch). This percentage is similar to Mitto and Zhang's (2010) 15% and to Faulkender and Petersen's (2006) 19%, indicating that the possession of a rating is not very common amongst listed firms.

Figure 8 illustrates the frequency of firms with S&P credit rating by year for the period from 1989 to 2008.



According to Figure 8 only 3% (10 firms) of firms in our sample were rated by S&P credit rating agency in 1989. The percentage of rated firms was rising gradually upto 1998 and leaped from

10% (44 firms) in 1998 to 15% (66 firms) in 1999. Since then it was rising steadily and in 2004 it reached 19% (70 firms) and has been constant up to 2008.

Figure 9 demonstrates the frequency of firms with Fitch credit rating by year for the period from 1998 to 2008.

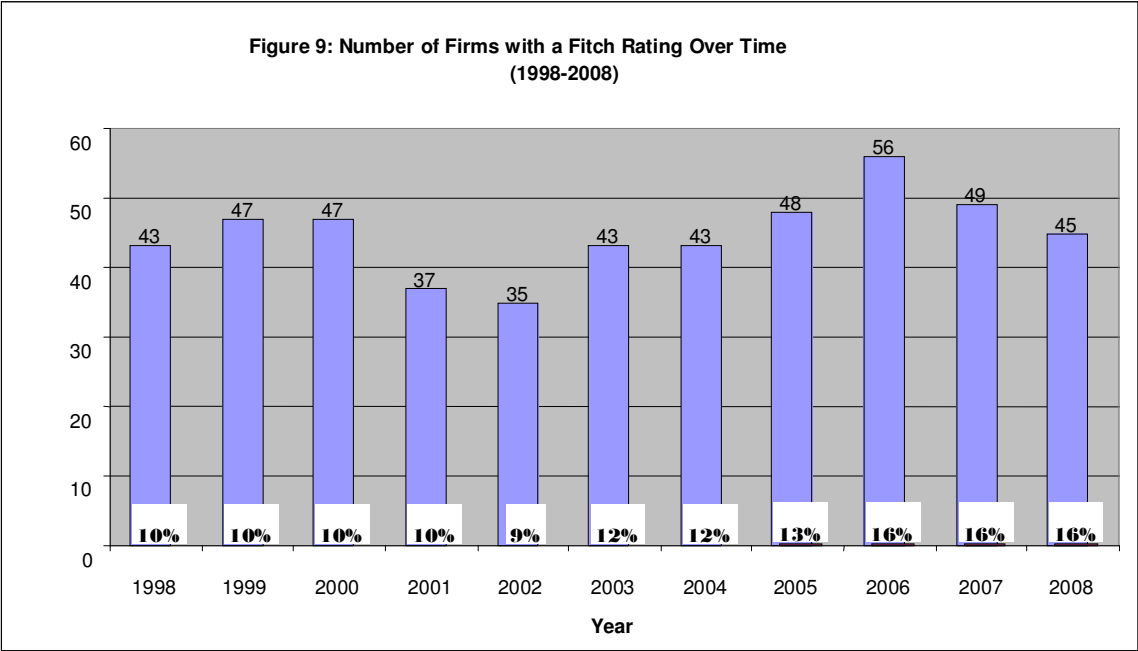


Figure 9 shows that on average 12% of firms are rated by Fitch each year. The percentage of firms rated was 10% in 1998 and reached 16% in 2008. Figure 10 presents the frequency of rated firms with both S&P and/or FITCH ratings over the 11 year period from 1998 to 2008.

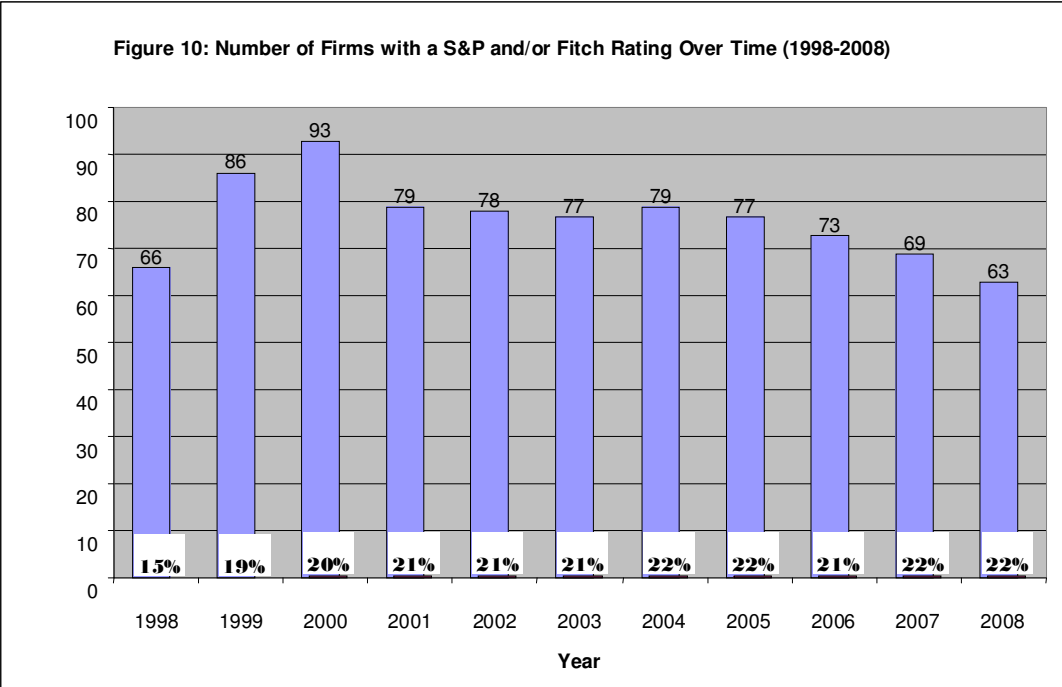
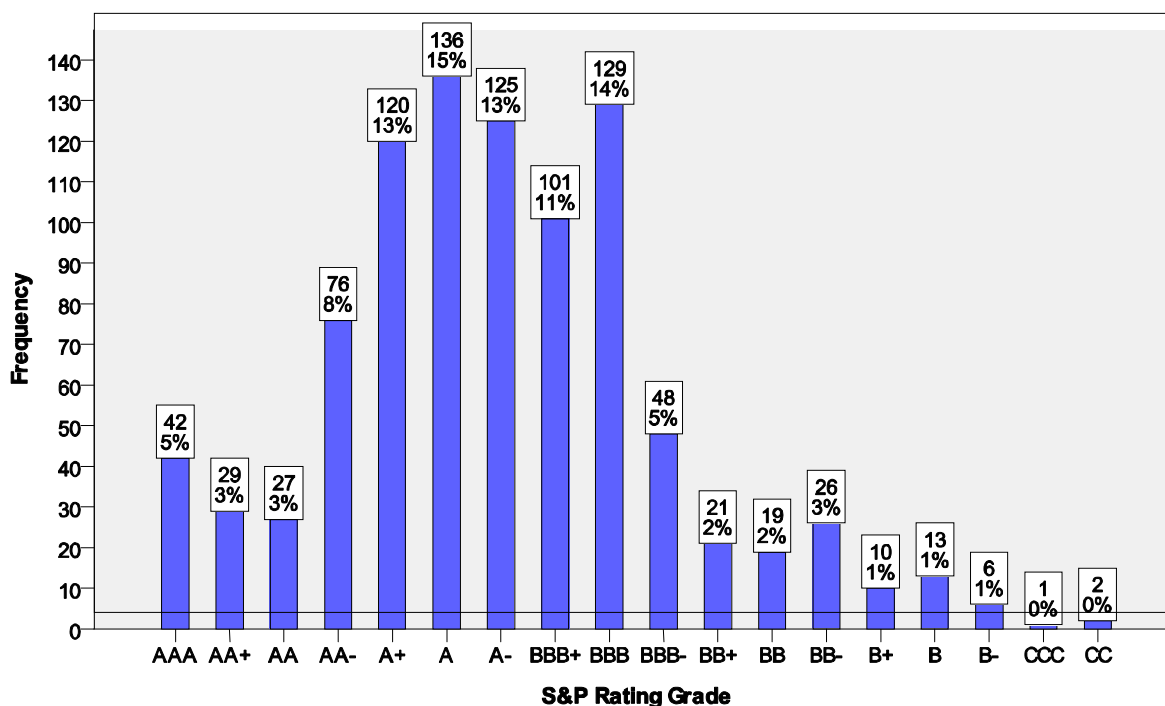


Figure 10 shows that the number of rated firms (by S&P and/or FITCH) averages at around 20.5% each year. This percentage ranges from 15% in 1998 to 22% in 2008.

4.1 Rating Categories

The ratings assigned to the firms in our sample range from the highest AAA to the lowest CC, indicating each firm's individual credit quality (see Appendix). All ratings above and including BBB- fall into the category of investment grade ratings and ratings below and including BB+ are considered to be non-investment or speculative ratings. In our sample out of 1,010 firm-years with rating, 909 (14%) possess investment grade rating and 101 (1.5%) have non-investment grade rating. Figures 11 and 12 below illustrate frequencies of the rating categories assigned by S&P and Fitch agencies to UK non-financial firms. Figure 11 presents frequencies of the rating grades assigned by S&P to UK firms.

Figure 11: Frequencies of the rating grades assigned by S&P to UK non-financial firms (1989 - 2008)



According to Figure 11, the highest concentration of firm-years is observed within the [A+ to BBB] rating interval with 595 firm-years observations (66% of the rated firm-years observations). The rating category with the highest frequency is ‘A’ with 134 firm-years observations (15% of the rated firm-years). This means that most companies in the UK possess investment grade rating. From Figure 11 we can see that 90% of companies in our sample possess S&P investment grade rating (AAA to BBB-), leaving only 10% firms in the UK with speculative grade rating over the period from 1989 to 2008. Figure 12 presents frequencies of the rating grades assigned by Fitch to UK firms.

Figure 12: Frequencies of the rating grades assigned by Fitch to UK non-financial firms (1998 – 2008)

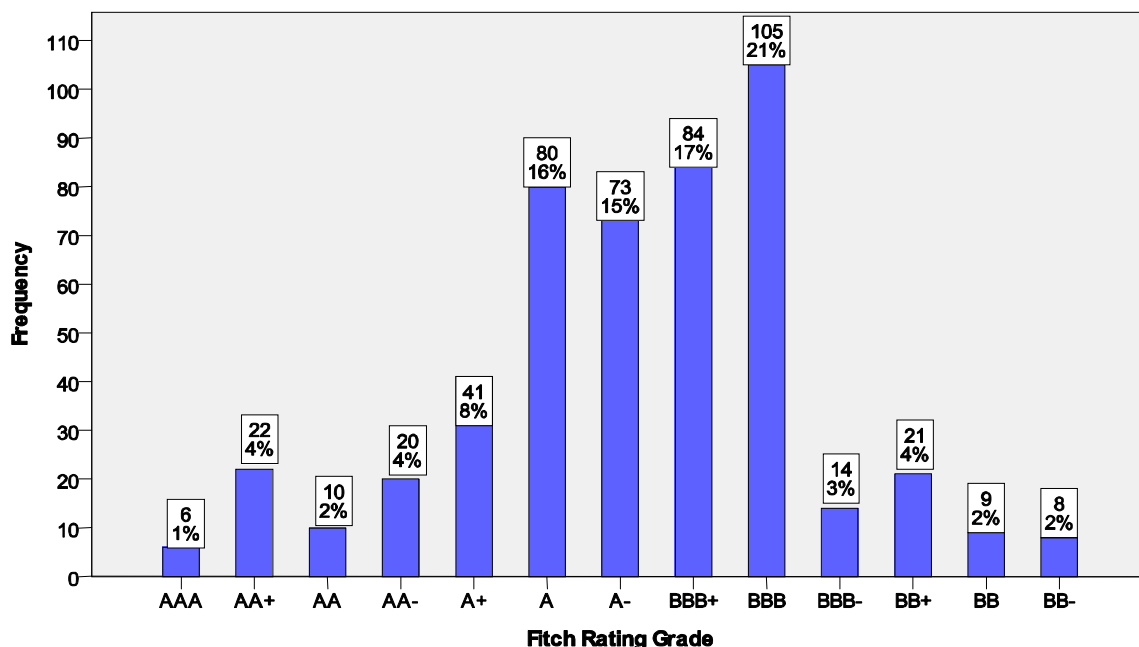
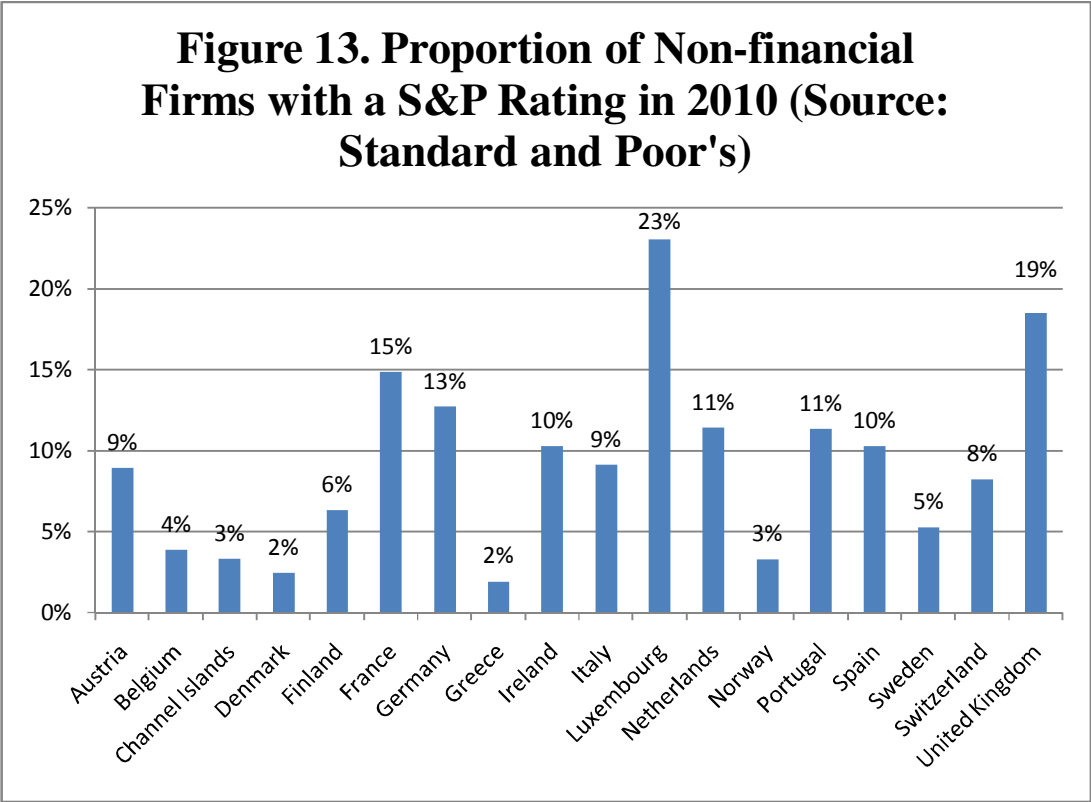


Figure 12 indicates that most of the firm-years observations are concentrated within the [A to BBB] credit rating interval with 70% of the firm-years possessing Fitch rating (327 of the firm-years observations). The highest frequency is observed in the BBB category with 22% of the firm-years with rating (102 of the firm-years observations). Figure 12 indicates that 92% of companies in our sample of UK non-financial firms possess Fitch investment grade rating, and only 8% have a speculative grade rating over the period from 1998 to 2008.

4.2 Credit Ratings in Europe

Figure 13 displays the percentage of non-financial firms in Europe that possess long-term S&P credit rating in 2010. Amongst the European Countries, the UK has the one of the highest rating recognition with 19% firms possessing a rating (see Figure 6). According to Figure 13 Luxembourg

has got the highest percentage of rated firms (23%)²⁰. There are 15% and 13% of non-financial firms with a rating in France and Germany respectively.



²⁰ This may be due to the fact that there are only 26 listed firms in Luxembourg compared to 297 in the UK.

5. Empirical Analysis

5.1 Descriptive Statistics

The empirical analysis that follows presents results from univariate and multivariate analyses. Bond market access is proxied by a possession of credit rating [Faulkender and Petersen (2006), Mitto and Zhang (2008)]. Following Faulkender and Petersen (2006) and Leary (2009) leverage is measured as a ratio of gross total debt to market value of assets. The univariate analysis examines differences in leverage and other firm characteristics between firms with and without a rating in our sample and other alternative measures of debt capital market access. The multivariate analysis shows the impact of credit rating on leverage while controlling for other firm characteristics and macroeconomic conditions. Following Chava and Purnanandam (2009) all variables are winsorized at 1% level to eliminate outliers that could influence the results.

The first stage of the analysis employs univariate tests to identify if rated firms are different to those without a rating. We begin by comparing the leverage of rated and non-rated firms. We then compare firm characteristics of rated and non-rated firms that capital structure theories predict to have an impact on firms' leverage. We follow the prior literature in our choice of variables [Faulkender and Petersen (2006), Leary (2009)]. These characteristics include: firm size, firm age, profitability, asset tangibility, market-to-book ratio, R&D expenditure, asset volatility, equity return, a portion of short-term debt and tax paid.

To verify that our results are not driven by the way we define access (possession of a credit rating), we follow Leary (2007) and create alternative measures of access based on firm size. Leary (2007) indicates that "while this may not be a perfect proxy, size is clearly highly correlated with public debt market access" (Leary (2007), p. 1160). In addition, Leary (2009) points out that according to Johnson (1997), and Krishnaswami, Spindt, and Subramaniam (1999), the proportion of outstanding debt from public sources is strongly correlated with firm size. He defines firms with access based on the upper two deciles of book assets, while those without access are those in the lower two deciles. The upper two deciles contain large firms with assets greater than \$100 million, whilst the lower two deciles contain small firms with assets between \$1 million and \$10 millions [Leary (2007), pp. 1161].

Following Leary's approach, we create three sized-based measures of access:

- 1 Firms with access are defined as being in the top 20% of the distribution by book value of assets, and firms without access are those in the remaining 80% of the size distribution—referred to as Top20% - Rest80% thereafter. This classification includes all firms in the sample.
- 2 Firms with access are defined as those in the top 20% of the distribution by book value of assets, and firms without access are defined as those in the bottom 20% of the size distribution (referred to as Top20% - Bottom20% thereafter). In this classification we drop the middle 60% of firms in the size distribution, thus keeping 40% of firms in the sample.
- 3 Firms with access are those with a credit rating and firms without access are those in the bottom 20% of the size distribution—referred to as Rated - Small thereafter. In this case we exclude a considerable number of firms from the sample, i.e. all unrated firms that do not fall into the bottom 20% of the size distribution.

5.2 Univariate Analysis: Differences between firms with and without a credit rating:

5.2.1 Differences in Leverage Ratios

In this section we examine if leverage of firms possessing a credit rating is different to those without a rating. Credit rating measures access to public debt market. Leverage is measured by the debt-to-asset ratio. This is defined as book value of total debt (long-term debt plus short-term debt) divided by market value of assets (MV), where market value of assets is defined as total assets minus book value of equity plus market value of equity. Following Faulkender and Petersen (2006) we also employ book value (BV) of assets in the denominator to measure leverage. Finally, we use net debt (total debt minus cash) as an alternative to total debt to measure “net leverage” (for full details see variable definitions in Appendix 1). Table 1 reports the results of tests for differences in the mean and median leverage between firms with and without a credit rating.

Table 1: Differences in Leverage between Firms with and without a rating (Rated vs. Unrated)

*The table reports tests for differences in the mean and median of firms’ leverage ratios for firms with and without a credit rating. The sample is based on listed non-financial firms for the period between 1989 and 2008 and contains firm-year observations with positive debt only. Access to the public debt market is measured by: 1) the possession of long-term corporate credit rating (Panel A); 2) the Top 20% of firms by size having access and the remaining 80% of firms not having access (Panel B); 3) the Top 20% of firms by size having access and the Bottom 20% of firms in the size distribution not having access (Panel C); 4) the possession of a long-term credit rating and firms in the bottom 20% of firms in the size distribution not having access (Panel D). Leverage is measured by debt-to-asset ratio. The first two columns measure leverage on a market value of assets basis, the last two columns – on a book value of assets. Columns I and III display results for gross value of leverage and columns II and IV for net leverage (total debt less cash and equivalent). ***, **, * indicate significance at 1%, 5% and 10% level respectively.*

	I	II	III	IV
	Gross Leverage MV	Net Leverage MV	Gross Leverage BV	Net Leverage BV
PANEL A: Access Proxied by Credit Rating				
Firms with Access				
N	1007	1007	999	999
Mean	0.2794	0.1858	0.3047	0.2072
Percentiles 25	0.1465	0.0554	0.1750	0.0729
Median	0.2474	0.1670	0.2876	0.2075
Percentiles 75	0.3896	0.2940	0.4083	0.3266
Firms without Access				
N	5455	5455	5470	5470
Mean	0.2283	0.1272	0.2228	0.1057
Percentiles 25	0.0708	-0.0058	0.1007	-0.0119
Median	0.1724	0.0945	0.1990	0.1160
Percentiles 75	0.3316	0.2493	0.3097	0.2430
Firms with Access vs. Firms without Access (Mean Difference Test)				
Mean Difference	0.0511***	0.0586***	0.0818***	0.1015***
T-Stat	8.0039	8.6906	14.5352	14.2398
Significance	0.0000	0.0000	0.0000	0.0000
Firms with Access vs. Firms without Access (Median Test)				
Median Difference	0.0750***	0.0725***	0.0886***	0.0915***
Chi-Squared	124.254	99.616	151.007	108.796
Significance	0.0000	0.0000	0.0000	0.0000
PANEL B: Access Proxied by Size (Top 20% vs. Rest 80% of Firms by Size Distribution)				
Firms with Access				

N	1361	1361	1359	1359
Mean	0.2930	0.1947	0.2816	0.1886
Percentiles 25	0.1540	0.0669	0.1709	0.0766
Median	0.2533	0.1752	0.2622	0.1928
Percentiles 75	0.3985	0.3101	0.3657	0.2924
Firms without Access				
N	5088	5088	5087	5087
Mean	0.1649	0.0875	0.1968	0.1106
Percentiles 25	0.0649	-0.0097	0.0958	-0.0194
Median	0.1649	0.0875	0.1968	0.1106
Percentiles 75	0.3250	0.2418	0.3135	0.2439
Firms with Access vs. Firms without Access (Mean Difference Test)				
Mean Difference	0.0715***	0.0736***	0.0582***	0.0851***
T-Stat	12.2208	11.5828	12.3625	14.0578
Significance	0.0000	0.0000	0.0000	0.0000
Firms with Access vs. Firms without Access (Median Test)				
Median Difference	0.0884	0.0877	0.0654	0.0822
Chi-Squared	206.785	189.604	151.433	136.775
Significance	0.0000	0.0000	0.0000	0.0000

PANEL C: Access Proxied by Size (Top 20% vs. Bottom 20% of Firms by Size Distribution)

Firms with Access				
N	1361	1361	1359	1359
Mean	0.2930	0.1947	0.2816	0.1886
Percentiles 25	0.1540	0.0669	0.1709	0.0766
Median	0.2533	0.1752	0.2622	0.1928
Percentiles 75	0.3985	0.3101	0.3657	0.2924
Firms without Access				
N	1109	1109	1112	1112
Mean	0.1399	0.0244	0.1635	-0.0290
Percentiles 25	0.0129	-0.0763	0.0335	-0.2046
Median	0.0604	-0.0009	0.1129	-0.0027
Percentiles 75	0.1663	0.0943	0.2235	0.1428
Firms with Access vs. Firms without Access (Mean Difference Test)				
Mean Difference	0.1530***	0.1703***	0.1181***	0.2176***
T-Stat	19.3147	19.6379	17.5575	20.7819
Significance	0.0000	0.0000	0.0000	0.0000
Firms with Access vs. Firms without Access (Median Test)				
Median Difference	0.1929***	0.1761***	0.1493***	0.1955***
Chi-Squared	529.824	486.072	376.025	357.441
Significance	0.0000	0.0000	0.0000	0.0000

PANEL D: Access Proxied by Size (Rated vs. Bottom 20% of Firms by Size Distribution)²¹

Firms with Access				
N	906	906	899	899
Mean	0.2651	0.1787	0.2959	0.2008
Percentiles 25	0.1430	0.0549	0.1740	0.0723
Median	0.2413	0.1600	0.2800	0.2037
Percentiles 75	0.3605	0.2794	0.3933	0.3146
Firms without Access				
N	1097	1097	1100	1100
Mean	0.1388	0.0230	0.1624	-0.0295
Percentiles 25	0.0134	-0.0763	0.0339	-0.2037
Median	0.0609	-0.0001	0.1133	-0.0007
Percentiles 75	0.1663	0.0943	0.2233	0.1414

²¹ Note that some firms that have a rating fall into the bottom 20% of firms by size distribution. This may be due to the fact that our sample consists of top 500 firms by market capitalisation, and therefore, while these firms are considered to be 'small' in our sample they are large enough to have a rating.

Firms with Access vs. Firms without Access (Mean Difference Test)				
Mean Difference	0.1263***	0.1557***	0.1335***	0.2303***
T-Stat	14.9524	16.8948	17.4246	20.4751
Significance	0.0000	0.0000	0.0000	0.0000
Firms with Access vs. Firms without Access (Median Test)				
Median Difference	0.1804***	0.1601***	0.1667***	0.2044***
Chi-Squared	427.283	356.270	342.211	294.127
Significance	0.0000	0.0000	0.0000	0.0000

Panel A of Table 1 shows that firms with a rating are clearly more highly levered than their unrated counterparts whether we measure leverage by MV or BV of assets or by total or net debt. When we employ MV measures of gross and net leverage (columns I and II), the univariate t-test shows that companies with rating have on average 5 – 6 % more leverage. This difference increases to between 8 – 10% when we employ BV measures of gross and net leverage (columns III and IV) (p-value < 0.01). These results imply that the possession of a credit rating increases firm’s leverage by between 22% [5.11/22.83] and 46% [5.86/12.72] when we compare MV leverage ratios and by between 37% and 96% when we compare BV leverage ratios. The results are robust throughout the whole distribution. Whether we look at differences in leverage at the 25th, 50th or 75th percentiles of the distribution, we observe that firms possessing a credit rating are more highly levered. For the median firm, credit rating increases market gross leverage by 7.5% and book gross leverage by almost 9%. Our result is slightly lower than that of Faulkender and Petersen results who find that having a debt rating raises MV debt ratio by 13.7% and BV ratio by 15.7%.

The results are similar when we use the alternative measures of public debt market access in panels B, C and D. The univariate test shows that firms with a rating have higher leverage ratios than those without a rating.

5.2.2 Differences in Firm Characteristics between rated and non-rated firms

The previous analysis shows that firms perceived to have access to the debt capital markets have higher leverage ratios than those without. In this section we examine whether rated firms exhibit the characteristics normally associated with highly levered firms. Capital structure theories predict that firm characteristics such as size, age, profitability, asset tangibility, growth opportunities, business risk, tax shields are related to the level of a firm’s indebtedness. Here we test whether these characteristics are related in a similar fashion to firms with access to the capital markets.

Table 2: Mean differences in firm characteristics between firms with and without access

The table presents the results from Univariate independent sample t-tests for the sample of UK listed non-financial firms with and without a rating for the period from 1989-2008 and contains firm-year observations with positive debt only. Access to debt market is measured by: 1) the possession of long-term corporate credit rating (Panel A); 2) Firm size based on the Top 20% and the Rest 80% of firms by the size distribution (Panel B); 3) Firm size based on the Top 20% and the Bottom 20% of firms by the size distribution (Panel C); 4) the possession of credit rating and firms in the bottom 20% of firms by the size distribution (Panel D). Mean values are reported. Fifth column reports mean differences between the firms with and without access. *** indicates statistical significance at 1% level, ** - at 5% level, * - at 10% level.

	Rated	N	Non-Rated	N	Mean Difference	t-stat	P-value	R vs NR
PANEL A: Access is measured by Credit Rating								
Size	15.5565	1003	12.8937	5447	2.6628	61.5640	0.0000	R>NR
Age	3.5237	1007	3.2751	5438	0.2486	7.5004	0.0000	R>NR
Profitability	0.1269	1002	0.1017	5415	0.0252	3.6673	0.0002	R>NR
Asset Tangibility	0.6543	1007	0.5347	5454	0.1196	16.0639	0.0000	R>NR
Market-to-Book	1.4841	999	1.6349	5444	-0.1508	-2.9988	0.0028	R<NR
R&D Expenditure	0.0112	1007	0.0149	5454	-0.0038	-3.8371	0.0001	R<NR
Asset Volatility	0.2275	993	0.2442	5288	-0.0167	-4.0735	0.0000	R<NR
Equity Return	0.0106	997	0.0071	5296	0.0036	0.2514	0.8015	R>NR
Short-Term Debt	0.2529	1007	0.3713	5455	-0.1184	-14.4944	0.0000	R<NR
Tax Paid	0.2494	1000	0.2520	5441	-0.0027	-0.2649	0.7911	R<NR
PANEL B: Access is measured by Size (Top 20% vs. Rest 80% of Firms by the Size Distribution)								
Size	15.6249	1361	12.6831	5080	2.9418	96.1117	0.0000	R>NR
Age	3.5127	1356	3.2637	5076	0.2491	8.5686	0.0000	R>NR
Profitability	0.1016	1351	0.1066	5054	-0.0050	-1.1583	0.2468	R<NR
Asset Tangibility	0.6898	1361	0.5171	5088	0.1727	25.8194	0.0000	R>NR
Market-to-Book	1.1872	1361	1.7255	5078	-0.5383	-15.6919	0.0000	R<NR
R&D Expenditure	0.0093	1361	0.0156	5088	-0.0064	-7.6340	0.0000	R<NR
Asset Volatility	0.2070	1348	0.2505	4924	-0.0435	-12.8165	0.0000	R<NR
Equity Return	0.0117	1348	0.0068	4932	0.0049	0.4020	0.6877	R>NR
Short-Term Debt	0.2498	1361	0.3801	5088	-0.1302	-17.8304	0.0000	R<NR
Tax Paid	0.2666	1361	0.2477	5074	0.0189	2.1258	0.0336	R>NR
PANEL C: Access is measured by Size (Top 20% vs. Bottom 20% of Firms by the Size Distribution)								
Size	15.6249	1361	11.0939	1105	4.5310	105.1458	0.0000	R>NR
Age	3.5127	1356	2.8152	1109	0.6975	18.0569	0.0000	R>NR
Profitability	0.1016	1351	0.0883	1102	0.0133	1.2721	0.2036	R>NR
Asset Tangibility	0.6898	1361	0.4059	1109	0.2839	31.5714	0.0000	R>NR
Market-to-Book	1.1872	1361	2.8684	1107	-1.6811	-18.3599	0.0000	R<NR
R&D Expenditure	0.0093	1361	0.0347	1109	-0.0254	-12.3439	0.0000	R<NR
Asset Volatility	0.2070	1348	0.3110	1023	-0.1040	-15.7111	0.0000	R<NR
Equity Return	0.0117	1348	0.0607	1027	-0.0490	-2.1932	0.0284	R<NR
Short-Term Debt	0.2498	1361	0.5526	1109	-0.3028	-26.5421	0.0000	R<NR
Tax Paid	0.2666	1361	0.2041	1106	0.0625	5.4052	0.0000	R>NR
PANEL D: Access is measured by Size (Rated vs. Bottom 20% of Firms by the Size Distribution)								
Size	15.6774	905	11.0919	1093	4.5855	87.8429	0.0000	R>NR

Age	3.5524	906	2.8287	1097	0.7238	16.8188	0.0000	R>NR
Profitability	0.1386	902	0.0867	1090	0.0519	4.5496	0.0000	R>NR
Asset Tangibility	0.6606	906	0.4065	1097	0.2541	26.0053	0.0000	R>NR
Market-to-Book	1.5044	898	2.8619	1095	-1.3575	-13.5655	0.0000	R<NR
R&D Expenditure	0.0112	906	0.0345	1097	-0.0233	-10.7972	0.0000	R<NR
Asset Volatility	0.2228	895	0.3094	1015	-0.0867	-12.3808	0.0000	R<NR
Equity Return	0.0245	896	0.0619	1019	-0.0374	-1.6205	0.1053	R<NR
Short-Term Debt	0.2614	906	0.5554	1097	-0.2940	-24.1281	0.0000	R<NR
Tax Paid	0.2615	899	0.2037	1094	0.0578	4.3555	0.0000	R>NR

The results in panel A of Table 2 show that rated firms are considerably larger than non-rated firms (about 266% on average - differences in natural logarithms). This result is consistent with the notion that since the average size of issues of bonds is higher than borrowing from the private sources and public bonds issues are associated with higher fixed costs hence it is only large firms that borrow from public debt market [Faulkender and Petersen (2006)]. The difference is statistically significant at 1% level. We find that firms with rating are significantly older (the difference is 25%) and more profitable. These results are similar to Faulkender and Petersen (2006).

Consistent with Faulkender and Petersen (2006) we find that firms with and without a rating differ in the type of assets they possess: firms with rating have more tangible assets (the difference is 12%), but spend less on research and development, suggesting less intangible assets and have lower growth opportunities. Firms with rating also have less volatile assets and have higher equity returns. Public bond markets tend to provide debt with longer maturities [Faulkender and Petersen (2006)]. As expected, firms with rating have 12 % less short-term debt than those without one.

We also compare average tax rates ratios - that proxy for marginal tax rates - of firms with and without a rating. Firms with access supposed to have higher tax paid ratios due to the higher tax shields effect. In Panel A the difference in ratios is insignificant, we therefore refer to Panel B, C and D where access is measured by firm size. According to Panel B, C and D firms with rating have higher average tax rates than their unrated counterparts.

Our results are robust to whether we use credit rating as a measure of access or firm size (see Panel B, C and D, Table 2). The only exceptions are: profitability appears to be greater for firms without access in Panel B - when we use TA20vs80 as a measure of access – but it is also not statistically significant. Equity returns are smaller for firms without access but again these figures are not statistically significant.

By comparing firms with and without access we find that they differ substantially in the firm characteristics. Firms with access possess characteristics that according to capital structure theories would motivate them to increase their debt ratios [Faulkender and Petersen (2006)]. To separate the effect of having a rating on leverage levels we have to control for firm characteristics that can be associated with firm's demand for debt in our further multivariate analysis.

5.3 Regression Analysis

In this section we examine whether the impact on leverage of having access to the public debt markets credit rating varies over our sample period. This is important for our study because our sample period includes the years before and during the current financial (credit) crisis and recession. Our sample period also incorporates a recession in the early 1990's and earlier periods of credit market tightening, 1999 to 2000 and 2002 to 2003. To examine whether credit market conditions are important in influencing the impact of having access to the public debt markets on firm leverage we control for changing credit market conditions. We employ two different approaches. Firstly, we interact our access variable with our year dummies to create a separate access coefficient for each year of our sample period. We examine whether the access coefficient varies over our sample period in a manner consistent with a tightening and/or loosening of credit markets. Secondly we use two alternate proxies for changes in credit market conditions.

5.3.1 The Effect of Public Debt Market Access Over Time

In this section we follow Faulkender and Petersen (2006) and interact our access variables (credit rating and size dummies) with the year dummies [see Equation (1)]. This allows the coefficient on access to vary by year thus letting us measure variation in the effect of access over time.

To examine whether the effect of access on leverage varies over our sample period we estimate the following model:

$$Leverage_{it} = \alpha_0 + \alpha_1 Access + \beta_1 X_{it} + \beta_2 GDP_t + \beta_3 FTSEALLSH_t + \beta_4 ID_{it} + \alpha_{2t} Access * Year_{it} + \varepsilon_{it} \quad (1)$$

Leverage is the response variable that measures the amount of total debt in capital structure of a firm;

CreditRating – is a dummy which equals to one if a firm possesses a S&P or Fitch credit rating and zero otherwise;

X_{it} – is a vector of firm-specific control variables;

ID_{it} – is a vector of industry-specific control variables;

GDP and *FTALLSH* – macroeconomic control variables.

The X_{it} includes firm characteristics (firm size, profitability, asset tangibility etc.) to control for demand-side factors. Following Leary (2007) we include annual GDP growth rate and annual stock market return to control for macroeconomic conditions.

Our key variables of interest are the interaction terms between access and year dummies (α_{2t}). We estimate model (1) using Pooled OLS technique. Following Mitto and Zhang (2008) and Leary (2009), the model is estimated using clustered standard errors by firms to control for the residual correlation across years for a given firm. This is an alternative method to the fixed-effects demeaning method to control for each firm's individual characteristics.²²

The results are presented in Tables 3 – 6. Tables 3 presents results from the regressions with credit rating variable as a measure of access. Tables 4 and 5 present results from the regressions with firm size as an indicator of access. Tables 6 presents results from the regressions with rated firms against 20% of the smallest firms as an indicator of access.

²² Wooldridge J., 2002, *Econometric Analysis of Cross-section and Panel Data*, Chapter 11, p.330

Table 3: Access and Capital Structure, access is measured by credit rating: Pooled OLS

The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 1989 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Public bond market access is proxied by a possession of credit rating. Credit rating is interacted with the year dummies to measure the variation in the effect of credit rating over time. Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.²³ Industry dummies are included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix 1. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.

VARIABLES	(1) Model	(2) Model	(3) Model	(4) Model	(5) Model	(6) Model
Credit Rating	-0.0030 (0.031)	0.0036 (0.029)	0.0031 (0.029)	0.0031 (0.030)	0.0020 (0.028)	0.0031 (0.029)
Size	0.0028 (0.004)	-0.0008 (0.004)	0.0000 (0.004)			
Age	0.0073 (0.005)	0.0085 (0.005)	0.0086 (0.005)	0.0080 (0.005)	0.0083* (0.005)	0.0086* (0.005)
Profitability	-0.2338*** (0.019)	-0.2284*** (0.018)	-0.2211*** (0.018)	-0.2316*** (0.018)	-0.2290*** (0.017)	-0.2211*** (0.017)
Asset Tangibility	0.1119*** (0.024)	0.0834*** (0.024)	0.0823*** (0.024)	0.1165*** (0.024)	0.0824*** (0.024)	0.0823*** (0.024)
Market-to-Book	-0.0114*** (0.002)	-0.0103*** (0.002)	-0.0105*** (0.002)	-0.0112*** (0.002)	-0.0104*** (0.002)	-0.0105*** (0.002)
R&D Spending	-0.2108* (0.116)	-0.2573** (0.111)	-0.2636** (0.111)	-0.2083* (0.115)	-0.2576** (0.111)	-0.2636** (0.111)
Asset Volatility	-0.4458*** (0.033)	-0.4295*** (0.033)	-0.4338*** (0.033)	-0.4477*** (0.034)	-0.4291*** (0.033)	-0.4338*** (0.033)
Equity Return	-0.1159*** (0.006)	-0.1162*** (0.006)	-0.1151*** (0.006)	-0.1149*** (0.006)	-0.1165*** (0.006)	-0.1151*** (0.006)
Short-Term Debt		-0.0925*** (0.011)	-0.0908*** (0.011)		-0.0920*** (0.010)	-0.0908*** (0.010)
Tax Paid			-0.0405*** (0.009)			-0.0405*** (0.009)
Rating_1990	-0.0494 (0.032)	-0.0570* (0.029)	-0.0569* (0.029)	-0.0498 (0.032)	-0.0568* (0.029)	-0.0569* (0.029)
Rating_1991	-0.0321 (0.030)	-0.0464 (0.029)	-0.0478* (0.028)	-0.0313 (0.031)	-0.0466 (0.029)	-0.0478* (0.028)
Rating_1992	0.0264 (0.034)	0.0172 (0.034)	0.0120 (0.035)	0.0272 (0.035)	0.0171 (0.034)	0.0120 (0.035)
Rating_1993	-0.0227 (0.032)	-0.0258 (0.031)	-0.0271 (0.031)	-0.0224 (0.032)	-0.0259 (0.031)	-0.0271 (0.031)
Rating_1994	-0.0394	-0.0339	-0.0350	-0.0403	-0.0337	-0.0350

²³ Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

	(0.028)	(0.027)	(0.027)	(0.028)	(0.027)	(0.027)
Rating_1995	-0.0069	-0.0080	-0.0087	-0.0070	-0.0080	-0.0087
	(0.030)	(0.029)	(0.029)	(0.030)	(0.029)	(0.029)
Rating_1996	-0.0264	-0.0260	-0.0263	-0.0267	-0.0259	-0.0263
	(0.031)	(0.030)	(0.030)	(0.032)	(0.030)	(0.030)
Rating_1997	0.0232	0.0201	0.0190	0.0232	0.0201	0.0190
	(0.033)	(0.032)	(0.031)	(0.033)	(0.032)	(0.031)
Rating_1998	0.0383	0.0313	0.0308	0.0373	0.0316	0.0308
	(0.030)	(0.029)	(0.029)	(0.030)	(0.029)	(0.029)
Rating_1999	0.0526*	0.0482*	0.0478*	0.0520*	0.0484*	0.0478*
	(0.030)	(0.029)	(0.029)	(0.030)	(0.029)	(0.029)
Rating_2000	0.0777**	0.0770***	0.0762***	0.0767**	0.0772***	0.0762***
	(0.031)	(0.029)	(0.029)	(0.031)	(0.029)	(0.029)
Rating_2001	0.0615**	0.0599**	0.0554*	0.0613*	0.0600**	0.0554*
	(0.031)	(0.030)	(0.030)	(0.031)	(0.030)	(0.030)
Rating_2002	0.0519	0.0481	0.0482	0.0514	0.0483	0.0482
	(0.032)	(0.031)	(0.031)	(0.032)	(0.031)	(0.031)
Rating_2003	0.0961***	0.0874***	0.0894***	0.0959***	0.0875***	0.0894***
	(0.032)	(0.030)	(0.030)	(0.032)	(0.030)	(0.030)
Rating_2004	0.0400	0.0304	0.0264	0.0397	0.0306	0.0264
	(0.032)	(0.031)	(0.031)	(0.033)	(0.031)	(0.031)
Rating_2005	0.0348	0.0216	0.0186	0.0350	0.0216	0.0186
	(0.033)	(0.031)	(0.031)	(0.033)	(0.031)	(0.031)
Rating_2006	0.0170	0.0096	0.0085	0.0175	0.0096	0.0085
	(0.033)	(0.031)	(0.031)	(0.033)	(0.031)	(0.031)
Rating_2007	0.0290	0.0215	0.0191	0.0298	0.0213	0.0191
	(0.033)	(0.031)	(0.031)	(0.033)	(0.031)	(0.031)
Rating_2008	0.0878**	0.0820**	0.0824**	0.0890**	0.0817**	0.0824**
	(0.036)	(0.034)	(0.035)	(0.036)	(0.034)	(0.034)
Stock Market Return	-0.0592***	-0.0501***	-0.0507***	-0.0608***	-0.0498***	-0.0507***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
GDP Growth	-0.0079***	-0.0090***	-0.0091***	-0.0076***	-0.0090***	-0.0091***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	0.2466***	0.3364***	0.3381***	0.2788***	0.3275***	0.3382***
	(0.046)	(0.047)	(0.046)	(0.026)	(0.026)	(0.026)
Observations	6,214	6,214	6,211	6,214	6,214	6,211
R-squared	0.4851	0.5031	0.5065	0.4848	0.5031	0.5065
F test	45.1230	47.9731	46.1024	46.4853	48.8269	46.9419
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 3 presents results from Equation (1) where access is measured by the possession of credit rating. Unlike Faulkender and Petersen's (2006) we find that the credit rating coefficient is not always significantly different from zero over our sample period, suggesting that the possession of a credit rating does not always have a significant impact on firm leverage.

The results are as follows: the coefficient on the interaction terms becomes highly significant in 2008. 2008 was the year of the current financial crisis when banks have significantly cut down on loans, firms found it difficult to raise funds. All firms suffered but especially those that did not have access to the alternative source of finance, such as bond market.

During the pre-crisis years (2004-2007) our results show that the coefficient on the interaction term is insignificant indicating that the possession of a credit rating had no material impact on firms leverage levels in these years. Figure 7 shows that during the period 2004-2007 credit conditions in the UK were relatively loose and net bank lending was at its highest point, whereas starting from the end of 2007-2009 credit conditions became deteriorated and net bank lending was reduced considerably.

The coefficient on credit rating is also significant during the period 1999-2001 and 2003. Although these years did not experience a financial crisis they did coincide with the bursting of the

"dot-com bubble" around the time of the millenium, the terrorists acts of 9/11 and a string of audit scandals in 2001 and 2002. All these events had a major impact on the availability of credit from the banking sector. Burgin (2001) suggests that post 11 September 2001 those borrowers in non-defensive sectors or without significant ancillary business were experiencing the greatest increase in the cost of bank loans. McGrath (2001) says that "*prior to 11 September 2001 the global economic situation had been deteriorating, and what has occurred since 11 September is an acceleration of that*" (page 59). Shawyer (2001) suggests that banks that were already more focused on credit issues and tighter covenant structures before 9/11 imposed more severe restrictions to the availability of credit post 9/11. Mason (2002) argues that the Enron scandal in October 2001 and WorldCom's bankruptcy in July 2002 contributed to a decline in corporate credit quality and difficult credit market conditions during 2002 and 2003. Fitzgerald (2002) suggests that around this time banks became increasingly more selective about the types of structures in which they would invest. He points out that the damaged confidence of lending banks and the "flight to quality" led to the credit market being only open to good quality well-rated companies, while other companies became credit-constrained. Fitzgerald (2002) says, "*The market is open and good quality well-rated companies are raising funds successfully – but there is no doubt that the market has become more nervous*" (page 67). This would seem to suggest that companies that suffered the most were those that could not access the public debt market and, as a result, became capital constrained.

To check the robustness of our results we replicate Table 3 using firm size as an alternative measure of public debt market access. In Table 4 the largest 20% of firms measured by total assets are defined as having access and the remaining 80% are deemed not to have access. In Table 5 the largest 20% of firms (top 2 deciles) measured by total assets are defined as having access and the smallest 20% of firms (bottom 2 deciles of the total asset distribution) are classified as not having access. In Table 6 firms with a credit rating are defined as having access and the bottom 2 deciles of the total asset distribution are classified as not having access.

Table 4: Access and Capital Structure, access is measured by firm size (Top 20% vs 80%): Pooled OLS

The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 1989 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Public bond market access is proxied by a dummy, which is equal to 1 if a firm is in the top 20% of the distribution by book value of total assets and 0 if a firm is in the rest 80% of size distribution. Size dummy is interacted with the year dummies to measure the variation in the effect of access over time. Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.²⁴ Industry dummies are

²⁴ Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix 1. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.

VARIABLES	Model 1	Model 2	Model 3
Access (Top 20% vs 80%)	0.0264 (0.021)	0.0275 (0.020)	0.0287 (0.020)
Age	0.0084 (0.005)	0.0087* (0.005)	0.0090* (0.005)
Profitability	-0.2280*** (0.018)	-0.2261*** (0.018)	-0.2178*** (0.017)
Asset Tangibility	0.1134*** (0.024)	0.0795*** (0.024)	0.0790*** (0.023)
Market-to-Book	-0.0107*** (0.002)	-0.0100*** (0.002)	-0.0100*** (0.002)
R&D Spending	-0.1980* (0.114)	-0.2487** (0.110)	-0.2560** (0.110)
Asset Volatility	-0.4462*** (0.033)	-0.4282*** (0.033)	-0.4330*** (0.033)
Equity Return	-0.1156*** (0.006)	-0.1170*** (0.006)	-0.1157*** (0.006)
Short-Term Debt		-0.0921*** (0.010)	-0.0907*** (0.010)
Tax Paid			-0.0425*** (0.009)
Access_1990	-0.0469*** (0.013)	-0.0500*** (0.013)	-0.0500*** (0.013)
Access_1991	-0.0397** (0.017)	-0.0506*** (0.017)	-0.0503*** (0.017)
Access_1992	-0.0085 (0.017)	-0.0164 (0.016)	-0.0165 (0.017)
Access_1993	-0.0312* (0.016)	-0.0361** (0.016)	-0.0353** (0.016)
Access_1994	-0.0648*** (0.016)	-0.0659*** (0.015)	-0.0661*** (0.015)
Access_1995	-0.0529*** (0.017)	-0.0550*** (0.016)	-0.0556*** (0.016)
Access_1996	-0.0553*** (0.018)	-0.0558*** (0.017)	-0.0533*** (0.017)
Access_1997	-0.0339* (0.019)	-0.0343* (0.018)	-0.0331* (0.018)
Access_1998	0.0100 (0.020)	0.0071 (0.019)	0.0064 (0.019)
Access_1999	0.0335* (0.020)	0.0305 (0.019)	0.0317* (0.019)
Access_2000	0.0640*** (0.021)	0.0634*** (0.020)	0.0651*** (0.020)
Access_2001	0.0316 (0.023)	0.0291 (0.022)	0.0241 (0.022)
Access_2002	0.0457* (0.023)	0.0405* (0.022)	0.0418* (0.022)
Access_2003	0.0844*** (0.024)	0.0743*** (0.023)	0.0772*** (0.023)
Access_2004	0.0093 (0.024)	-0.0028 (0.022)	-0.0037 (0.022)
Access_2005	0.0068 (0.023)	-0.0085 (0.022)	-0.0096 (0.022)
Access_2006	-0.0142 (0.022)	-0.0217 (0.021)	-0.0225 (0.021)
Access_2007	-0.0153 (0.022)	-0.0248 (0.021)	-0.0291 (0.020)
Access_2008	0.0618** (0.025)	0.0472** (0.024)	0.0477** (0.024)
Stock Market Return	-0.0540*** (0.013)	-0.0447*** (0.013)	-0.0459*** (0.013)
GDP Growth	-0.0069*** (0.002)	-0.0086*** (0.002)	-0.0086*** (0.002)
Constant	0.2754*** (0.026)	0.3252*** (0.026)	0.3363*** (0.026)
Observations	6,214	6,214	6,211

R-squared	0.4873	0.5057	0.5094
F test	50.8876	50.9954	49.8481
Prob>F	0.0000	0.0000	0.0000

Table 5: Access and Capital Structure, access is measured by firm size (Top 20% vs bottom 20%):

Pooled OLS

*The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 1989 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Public bond market access is proxied by a dummy, which is equal to 1 if a firm is in the top 20% of the distribution by book value of total assets and 0 if a firm is in the bottom 20% of size distribution. Size dummy is interacted with the year dummies to measure the variation in the effect of access over time. Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.²⁵ Industry dummies are included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix I. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.*

VARIABLES	Model 1	Model 2	Model 3
Access (TA20vs20)	0.0645*** (0.024)	0.0549** (0.024)	0.0586** (0.023)
Age	-0.0003 (0.008)	0.0007 (0.008)	0.0010 (0.008)
Profitability	-0.2271*** (0.024)	-0.2247*** (0.023)	-0.2164*** (0.023)
Asset Tangibility	0.1144*** (0.035)	0.0992*** (0.035)	0.0966*** (0.034)
Market-to-Book	-0.0044* (0.002)	-0.0044* (0.002)	-0.0045* (0.002)
R&D Spending	-0.2105 (0.150)	-0.2333 (0.147)	-0.2303 (0.147)
Asset Volatility	-0.3665*** (0.054)	-0.3647*** (0.054)	-0.3707*** (0.054)
Equity Return	-0.1030*** (0.009)	-0.1046*** (0.009)	-0.1022*** (0.009)
Short-Term Debt		-0.0510*** (0.017)	-0.0482*** (0.017)
Tax Paid			-0.0469*** (0.014)
Access_1990	0.0131 (0.017)	0.0117 (0.016)	0.0112 (0.016)
Access_1991	-0.0263 (0.019)	-0.0287 (0.019)	-0.0286 (0.020)
Access_1992	-0.0000 (0.019)	-0.0019 (0.019)	-0.0022 (0.019)
Access_1993	-0.0327* (0.017)	-0.0352** (0.017)	-0.0344** (0.017)
Access_1994	-0.0204	-0.0238	-0.0243

²⁵ Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

	(0.019)	(0.019)	(0.019)
Access_1995	-0.0451**	-0.0471***	-0.0477***
	(0.018)	(0.017)	(0.017)
Access_1996	-0.0418**	-0.0428**	-0.0401**
	(0.019)	(0.018)	(0.018)
Access_1997	-0.0358*	-0.0365*	-0.0351*
	(0.020)	(0.019)	(0.019)
Access_1998	0.0146	0.0124	0.0119
	(0.021)	(0.021)	(0.021)
Access_1999	0.0255	0.0235	0.0252
	(0.021)	(0.020)	(0.020)
Access_2000	0.0906***	0.0892***	0.0911***
	(0.023)	(0.023)	(0.023)
Access_2001	0.0798***	0.0781***	0.0721***
	(0.026)	(0.026)	(0.025)
Access_2002	0.1143***	0.1109***	0.1117***
	(0.028)	(0.027)	(0.027)
Access_2003	0.0912***	0.0855***	0.0887***
	(0.025)	(0.025)	(0.025)
Access_2004	0.0273	0.0199	0.0188
	(0.024)	(0.024)	(0.024)
Access_2005	0.0139	0.0056	0.0044
	(0.024)	(0.023)	(0.024)
Access_2006	-0.0044	-0.0088	-0.0098
	(0.023)	(0.023)	(0.023)
Access_2007	0.0106	0.0052	0.0005
	(0.022)	(0.021)	(0.021)
Access_2008	0.1410***	0.1340***	0.1340***
	(0.029)	(0.029)	(0.029)
Stock Market Return	0.0760***	0.0789***	0.0755***
	(0.027)	(0.028)	(0.027)
GDP Growth	-0.0069**	-0.0068**	-0.0069**
	(0.003)	(0.003)	(0.003)
Constant	0.2143***	0.2479***	0.2597***
	(0.037)	(0.038)	(0.037)
Observations	2,355	2,355	2,354
R-squared	0.5694	0.5736	0.5779
F test	35.0829	35.1206	34.7663
Prob>F	0.0000	0.0000	0.0000

Table 6: Access and Capital Structure, access is measured rated firms versus smallest 20%: Pooled OLS

The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 1989 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Public bond market access is proxied by a dummy, which is equal to 1 if a firm has a rating and equal to 0 if a firm is in the bottom 20% of the distribution by book value of total assets. Access is interacted with the year dummies to measure the variation in the effect of public bond market access over time. Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.²⁶ Industry dummies are

²⁶ Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix 1. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.

VARIABLES	Model 1	Model 2	Model 3
Access (Ratedsmall20)	0.0446 (0.033)	0.0293 (0.032)	0.0317 (0.032)
Age	0.0043 (0.009)	0.0056 (0.008)	0.0056 (0.008)
Profitability	-0.1839*** (0.024)	-0.1808*** (0.023)	-0.1732*** (0.023)
Asset Tangibility	0.0895*** (0.032)	0.0721** (0.031)	0.0718** (0.030)
Market-to-Book	-0.0071*** (0.002)	-0.0072*** (0.002)	-0.0074*** (0.002)
R&D Spending	-0.2049 (0.147)	-0.2332 (0.144)	-0.2280 (0.143)
Asset Volatility	-0.2774*** (0.054)	-0.2718*** (0.054)	-0.2781*** (0.053)
Equity Return	-0.0882*** (0.009)	-0.0903*** (0.009)	-0.0883*** (0.009)
Short-Term Debt		-0.0657*** (0.017)	-0.0627*** (0.017)
Tax Paid			-0.0454*** (0.014)
ratedsmall_90	0.0068 (0.032)	0.0023 (0.030)	0.0019 (0.030)
ratedsmall_91	-0.0093 (0.031)	-0.0160 (0.031)	-0.0174 (0.030)
ratedsmall_92	0.0404 (0.034)	0.0362 (0.033)	0.0306 (0.034)
ratedsmall_93	-0.0170 (0.029)	-0.0185 (0.029)	-0.0197 (0.028)
ratedsmall_94	0.0082 (0.028)	0.0101 (0.027)	0.0085 (0.027)
ratedsmall_95	0.0037 (0.029)	0.0034 (0.029)	0.0028 (0.029)
ratedsmall_96	-0.0148 (0.030)	-0.0136 (0.030)	-0.0136 (0.029)
ratedsmall_97	0.0134 (0.032)	0.0115 (0.031)	0.0108 (0.031)
ratedsmall_98	0.0301 (0.030)	0.0269 (0.029)	0.0267 (0.029)
ratedsmall_99	0.0338 (0.030)	0.0325 (0.029)	0.0327 (0.029)
ratedsmall_00	0.0947*** (0.032)	0.0951*** (0.031)	0.0955*** (0.031)
ratedsmall_01	0.0927*** (0.032)	0.0922*** (0.032)	0.0884*** (0.032)
ratedsmall_02	0.1018*** (0.034)	0.0981*** (0.033)	0.0991*** (0.033)
ratedsmall_03	0.0754** (0.031)	0.0699** (0.029)	0.0734** (0.029)
ratedsmall_04	0.0333 (0.031)	0.0272 (0.030)	0.0230 (0.030)
ratedsmall_05	0.0123 (0.032)	0.0047 (0.030)	0.0019 (0.030)
ratedsmall_06	0.0073 (0.033)	0.0038 (0.032)	0.0040 (0.032)
ratedsmall_07	0.0338 (0.033)	0.0294 (0.032)	0.0263 (0.032)
ratedsmall_08	0.1488*** (0.041)	0.1447*** (0.040)	0.1466*** (0.040)
Stock Market Return	0.0541* (0.028)	0.0592** (0.028)	0.0570** (0.028)
GDP Growth	-0.0083*** (0.003)	-0.0080*** (0.003)	-0.0081*** (0.003)
Constant	0.1943*** (0.043)	0.2368*** (0.044)	0.2498*** (0.043)
Observations	1,898	1,898	1,897

R-squared	0.5178	0.5272	0.5319
F test	23.6723	25.3179	24.3821
Prob>F	0.0000	0.0000	0.0000

Similar to Faulkender and Petersen (2006) to illustrate variation in the effect of having an access over time we plot the coefficients on bond market access obtained from estimating Equation (1) against time. We use the results presented in Table 3 (column 1), Table 4 (column 1), Table 5 (column 1) and Table 6 (column 1). Figure 14 presents a graph of access coefficient over time measured by four different proxies: the possession of a credit rating; firms in the top 2 deciles and the remaining firms (Top 20 versus Remaining 80); firms in the top 2 deciles and in the bottom 2 deciles (Top 20 versus Bottom 20); Rated firms versus the smallest 20% of firms.

Unlike Faulkender and Petersen (2006) we find a strong variation in the effect of having an access over time and our coefficient is not always statistically significant from zero.²⁷ The coefficient on credit rating is negative and insignificant in 1990-1992 and 1994-1996 but it is positive and statistically significant in the years of economic downturns: 1999-2001, 2003 and current financial crisis year 2008. It varies from a low of - 4.9% in 1990 (p-value > 0.1) to a high of 9.6% in 2003 (p-value < 0.01) and 8.8% in 2008 (p-value < 0.05). The coefficient becomes positive statistically significant during the years of economic recession (1999-2001 and 2003) and current financial crisis (2008). The figures indicate that in 2008 firms with access proxied by credit rating had a leverage ratio that is 8.8% higher than an otherwise identical firm.

The coefficients on access proxied by firm size follow similar pattern. The coefficient on access becomes positive and significant around the periods of economic recession (1999-2003) and the current financial crisis (2008). When we compare the largest 20% with the smallest 20% of firms the coefficient on access in 2008 increases from 8.8% in Table 1 (column 1) to 14% in Table 3 (column 1, p-value < 0.01). Similar happens to the coefficient on access in 2008 when we compare rated firms with the smallest 20% of firms. The coefficient on access in 2008 becomes 14.9% in Table 6 (column 1, p-value < 0.01).

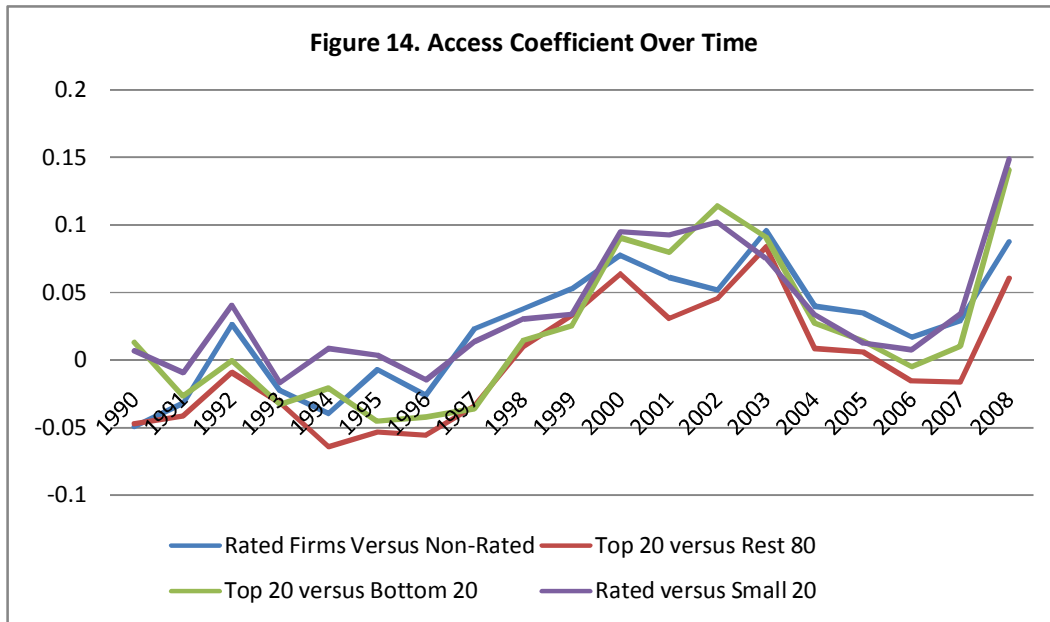
These findings are consistent with the prediction made by Faulkender and Petersen (2006) who noticed that even though there is no systematic rise or fall in their coefficient on bond rating and is low during the 1990-1991 recession, they expect it to rise “*if the recession was associated with a banking credit crunch...because bank-dependent firms have less access to debt capital and thus would be increasingly under-levered relative to firms with access to the bond market*”[Faulkender and Petersen (2006), p. 62].

Since the current financial crisis is associated with a banking credit crunch and a substantial reduction in loan supply to corporate sector, we expect our coefficient to rise in 2008. Figure 14 confirms this prediction: regardless of how we measure access, the coefficient follows a similar time series pattern. In 2008 the coefficient on access experiences the most substantial/rapid increase over the period. When we measure access by credit rating, the coefficient increases by almost 6% (from 3% in 2007 to 8.8% in 2008); when we compare rated firms with the firms in the bottom 2 deciles, this difference is even larger (the coefficient increases by almost 12% from 3.3% in 2007 to 14.8% in 2008). There is also a significant variation of the access coefficient over time. The coefficient peaks

²⁷ Faulkender and Petersen (2006) find some variation in the effect of having a rating over time and their coefficient is always statistically greater than zero.

in 1992, 2000, around 2002-2003 and 2008 during the periods of economic recession and/or financial crisis, when access was especially important for firms.

Figure 14: Plot of the access coefficient over time.



5.2 Credit conditions proxy: Standards

In this section we follow Leary (2009) and employ two measures for changes in bank loan supply:

- 1) Lending Standards Index in the EU and the UK;
- 2) Spread between Long-term and Short-term Interest Rates

For the first measure Leary (2009) uses “a direct measure of the willingness of banks to extend loans, taken from the Federal Reserve Board’s Senior Loan Officer Opinion Survey on Bank Lending Practices” [Leary (2009), p. 1177]. Leary (2009) utilizes the Federal Reserves’ survey data on how large banks changed their “standards of creditworthiness for loans to nonfinancial businesses” [Leary (2009), p.1177].

We use the analogous measure to this and collect similar survey data of bank lending in the euro area from ECB. “The survey addresses issues such as *credit standards for approving loans as well as credit terms and conditions applied to enterprises...*”²⁸

The survey initiated in April 2003. We therefore limit our sample period to cover 6 years from 2003-2008.

The survey is addressed to senior loan officers of a representative sample of euro area banks and is conducted four times a year. The sample group participating in the survey comprises around 90 banks from all euro area countries and takes into account the characteristics of their respective national banking structures. [ECB official website: <http://www.ecb.int/>]

²⁸ECB official website: <http://www.ecb.int/stats/money/surveys/lend/html/index.en.html>

The questionnaire covers both loan demand and loan supply factors. Among the supply factors, attention is given to credit standards and credit conditions and terms, as well as to the various factors that may be responsible for their changes. Among the factors that may affect loan demand, various factors related to financing needs and the use of alternative finance are mentioned. [ECB official website: <http://www.ecb.int/>]

We also employ similar data from the Bank of England survey on “*trends and developments in credit conditions*”[Bank of England, Credit Conditions Survey, 2007 Q3].

Lenders are asked about the past three months and the coming three months. The survey covers secured and unsecured lending to households and small businesses; and lending to non-financial corporations, and to non-bank financial firms [Bank of England, Credit Conditions Survey, 2007 Q3].

The Bank of England started their survey in the second quarter of 2007. Figures 14 shows strong correlation between credit conditions in the UK and credit conditions in Europe. We therefore use two years of data available (2007 and 2008) from the Bank of England website and the remaining four years (2003-2006) we substitute with data from ECB. Hence we end up with 6 years of data for the UK proxy for credit conditions.

Following Leary (2009) we modify Equation (1) using these proxies and estimate the following model:

$$\begin{aligned}
 Leverage_{it} = & \alpha_0 + \alpha_1 Access + \beta_1 X_{it} + \beta_2 GDP_t + \beta_3 FTSEALLSH_t + \beta_4 ID_{it} + \\
 & + \alpha_{2t} Access * Credit Conditions + \varepsilon_{it} \qquad (2)
 \end{aligned}$$

Where the coefficient on *Access*CreditConditions* is the coefficient of our interest. We estimate Equation (2) beginning from 2003. We use data on credit conditions for each quarter (Q1, Q2, Q3 and Q4) as well as average of the four quarters.

The results are presented in Table 7 – 10. Table 7 and 8 present results from estimating Equation (2) where access is interacted with the credit conditions in the EU. In Table 7 access is measured by a possession of credit rating; in Table 8 access is measured by rated firms against small 20%. Table 9 and 10 present results from Equation (2) where access is interacted with the credit conditions in the UK. In Table 9 access is measured by a possession of credit rating; in Table 10 access is measured by rated firms against small 20%.

Table 7: Capital Structure and Credit market Conditions in the EU, access is measured by credit rating: Pooled OLS

The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 2003 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Public bond market access is proxied by a possession of credit rating. Credit Conditions represent credit conditions in the EU, which are measured quarterly as well as on average. Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.²⁹ Industry dummies are included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix 1. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.

VARIABLES	(1) Model	(2) Model	(3) Model	(4) Model	(5) Model	(6) Model
Credit Rating	0.0468** (0.0198)	0.0243 (0.020)	0.0310 (0.020)	0.0380* (0.020)	0.0355* (0.020)	0.0279 (0.020)
Rating*EUQ1		0.0011*** (0.000)				
Rating*EUQ2			0.0011*** (0.000)			
Rating*EUQ3				0.0012*** (0.000)		
Rating*EUQ4					0.0007*** (0.000)	
Rating*EUQave						0.0013*** (0.000)
Size	-0.0130** (0.0061)	-0.0130** (0.006)	-0.0131** (0.006)	-0.0134** (0.006)	-0.0134** (0.006)	-0.0133** (0.006)
Age	-0.0009 (0.0078)	-0.0008 (0.008)	-0.0007 (0.008)	-0.0007 (0.008)	-0.0008 (0.008)	-0.0007 (0.008)
Profitability	-0.2262*** (0.0312)	-0.2210*** (0.031)	-0.2208*** (0.031)	-0.2221*** (0.031)	-0.2250*** (0.031)	-0.2214*** (0.031)
Asset Tangibility	0.0987*** (0.0325)	0.0973*** (0.033)	0.0977*** (0.033)	0.0977*** (0.033)	0.0976*** (0.033)	0.0972*** (0.033)
Market-to-Book	-0.0240 (0.0146)	-0.0236 (0.015)	-0.0237 (0.015)	-0.0237 (0.015)	-0.0238 (0.015)	-0.0237 (0.015)
R&D Spending	0.0473 (0.1698)	0.0520 (0.169)	0.0512 (0.169)	0.0516 (0.169)	0.0499 (0.169)	0.0522 (0.169)
Asset Volatility	-0.5903*** (0.0651)	-0.6004*** (0.065)	-0.5977*** (0.065)	-0.5987*** (0.065)	-0.5957*** (0.065)	-0.6001*** (0.065)
Equity Return	-0.1287*** (0.0114)	-0.1307*** (0.011)	-0.1314*** (0.011)	-0.1312*** (0.011)	-0.1298*** (0.011)	-0.1313*** (0.011)
Short-Term Debt	-0.0974*** (0.0160)	-0.0979*** (0.016)	-0.0983*** (0.016)	-0.0988*** (0.016)	-0.0984*** (0.016)	-0.0987*** (0.016)
Stock Market Return	-0.1509*** (0.0369)	-0.1375*** (0.037)	-0.1255*** (0.038)	-0.1190*** (0.038)	-0.1300*** (0.036)	-0.1212*** (0.037)
GDP Growth	-0.0068 (0.0045)	-0.0074 (0.005)	-0.0076* (0.005)	-0.0085* (0.004)	-0.0073 (0.004)	-0.0079* (0.004)
Constant	0.5945*** (0.0865)	0.5972*** (0.087)	0.5978*** (0.087)	0.6043*** (0.087)	0.6025*** (0.087)	0.6026*** (0.087)
Observations	1,714	1,714	1,714	1,714	1,714	1,714

²⁹ Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

R-squared	0.5672	0.5717	0.5708	0.5700	0.5683	0.5709
F test	52.53	57.8638	58.9326	54.8366	50.4589	56.9906
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 8: Capital Structure and Credit market Conditions in the EU, access is measured by rated firms against small 20%: Pooled OLS

The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 2003 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Access is measured by rated firms against small 20% of firms. Credit Conditions represent credit conditions in the EU, which are measured quarterly as well as on average. Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.³⁰ Industry dummies are included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix I. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.

VARIABLES	(1) Model	(2) Model	(3) Model	(4) Model	(5) Model	(6) Model
Access (Ratedsmall20)	0.2302*** (0.0687)	0.1976*** (0.071)	0.2003*** (0.071)	0.2089*** (0.069)	0.2102*** (0.068)	0.1963*** (0.070)
RatedSmall20*EUQ1		0.0009*** (0.000)				
RatedSmall20*EUQ2			0.0011*** (0.000)			
RatedSmall20*EUQ3				0.0017*** (0.000)		
RatedSmall20*EUQ4					0.0018*** (0.000)	
RatedSmall20*EUQave						0.0016*** (0.000)
Size	-0.0396*** (0.0149)	-0.0374** (0.015)	-0.0378** (0.015)	-0.0396*** (0.015)	-0.0437*** (0.015)	-0.0389*** (0.015)
Age	0.0099 (0.0147)	0.0110 (0.015)	0.0110 (0.015)	0.0103 (0.015)	0.0092 (0.015)	0.0107 (0.015)
Profitability	-0.2318*** (0.0424)	-0.2258*** (0.042)	-0.2224*** (0.042)	-0.2217*** (0.041)	-0.2250*** (0.040)	-0.2221*** (0.041)
Asset Tangibility	0.0623 (0.0572)	0.0592 (0.058)	0.0604 (0.058)	0.0600 (0.058)	0.0578 (0.058)	0.0588 (0.058)
Market-to-Book	-0.0076 (0.0102)	-0.0076 (0.010)	-0.0076 (0.010)	-0.0074 (0.010)	-0.0068 (0.010)	-0.0074 (0.010)
R&D Spending	0.0688 (0.2516)	0.0806 (0.250)	0.0844 (0.248)	0.0893 (0.245)	0.0911 (0.243)	0.0889 (0.246)
Asset Volatility	-0.3489*** (0.1258)	-0.3689*** (0.127)	-0.3714*** (0.127)	-0.3873*** (0.129)	-0.3988*** (0.133)	-0.3851*** (0.128)
Equity Return	-0.0835*** (0.0181)	-0.0857*** (0.018)	-0.0873*** (0.018)	-0.0869*** (0.018)	-0.0843*** (0.018)	-0.0867*** (0.018)
Short-Term Debt	-0.0535 (0.0359)	-0.0539 (0.036)	-0.0546 (0.036)	-0.0575 (0.036)	-0.0573 (0.036)	-0.0558 (0.036)
Stock Market Return	-0.1529** (0.0609)	-0.1221* (0.063)	-0.0805 (0.065)	-0.0259 (0.066)	0.0011 (0.062)	-0.0516 (0.064)
GDP Growth	-0.0112	-0.0126*	-0.0131*	-0.0176**	-0.0145*	-0.0147*

³⁰ Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

Constant	(0.0075) 0.7412*** (0.2034)	(0.008) 0.7251*** (0.204)	(0.008) 0.7306*** (0.203)	(0.008) 0.7717*** (0.203)	(0.008) 0.8203*** (0.211)	(0.008) 0.7546*** (0.202)
Observations	489	489	489	489	489	489
R-squared	0.5627	0.5727	0.5738	0.5763	0.5765	0.5771
F test	20.01	27.1403	27.9788	25.6988	19.8732	26.7950
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 9: Capital Structure and Credit market Conditions in the UK, access is measured by credit rating: Pooled OLS

The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 2003 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Public bond market access is proxied by a possession of credit rating. Credit Conditions represent credit conditions in the UK, which are measured quarterly as well as on average. Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.³¹ Industry dummies are included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix 1. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.

VARIABLES	(1) Model	(2) Model	(3) Model	(4) Model	(5) Model	(6) Model
Credit Rating	0.0468** (0.0198)	0.0243 (0.020)	0.0308 (0.020)	0.0377* (0.020)	0.0295 (0.020)	0.0275 (0.020)
Rating*UKQ1		0.0010*** (0.000)				
Rating*UKQ2			0.0012*** (0.000)			
Rating*UKQ3				0.0015*** (0.000)		
Rating*UKQ4					0.0015*** (0.000)	
Rating*UKQave						0.0015*** (0.000)
Size	-0.0130** (0.0061)	-0.0131** (0.006)	-0.0130** (0.006)	-0.0133** (0.006)	-0.0135** (0.006)	-0.0132** (0.006)
Age	-0.0009 (0.0078)	-0.0007 (0.008)	-0.0007 (0.008)	-0.0007 (0.008)	-0.0008 (0.008)	-0.0007 (0.008)
Profitability	-0.2262*** (0.0312)	-0.2209*** (0.031)	-0.2207*** (0.031)	-0.2219*** (0.031)	-0.2245*** (0.031)	-0.2212*** (0.031)
Asset Tangibility	0.0987*** (0.0325)	0.0974*** (0.033)	0.0976*** (0.033)	0.0974*** (0.033)	0.0968*** (0.033)	0.0971*** (0.033)
Market-to-Book	-0.0240 (0.0146)	-0.0236 (0.015)	-0.0237 (0.015)	-0.0237 (0.015)	-0.0237 (0.015)	-0.0236 (0.015)
R&D Spending	0.0473 (0.1698)	0.0521 (0.169)	0.0512 (0.169)	0.0520 (0.169)	0.0518 (0.169)	0.0525 (0.169)
Asset Volatility	-0.5903*** (0.0651)	-0.6000*** (0.065)	-0.5982*** (0.065)	-0.6003*** (0.065)	-0.6001*** (0.065)	-0.6010*** (0.065)
Equity Return	-0.1287***	-0.1311***	-0.1312***	-0.1310***	-0.1299***	-0.1312***

³¹ Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

Short-Term Debt	(0.0114) -0.0974*** (0.0160)	(0.011) -0.0981*** (0.016)	(0.011) -0.0982*** (0.016)	(0.011) -0.0988*** (0.016)	(0.011) -0.0986*** (0.016)	(0.011) -0.0985*** (0.016)
Stock Market Return	-0.1508*** (0.0369)	-0.1337*** (0.037)	-0.1279*** (0.038)	-0.1174*** (0.038)	-0.1275*** (0.036)	-0.1239*** (0.037)
GDP Growth	-0.0068 (0.0045)	-0.0069 (0.005)	-0.0082* (0.005)	-0.0097** (0.005)	-0.0077* (0.004)	-0.0082* (0.005)
Constant	0.5945*** (0.0865)	0.5968*** (0.087)	0.5985*** (0.087)	0.6075*** (0.087)	0.6064*** (0.087)	0.6026*** (0.087)
Observations	1,714	1,714	1,714	1,714	1,714	1,714
R-squared	0.5672	0.5715	0.5712	0.5705	0.5694	0.5713
F test	52.53	58.8642	58.3804	55.2581	51.3409	57.8346
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 10: Capital Structure and Credit market Conditions in the EU, access is measured by rated firms against small 20%: Pooled OLS

The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 2003 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Access is measured by rated firms against small 20% of firms. Credit Conditions represent credit conditions in the UK, which are measured quarterly as well as on average. Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.³² Industry dummies are included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix 1. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.

VARIABLES	(1) Model	(2) Model	(3) Model	(4) Model	(5) Model	(6) Model
Access (Ratedsmall20)	0.2302*** (0.0687)	0.1962*** (0.071)	0.2014*** (0.071)	0.2091*** (0.069)	0.2061*** (0.068)	0.1976*** (0.070)
RatedSmall20*EUQ1		0.0009*** (0.000)				
RatedSmall20*EUQ2			0.0011*** (0.000)			
RatedSmall20*EUQ3				0.0018*** (0.000)		
RatedSmall20*EUQ4					0.0024*** (0.001)	
RatedSmall20*EUQave						0.0015*** (0.000)
Size	-0.0396*** (0.0149)	-0.0377** (0.015)	-0.0375** (0.015)	-0.0392*** (0.015)	-0.0423*** (0.015)	-0.0384** (0.015)
Age	0.0099 (0.0147)	0.0110 (0.015)	0.0110 (0.015)	0.0104 (0.015)	0.0096 (0.015)	0.0108 (0.015)
Profitability	-0.2318*** (0.0424)	-0.2247*** (0.042)	-0.2237*** (0.042)	-0.2231*** (0.041)	-0.2275*** (0.041)	-0.2235*** (0.041)
Asset Tangibility	0.0623 (0.0572)	0.0594 (0.058)	0.0602 (0.058)	0.0593 (0.058)	0.0560 (0.058)	0.0587 (0.058)
Market-to-Book	-0.0076 (0.0102)	-0.0076 (0.010)	-0.0077 (0.010)	-0.0074 (0.010)	-0.0068 (0.010)	-0.0075 (0.010)

³² Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

R&D Spending	0.0688 (0.2516)	0.0826 (0.249)	0.0821 (0.249)	0.0872 (0.247)	0.0883 (0.246)	0.0862 (0.248)
Asset Volatility	-0.3489*** (0.1258)	-0.3715*** (0.127)	-0.3686*** (0.127)	-0.3858*** (0.129)	-0.3976*** (0.132)	-0.3808*** (0.128)
Equity Return	-0.0835*** (0.0181)	-0.0863*** (0.018)	-0.0866*** (0.018)	-0.0859*** (0.018)	-0.0830*** (0.018)	-0.0862*** (0.018)
Short-Term Debt	-0.0535 (0.0359)	-0.0542 (0.036)	-0.0542 (0.036)	-0.0572 (0.036)	-0.0566 (0.036)	-0.0553 (0.036)
Stock Market Return	-0.1529** (0.0609)	-0.1100* (0.063)	-0.0948 (0.065)	-0.0374 (0.065)	-0.0450 (0.057)	-0.0730 (0.063)
GDP Growth	-0.0112 (0.0075)	-0.0112 (0.008)	-0.0148* (0.008)	-0.0213*** (0.008)	-0.0151** (0.008)	-0.0152** (0.008)
Constant	0.7412*** (0.2034)	0.7253*** (0.203)	0.7301*** (0.203)	0.7757*** (0.203)	0.8057*** (0.207)	0.7481*** (0.202)
Observations	489	489	489	489	489	489
R-squared	0.5627	0.5736	0.5729	0.5758	0.5771	0.5759
F test	20.01	27.7218	27.7797	26.5528	20.7613	27.5030
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Consistent with Leary (2009) the estimated coefficient on the interaction terms between public bond market access and proxies for credit conditions both in the EU and the UK are positive and significant. Our results are robust to whether we measure access by a possession of credit rating or rated firms versus small 20% of firms. According to Leary (2009) *“this suggests that the magnitude of the leverage difference between firms with and without public debt market access is greater in periods of tight credit conditions/reduced loan supply”* [Leary (2009), p.1180].

This result suggest that public debt market access becomes more important for firms during the periods of tight credit conditions.

5.3 Credit conditions proxy: Spreads

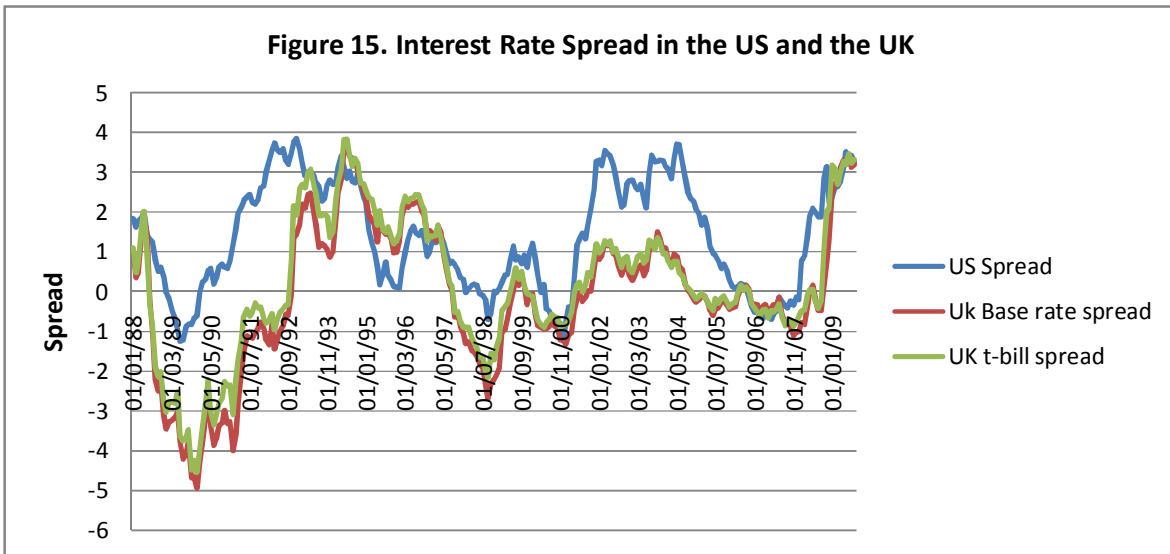
For the second measure of credit market conditions we follow Leary (2009) and use spread between Long-term and Short-term Interest Rates. This is a measure of the stance of monetary policy. According to Leary (2009) this proxy can be an important measure because “*proponents of the bank lending channel of monetary policy have argued that policy shocks influence economic activity by reducing the supply of bank loans due to the drain on bank reserves*” [Leary (2009), p.1178]

We calculate this spread using two methods:

- a) Monthly YTM 10 year zero bonds minus Base Rate (%)
- b) Monthly YTM 10 year zero bonds minus 3 mth T-bill Rate (%)

We also use Spread in the US for comparison.

Figure 15 shows that Interest Rate Spread in the UK and the US follow similar pattern over time.



The results from Tables 11-13 are consistent with Leary’s (2009) results. The coefficient on the interaction terms between access and interest rate spread is positive and significant, suggesting that access becomes more important during the periods of reduced loan supply.

Table 11 Capital Structure and Interest Rate Spread, Uktbill, access is measured by a possession of credit rating: Pooled OLS

The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 2003 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Access is measured by a possession of credit rating. Credit conditions are proxied by interest rate spread in the UK, which is the difference between Monthly YTM 10 year zero bonds and 3 mth T-bill Rate (%). Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.³³ Industry dummies are included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix 1. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.

VARIABLES	MVNetlev		US Spread			BVLev		BVNetlev	
	(1)>2000 Model	(2)>2000 Model	(3) >2000 Model	(4)>2002 Model	(5) >2002 Model	(6) >2002 Model	(7) >2002 Model	(8) >2002 Model	(9) >2002 Model
Credit Rating	0.0344* (0.019)	0.0254 (0.019)	-0.0050 (0.022)	0.0440** (0.020)	0.0368* (0.021)	0.0217 (0.021)	0.0239 (0.022)	0.0064 (0.023)	0.0113 (0.025)
Rating*Uktbill		0.0348*** (0.008)	0.0392*** (0.010)		0.0495*** (0.009)		0.0252** (0.011)	0.0498*** (0.010)	0.0336*** (0.011)
Rating*USspread						0.0148*** (0.004)			
Size	-0.0036 (0.006)	-0.0033 (0.006)	0.0060 (0.007)	-0.0092 (0.006)	-0.0089 (0.006)	-0.0088 (0.006)	0.0063 (0.005)	0.0004 (0.007)	0.0062 (0.007)
Age	-0.0006 (0.008)	-0.0006 (0.008)	-0.0066 (0.010)	-0.0015 (0.008)	-0.0015 (0.008)	-0.0014 (0.008)	0.0023 (0.010)	-0.0022 (0.010)	0.0054 (0.012)
Profitability	-0.2217*** (0.028)	-0.2179*** (0.028)	-0.1875*** (0.031)	-0.2275*** (0.032)	-0.2227*** (0.032)	-0.2235*** (0.032)	-0.1718*** (0.032)	-0.2328*** (0.034)	-0.1979*** (0.041)
Asset Tangibility	0.1269*** (0.031)	0.1271*** (0.031)	0.3184*** (0.045)	0.1304*** (0.033)	0.1302*** (0.034)	0.1307*** (0.034)	0.1549*** (0.036)	0.3100*** (0.046)	0.3569*** (0.049)
Market-to-Book	-0.0305** (0.013)	-0.0305** (0.013)	0.0054 (0.011)	-0.0247 (0.015)	-0.0244 (0.015)	-0.0245 (0.015)	0.0349*** (0.009)	0.0130 (0.011)	0.0329*** (0.011)
R&D Spending	0.1369 (0.158)	0.1369 (0.158)	-0.1925 (0.255)	0.1179 (0.178)	0.1206 (0.178)	0.1178 (0.178)	-0.1341 (0.229)	-0.3037 (0.273)	-0.8297** (0.333)
Asset Volatility	-0.6446*** (0.047)	-0.6445*** (0.047)	-0.7208*** (0.061)	-0.6080*** (0.066)	-0.6136*** (0.066)	-0.6071*** (0.066)	-0.4723*** (0.058)	-0.6669*** (0.082)	-0.5196*** (0.074)
Equity Return	-0.1296*** (0.008)	-0.1306*** (0.008)	-0.1058*** (0.012)	-0.1283*** (0.011)	-0.1294*** (0.012)	-0.1296*** (0.012)	-0.0590*** (0.013)	-0.1165*** (0.014)	-0.0673*** (0.014)
Stock Market Return	-0.0523** (0.020)	-0.0398* (0.021)	-0.0469* (0.028)	-0.1259*** (0.032)	-0.1178*** (0.033)	-0.1198*** (0.033)	-0.0411 (0.034)	-0.0920** (0.038)	-0.0569 (0.041)
GDP Growth	-0.0266*** (0.006)	-0.0292*** (0.006)	-0.0209*** (0.008)	-0.0124*** (0.005)	-0.0150*** (0.005)	-0.0136*** (0.005)	-0.0024 (0.005)	-0.0092* (0.005)	0.0007 (0.006)
Constant	0.4795*** (0.080)	0.4815*** (0.080)	0.1068 (0.108)	0.5125*** (0.089)	0.5146*** (0.089)	0.5081*** (0.089)	0.1101 (0.088)	0.1238 (0.117)	-0.1092 (0.112)
Observations	2,384	2,384	2,384	1,714	1,714	1,714	1,714	1,714	1,714
R-squared	0.5561	0.5579	0.4869	0.5477	0.5515	0.5500	0.3616	0.4981	0.4427
F test	59.3217	63.4292	39.2821	47.0000	51.0553	51.1415	18.2389	34.6358	18.9798
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

³³ Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

Table 12 Capital Structure and Interest Rate Spread, Ukbase, access is measured by a possession of credit rating: Pooled OLS

The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 2003 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Access is measured by a possession of credit rating. Credit conditions are proxied by interest rate spread in the UK, which is the difference between Monthly YTM 10 year zero bonds and 3 mth Base Rate (%). Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.³⁴ Industry dummies are included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix 1. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.

VARIABLES	(1)>2000 Model	(2)>2000 Model	MVNetlev (3) >2000 Model	Just Rating (4)>2002 Model	(5) >2002 Model	US Spread (6) >2002 Model	BVLev (7) >2002 Model	MVNetlev (8) >2002 Model	BVNetlev (9) >2002 Model
Credit Rating	0.0344* (0.019)	0.0306 (0.019)	0.0014 (0.022)	0.0440** (0.020)	0.0408** (0.021)	0.0217 (0.021)	0.0261 (0.022)	0.0107 (0.023)	0.0141 (0.025)
Rating*UKbase		0.0283*** (0.009)	0.0272*** (0.010)		0.0481*** (0.011)		0.0230* (0.012)	0.0453*** (0.012)	0.0322** (0.013)
Rating*USspread						0.0148*** (0.004)			
Size	-0.0036 (0.006)	-0.0033 (0.006)	0.0059 (0.007)	-0.0092 (0.006)	-0.0089 (0.006)	-0.0088 (0.006)	0.0064 (0.005)	0.0004 (0.007)	0.0062 (0.007)
Age	-0.0006 (0.008)	-0.0006 (0.008)	-0.0066 (0.010)	-0.0015 (0.008)	-0.0015 (0.008)	-0.0014 (0.008)	0.0023 (0.010)	-0.0022 (0.010)	0.0054 (0.012)
Profitability	-0.2217*** (0.028)	-0.2192*** (0.028)	-0.1893*** (0.031)	-0.2275*** (0.032)	-0.2237*** (0.032)	-0.2235*** (0.032)	-0.1725*** (0.032)	-0.2341*** (0.034)	-0.1986*** (0.041)
Asset Tangibility	0.1269*** (0.031)	0.1271*** (0.031)	0.3184*** (0.045)	0.1304*** (0.033)	0.1303*** (0.034)	0.1307*** (0.034)	0.1549*** (0.036)	0.3101*** (0.046)	0.3570*** (0.049)
Market-to-Book	-0.0305** (0.013)	-0.0305** (0.013)	0.0054 (0.011)	-0.0247 (0.015)	-0.0245 (0.015)	-0.0245 (0.015)	0.0349*** (0.009)	0.0129 (0.011)	0.0328*** (0.011)
R&D Spending	0.1369 (0.158)	0.1360 (0.158)	-0.1934 (0.255)	0.1179 (0.178)	0.1194 (0.179)	0.1178 (0.178)	-0.1348 (0.230)	-0.3051 (0.273)	-0.8305** (0.333)
Asset Volatility	-0.6446*** (0.047)	-0.6436*** (0.047)	-0.7199*** (0.061)	-0.6080*** (0.066)	-0.6120*** (0.066)	-0.6071*** (0.066)	-0.4714*** (0.058)	-0.6650*** (0.083)	-0.5185*** (0.074)
Equity Return	-0.1296*** (0.008)	-0.1300*** (0.008)	-0.1050*** (0.012)	-0.1283*** (0.011)	-0.1287*** (0.012)	-0.1296*** (0.012)	-0.0586*** (0.013)	-0.1158*** (0.014)	-0.0668*** (0.014)
Stock Market Return	-0.0523** (0.020)	-0.0444** (0.021)	-0.0533* (0.028)	-0.1259*** (0.032)	-0.1175*** (0.033)	-0.1198*** (0.033)	-0.0412 (0.034)	-0.0922** (0.038)	-0.0567 (0.041)
GDP Growth	-0.0266*** (0.006)	-0.0293*** (0.006)	-0.0206*** (0.008)	-0.0124*** (0.005)	-0.0172*** (0.005)	-0.0136*** (0.005)	-0.0033 (0.005)	-0.0111** (0.005)	-0.0007 (0.006)
Constant	0.4795*** (0.080)	0.4821*** (0.080)	0.1071 (0.108)	0.5125*** (0.089)	0.5187*** (0.089)	0.5081*** (0.089)	0.1121 (0.088)	0.1276 (0.117)	-0.1064 (0.112)
Observations	2,384	2,384	2,384	1,714	1,714	1,714	1,714	1,714	1,714
R-squared	0.5561	0.5573	0.4860	0.5477	0.5509	0.5500	0.3613	0.4973	0.4424
F test	59.3217	61.6753	37.7949	47.0000	49.0633	51.1415	18.0679	33.2574	18.6364
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

³⁴ Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

Table 13 Capital Structure and Interest Rate Spread, Uktbill, Ukbase, access is measured by rated firms versus small 20% of firms: Pooled OLS

The table presents estimates of equation (1) using annual data of UK listed non-financial firms for the period from 2003 to 2008. The dependent variable is the ratio of total debt to the market value (MV) of assets. Total debt incorporates short-term debt and long-term debt. MV of assets is the sum of MV of equity and BV of total debt. Access is measured by rated firms against small 20% of firms. Credit conditions are proxied by interest rate spread in the UK, which is the difference between Monthly YTM 10 year zero bonds and 3 mth T-bill Rate (%) or 3 mth T-bill Rate (%). Firm size is the natural logarithm of MV of assets. Age is the natural log of firm age plus one. Profitability is measured as return on invested capital (ROIC) which calculated as the sum of pre-tax profits and total interest charges divided by invested capital. Asset tangibility is calculated as the difference of total assets minus current assets divided by total assets. Market-to-book ratio of assets is MV of assets over BV of assets. Firm's spending on R&D is expressed as natural logarithm of the ratio of one plus R&D expenditure scaled by total assets. Riskiness of operations is calculated as equity volatility multiplied by the equity-to-asset ratio. Equity volatility is expressed as square root of number of trading days multiplied by standard deviation of natural log of the daily price growth rate. Past equity returns are calculated as natural log of share price at the end of the year over share price at the beginning of the year. Portion of short-term debt is calculated as the sum of short-term debt and current portion of long-term debt due to within one year divided by total debt. Average tax paid is calculated as income taxes over pre-tax income (taxable income). All variables are winzorised at 1% level in order to prevent potential outliers driving the results. All specifications include annual stock market return and annual GDP growth rate to control for macroeconomic conditions. Annual stock market return is calculated as natural logarithm of FTSE at the end of the year over FTSE at the beginning of the year. Annual GDP growth rate is sourced from the IMF official website.³⁵ Industry dummies are included across all specifications to control for industry-specific effects. Variables definitions are presented in Appendix 1. Standard errors (in parenthesis) are adjusted for heteroskedasticity and clustering by firms. ***, **, * indicate statistical significance at 1%, 5%, and 10% levels respectively.

VARIABLES	(1)>2000 Model	(2)>2000 Model	(3) >2000 Model	(4)>2002 Model
RatedSmall20	0.2358*** (0.065)	0.2271*** (0.066)	0.2252*** (0.068)	0.2366*** (0.075)
RatedSmall20UKbase	0.0190** (0.009)			0.0315*** (0.012)
RatedSmall20UKtbill		0.0283*** (0.009)		
RatedSmall20USspread			0.0077** (0.004)	
UKbase				
Size	-0.0383*** (0.014)	-0.0375*** (0.014)	-0.0382*** (0.014)	-0.0380*** (0.016)
Age	0.0076 (0.014)	0.0079 (0.014)	0.0077 (0.014)	0.0094 (0.015)
Profitability	-0.2326*** (0.040)	-0.2308*** (0.039)	-0.2317*** (0.040)	-0.2332*** (0.042)
Asset Tangibility	0.0903 (0.056)	0.0900 (0.056)	0.0906 (0.056)	0.0795 (0.060)
Market-to-Book	-0.0075 (0.011)	-0.0076 (0.011)	-0.0076 (0.011)	-0.0064 (0.010)
R&D Spending	0.0913 (0.202)	0.0933 (0.201)	0.0922 (0.201)	0.1046 (0.254)
Asset Volatility	-0.4590*** (0.112)	-0.4602*** (0.112)	-0.4581*** (0.113)	-0.3556*** (0.124)
Equity Return	-0.0870*** (0.015)	-0.0887*** (0.015)	-0.0875*** (0.015)	-0.0842*** (0.019)
Stock Market Return	-0.0425 (0.042)	-0.0275 (0.042)	-0.0450 (0.042)	-0.0029 (0.079)
GDP Growth	-0.0365*** (0.009)	-0.0373*** (0.009)	-0.0331*** (0.009)	-0.0249*** (0.009)
Constant	0.7702*** (0.189)	0.7631*** (0.189)	0.7601*** (0.191)	0.7122*** (0.210)
Observations	675	675	675	489
R-squared	0.5566	0.5587	0.5565	0.5613
F test	31.0168	34.1981	32.6853	24.2615
Prob>F	0.0000	0.0000	0.0000	0.0000

³⁵ Available at the official IMF website at <http://www.imf.org/external/pubs/ft/weo/2010/02/weodata/index.aspx>

6. Conclusion

This paper examines the factors that are important in determining capital structure choices for a large sample of UK firms over a twenty year period. To the best of our knowledge, this study is the first to consider the role bond market access has on influencing leverage levels in a UK setting. The current financial crisis and the resulting lack of funding and liquidity in the global money and capital markets demonstrates that the availability of a diversified source of potential funding has never been more important.

Credit rating benefits firms by providing access to both domestic and international debt markets. For U.K. firms this is especially important, since credit rating can “open the door” to the U.S. capital market – the largest global source of debt capital. Such access is especially important during a contraction in bank loan supply when firms without access to public debt markets can find themselves constrained in the amount of debt capital they can raise. We find that access to long-term bond markets as measured by the possession of a credit rating has an economically and statistically significant effect on the level of leverage for UK firms over our sample period. More importantly we find that the leverage difference between firms with and without access is greater during periods of credit market tightening and smaller when credit conditions are loose. Our results show that debt market segmentation did not matter when credit conditions were loose, such as the period 2004 to 2007, as banks were willingly supplying the UK corporate sector with the credit needed. However, in 2008 at the height of the financial crisis, firms that could not switch from bank to public market debt found themselves most severely financially constrained.

In the current financial crisis banks have significantly cut back on their holdings of debt and have also become less willing to lend to the corporate sector. Anecdotal evidence suggests that those firms that are heavily dependent on the banks for funding and who therefore find themselves financially constrained have not been able to fund all their profitable investment projects resulting in a significant diminution in firm value. However, those companies that have been able to successfully source debt funding during the current credit crisis, such as those with access to the public debt markets, should be in a strong position to fully exploit their current and future investment opportunities. It follows that the credit crisis might affect these two groups of firms differently, with financially constrained firms being forced to cut back on value enhancing investment whereas those with access to the public debt markets not being greatly affected by the contraction in bank lending.

References

Bacon, G., J. Grout and M. O'Donovan, 2009, "Credit Crisis and Corporates – Funding and Beyond", Report by The Association of Corporate Treasurers, Electronic copy available at www.treasurers.org/creditcrisisimpact

Baker, M. and J. Wurgler, 2002 "Market timing and capital structure", *Journal of Finance* Vol. 57(1), pp.1-32.

Bancel, F., Mittoo, U.R., 2004, "The Determinants of Capital Structure Choice: A Survey of European Firms", *Financial Management* Vol.33, pp.103-132

Bank of England, August 2009, Trends in Lending, pp. 1-13, ISSN: 2040-4042 (online)

Bank for International Settlement (BIS) Quarterly Review, December 2008, "International banking and financial market developments", Statistical Annex, pp. A1-B4

Burgin, F., (2001), "The Road Ahead", *The Treasurer*, December, p.58

Byoun, S., 2008 "Financial Flexibility and Capital Structure Decision" Working Paper, Baylor University, Electronic copy available at: http://papers.ssrn.com/abstract_id=1108850

Campello, M., E. Giambona, J.R. Graham and C.R. Harvey, 2009, "Liquidity Management and Corporate Investment During a Financial Crisis", Working paper, University of Illinois, University of Amsterdam and Duke University, Electronic copy available at: <http://ssrn.com/abstract=1444009>

Campello, M., J.R. Graham and C.R. Harvey, 2009, "The Real Effects of Financial Constraints: Evidence from a Financial Crisis, Working Paper, University of Illinois and Duke University, Electronic copy available at: <http://ssrn.com/abstract=1318355>

Cantillo, M., and J. Wright, 2000, "How Do Firms Choose Their Lenders? An Empirical Investigation," *Review of Financial Studies*, Vol. 13, pp. 155 – 189

Chava, S. and A. Purnanandam, 2009 The Effect of Banking Crisis on Bank-Dependent Borrowers, Working Paper Series, College of Management and Stephen M. Ross School of Business available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=821804

European Commission, Directorate-General for Economic and Financial Affairs, 2009, Economic Crisis in Europe: Causes, Consequences and Responses, ISSN 0379-0991

Faulkender, M.W., and M. A. Petersen, 2006 "Does the Source of Capital Affect Capital Structure?" *The Review of Financial Studies*, Vol. 19 n 1, p. 45- 79.

Fitzgerald, I., (2002), "What Does Future Hold for Loans", *The Treasurer*, December, p.67

Frank, M. Z. and V. K. Goyal, 2007 "Capital Structure Decisions: Which Factors are Reliably Important?" Working Paper, University of Minnesota, Electronic copy available at: http://papers.ssrn.com/abstract_id=567650

Frydenberg, S., 2008 “Theory of Capital Structure - A Review”, *Freedom And Plurality - Honorary Thesis For Odd G. Arntzen, Lars Fallan and Ove Gustafsson, eds., Tapir Academic Press, NO-7005 Trondheim, Norway*, Electronic copy available at: http://papers.ssrn.com/abstract_id=556631

Graham, J. R., and C. R. Harvey, 2001 “The theory and practice of corporate finance: evidence from the field”, *Journal of Financial Economics Vol. 60*, pp. 187-243.

Hanafin, S., (2007), “In search of Diversification”, *The Treasurer*, July/August 2007, page 26.

Harris, M. and Raviv, A., 1991 “The Theory of Capital Structure”, *Journal of Finance*, Vol. 46(1), pp. 297-355.

Hovakimian, A.G., A. Kayhan, and S. Titman, 2008 “How Do Managers Target Their Credit Ratings? A Study of Credit Ratings and Managerial Discretion,” Working paper, Zicklin School of Business, Electronic copy available at: http://papers.ssrn.com/abstract_id=1098351

Ivashina, V., and D. Scharfstein, 2009, “Bank Lending During the Financial Crisis of 2008”, Working paper, Harvard Business School, Electronic copy available at: <http://ssrn.com/abstract=1297337>

Kisgen, D. J., 2006, “Credit Ratings and Capital Structure,” *Journal of Finance*, Vol. 61(3), pp.1035-1072

Kisgen, D. J., 2007, “The Influence of Credit Ratings on Corporate Capital Structure Decision”, *Journal of Applied Corporate Finance*, Vol. 19 No 3, pp. 65-73

Kisgen, D. J., 2009, “Do firms target credit ratings or leverage levels?” *Journal of Financial and Quantitative Analysis*, Forthcoming, Electronic version available at <http://ssrn.com/abstract=686227>

Korajczyk, R.A.,and A. Levy, 2003, “Capital structure choice: Macroeconomic conditions and financial constraints, *Journal of Financial Economics*, Vol. 68, pp. 75–109.

Leary, M.T., 2009, “Bank Loan Supply, Lender Choice, and Corporate Capital Structure”, *Journal of Finance*, Vol. 64, pp.1143-1185

Lemmon, M.L., and M.R. Roberts, 2007, “The Response of Corporate Financing and Investment to Changes in the Supply of Credit”, *HKUST Business School Research Paper No. 07-29*, Electronic copy available at: <http://ssrn.com/abstract=961616>

Levy, A., 2001, “Why Does Capital Structure Choice Vary With Macroeconomic Conditions?” Unpublished working paper, Haas School of Business, U.C. Berkeley, Electronic copy available at: http://papers.ssrn.com/abstract_id=1295832

Mason, P., (2002), “Where will the opportunity knock next”, *The Treasurer*, December, p. 64

McGrath, D., (2001), “The Road Ahead”, *The Treasurer*, December, p.59

Mitto, U.R., and Z. Zhang, 2008, “The Capital Structure of Multinational Corporations: Canadian versus U.S. Evidence”, *Journal of Corporate Finance*, Vol. 14, pp. 706-720

Modigliani, F., and M. Miller, 1958 “The Cost of Capital, Corporation Finance and the Theory of Investment,” *American Economic Review*, Vol. 48, pp. 261–297.

Morellec, E., 2004 “Can managerial discretion explain observed leverage ratios?” *Review of Financial Studies* 17, 257–294.

Oliver, B.R., 2006, “The Impact of Management Confidence on Capital Structure” Australian National University, Electronic copy available at: <http://www.ecocomm.anu.edu.au/research/papers/pdf/0505.pdf>

Rajan, R., and L. Zingales, 1995 “What Do We Know about Capital Structure? Some Evidence from International Data,” *Journal of Finance*, Vol. 50(5), pp. 1421–1460

Rauh, J.D. and A. Sufi, 2009, “Capital Structure and Debt Structure”, Working paper, University of Chicago Booth School of Business and NBER, and University of Chicago Booth School of Business, Electronic copy available at: <http://ssrn.com/abstract=1097577>

Shawyer, C., (2001), “The Road Ahead”, *The Treasurer*, December, p.60

Shyam-Sunder, L., and S. C. Myers, 1999, “Testing static tradeoff against pecking order models of capital structure,” *Journal of Financial Economics* Vol. 51, pp. 219–244

Sufi, A., 2009 “The Real Effects of Debt Certification: Evidence from the Introduction of Bank Loan Ratings” *Review of Financial Studies*, vol. 22, issue 4, pages 1659-1691

Standard and Poor’s (2010), “Amid the Changing Banking Landscape, U.K. Corporates are Embracing the Capital Markets”, 21 September 2010

Tang, T.T., 2009 “Information Asymmetry and Firms’ Credit Market Access: Evidence from Moody’s Credit Rating Format Refinement” *Journal of Financial Economics*, Vol. 93, issue 2, pp. 325-351

Appendix 1

Table A: Variable definitions and predicted signs with leverage

Variables	Definition	Expected Sign
Response variable:		
Market Value Gross Leverage	Total Debt / (MV of Equity + Total Debt)	
Market Value Net Leverage	(Total Debt – Cash and Equivalents) / (MV of Equity + Total Debt)	
Book Value Gross Leverage	Total Debt / (BV of Assets)	
Book Value Net Leverage	(Total Debt – Cash and Equivalents) / (BV of Assets)	
Predictors:		
Proxies for Access		
Credit Rating Dummy	Equal to 1 for firms with rating, and 0 otherwise	+
Firm Size Dummy 1	Equal to 1 for firms in the top 20% of distribution by total BV of assets, and 0 – if in the rest 80%	
Firm Size Dummy 2	Equal to 1 for firms in the top 20% of distribution by total BV of assets, and 0 – if in the bottom 20%	+
Access Dummy	Equal to 1 for rated firms and 0 for firms in the bottom 20% of distribution by total BV of assets	+
Firm Characteristics		
Firm Size		
Firm Size	Natural Log (BV of Total Debt + MV of equity)	+
Firm Age		
Firm Age	Natural Log (firm age + 1)	+
Profitability		
Return on Invested Capital (ROIC)	(Pre-tax Profit + Total Interest Charges) / Invested Capital	-
Pre-Tax Margin	Pretax Income as Percentage of Total Sales	-
Asset Tangibility		
Asset Tangibility 1	Total Assets-Current Assets/Total Assets	+
Growth Opportunities		
Market-to-Book of Assets	MV of Assets / BV of Assets	-
Firm's R&D Expenditure	Natural Log of (1 + Research & Development Expense / Total Assets)	-
Business Risk		
Asset Volatility 1	Equity Volatility * (Equity/MV of Assets)	-
Equity Volatility	$\sqrt{\text{No of Trading Days} * \text{Standard Deviation of [Natural Log of (Price day (t) / Price day (t-1))]}$	-
Past Equity Return		
Equity Return	Natural Log of (Share Price end year / Share Price beginning year)	-
Debt Maturity		
Short-Term Debt	(Short Term Debt + Current Portion of Long Term Debt due to within 1 year) /Total Debt	-
Taxes		
Tax Paid	Income Tax / Pre-tax Income	+

Macroeconomic Variables		
Annual GDP Growth Rate	$\text{LN}(\text{Nominal GDP}_t / \text{Nominal GDP}_{t-1}) \%$	+
Annual Stock Market Return	$\text{LN}(\text{FTSE at the end of the year} / \text{FTSE at the beginning of the year}) \%$	-

Model includes 11 industries:

1. Oil, mining, chemical and other commodities
2. Telecom fixed line
3. Transport, shipping, freight
4. Business support
5. Engineering, general
6. Medical supplies and pharmaceuticals
7. Retail, soft goods, foods and drugs
8. Media and leisure facilities
9. Water and electricity
10. Real estate
11. Software and computer services