Risk-sensitive Basel Regulations and Firms' Access to Credit: Direct and Indirect Effects *

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Abstract

This paper examines the impact of risk-sensitive Basel regulations on access to debt and cost of debt for firms with varying characteristics around the world, and investigates how firms cope through reliance on alternative financing sources and adjustments to their capital investments. We find that the implementation of Basel II regulations had a significant impact on the credit availability for firms. The results indicate that debt financing has become more difficult for the lower-rated firms in the post-Basel II period. Firms mitigate the shortage in bank credit induced by the regulation through a combination of higher trade credit, lower payouts, and reduced capital investments. In particular, lower-rated firms substitute reduced bank credit with increased reliance on accounts payables. Such firms also lower their payouts to shareholders, in an effort to maintain their liquidity. We also find that the lower-rated firms experience a significant decline in their capital investment in the post-Basel II period, implying an active response to the deterioration in access to credit. Our key results are robust to alternative estimations that control for changes in credit demand and credit supply shocks, and inclusion of bank-specific variables obtained from loan-level information. The findings of the paper substantially contribute to the understanding of the real effects of risk-sensitive bank capital regulations.

Keywords: *banking*, *Basel regulations*, *real effects*, *credit risk*, *trade credit*
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1 Introduction

One of the major components of bank capital regulation prescribed by the Basel accords is the credit risk-sensitive capital requirements. Unlike Basel I norms, where capital requirements were independent of credit risk for corporate lending, Basel II norms prescribed differential risk weights based on the borrower's credit risk (BCBS, 2006). The Basel III regulations, introduced to strengthen the Basel II norms (BCBS, 2011) in the aftermath of the 2008 global financial crisis, prescribed more safeguards for banking such as limits on overall leverage, minimum liquidity levels, and restricted the core capital to equity, among other changes. However, it retained the credit risk-based approach framed under Basel II to determine the capital charges for banks (BCBS, 2006, 2011). The credit risk driven approach introduced by Basel II has forced banks around the world to estimate their capital requirements for corporate lending based on borrower-specific credit risk. The risk-sensitive capital requirements for banks are determined with the help of external credit ratings (standardized approach) or ratings assessed by an internal rating model (IRB approach). The risk weights under the standardized approach brought about by the Basel II accord show substantial changes in capital requirement across rating categories (see Figure 1).[1] These changes in risk-related capital requirements, on account of the regulatory changes, are expected to impact the bank lending behaviour.

Anecdotal evidence suggests that banks have advised their clients to be prepared for the impact of the risk-sensitive Basel norms on the credit availability. An advisory issued by J.P. Morgan on Basel norms exhorted their clients to maintain a better risk profile to ensure greater access to bank products, including corporate loans.[2] Firms have also alerted their stakeholders about the likely adverse impact of the risk-sensitive Basel norms on the credit availability. For instance, one of the energy firms, Noble Energy, wrote in its 2013 Annual Report "As a result, traditional lending practices could change, resulting in more restricted access to funds or reduced availability of funds at rates and

[1] Under the internal rating based approach, banks are allowed to compute risk weights based on internally generated credit risk parameters such as probability of default and loss given default.

[2] The advisory issued by J.P. Morgan in Feb 2014 can be accessed from: https://www.jpmorgan.com/global/jpmorgan/investbk/solutions/banking/cfa/pub

terms we consider to be economic. Increased regulation could also negatively impact the project finance market, even for investment grade companies such as we are, and reduce our ability to obtain funding for the capital requirements of future major development projects ..." (p. 42). In a recent survey of corporate finance professionals, the US Chamber of Commerce found that on account of the changes in banking regulations, most of the businesses that were surveyed faced difficulty in obtaining financing and nearly one-fifth of the firms have delayed or cancelled planned investments.[3] The same survey also revealed that three-fourth of the respondents had a poor outlook on the firms' performance due to the new banking regulations. While risk-sensitive Basel regulations were expected to impact the credit flow to firms, existing research has mainly examined their impact on the intermediation costs and have largely ignored their impact on the credit flow to firms (Allen, Chan, Milne, & Thomas, 2012). In this study, we quantify the impact of risk-sensitive Basel regulations on credit flows to the real sector and isolate a range of firm-level responses to the resulting changes in the bank credit flows across developed and emerging economies.

The available evidence on the impact of Basel regulations indicates a credit risk driven change in the loan and investment portfolios of banks (Acharya & Steffen, 2015; Aiyar, Calomiris, Hooley, Korniyenko, & Wieladek, 2014; Demir, Michalski, & Ors, 2017; Gropp, Mosk, Ongena, & Wix, 2018; Hasan, Kim, & Wu, 2015; Hessou & Lai, 2018). Acharya and Steffen (2015) found that during the Eurozone crisis, under-capitalized banks shifted their investment portfolio to European sovereign bonds which offered lower capital charges, to comply with Basel II regulations. The behaviour of the European banks reflected a regulatory arbitrage where portfolio is reallocated from riskier assets to safer assets. Aiyar et al. (2014) found that banks in the United Kingdom significantly reduced the cross-border lending in response to the higher capital requirements. Gropp et al. (2018) found that banks in the European Union that were subjected to higher capital requirements reduced lending to corporate and retail customers relative to other banks. They also found that the European firms reliant on the banks subjected to higher capital ratios had lower

[3]The survey report that was made public in June 2016 can be accessed from: https://www.uschamber.com/sites/default/files/documents/files/financing_growth_report_16_june_16.pdf

sales growth and lower investments. Hasan et al. (2015) analysed the impact of Basel II regulations on the sensitivity of cross-border bank flows to sovereign rating changes in destination countries. The study found that the bank flows increased (decreased) with rating upgrades (downgrades) of the destination country. The implementation of Basel II in Turkey has resulted in a decrease in the issuance of letters of credit by banks for counterparties with higher risk weights (Demir et al., 2017).

While most of the studies cited above have examined the reallocation of credit by banks and changes in the cross-border bank flows on account of the Basel regulations, they have inadequately addressed the distributional impact of the changes in credit flows to firms and the consequent adjustments that may be made by borrowers to deal with these changes. Risk-sensitive capital requirements can be thought of as an exogenous shock that could differentially affect firms based on their risk profile. Any shock to the banking channel, such as the regulatory changes mandated by the Basel regulations, has a high likelihood of altering banks' behaviour and thereby result in spillover effect on the real sector given the significance of the banking channel in the credit supply to firms (Dell'Ariccia, Detragiache, & Rajan, 2008; Fernández, González, & Suárez, 2013).[4]

Several interesting research questions emerge in the context of changes in risk-sensitive capital regulations for banks. Which firms are the most adversely affected by way of changes in credit flow or interest costs? How have firms addressed the possible change in the credit supply from banks? Did they mitigate any credit shortfall through incremental trade credit or through internal funds, perhaps secured from lower payouts to shareholders? How do changes in distribution of credit flows to firms impact their capital investment in the post-Basel II period?

We attempt to address the above questions and substantially contribute to the understanding of the impact of the credit flows to the real sector on account of the introduction of risk-sensitive Basel regulations in the following ways. First, we carry out a comparative analysis of the role played by credit ratings, an observable measure of credit risk, on debt financing in the pre- and post-Basel II implementation periods. We exploit the

[4] As per the BIS total credit database, bank credit constitutes roughly 60% of the total credit to the private non-financial sector.

cross-sectional variation in firm-level credit ratings to investigate the difference brought about by Basel II implementation in the access to debt financing, especially for the riskier firms. The wide cross-section of countries in our sample allows us to examine whether this impact is pervasive after accounting for time-invariant differences in the market structure and institutional environment of each country. Second, we examine whether any possible reduction in access to bank credit is addressed by firms through alternative sources of financing, such as trade credit, especially in the case of the financially-constrained firms. Third, we investigate how changes in the availability of bank credit impacts the payout policies of firms, as adversely affected firms may try to secure more funds through lower payouts. Finally, we analyse whether firms adjust their investment behaviour in response to the financing constraints arising out of the changes in bank lending behaviour. A significantly lower capital investment intensity by financially constrained firms in the post-Basel II period would imply a sharp real response to the deterioration in access to financing. To the best of our knowledge, our paper is the first to examine these aspects of firm behaviour as an outcome of the implementation of risk-sensitive Basel II and Basel III regulations.

The findings of our study suggest that the implementation of risk-sensitive regulations have a significant impact on the flow and the cost of bank credit, particularly on the lower-rated firms, around the world. The findings further suggest that firms have attempted to counterbalance the changes in bank credit induced by the Basel implementation through a combination of (a) higher reliance on trade credit (b) lower shareholder payouts and (c) a downward adjustment of their capital investments. The detailed results of our study and their implications are as follows.

An overall decline in debt financing following the implementation of Basel II regulations across countries masks significant changes in the cross-sectional variation in the flow of credit to firms. We observe the following cross-sectional impact on the flow of credit to firms on account of the risk-sensitive regulations. First, while firms with low credit ratings had no significant difference in their new borrowing compared to higher-rated firm in the pre-Basel II period, the incremental borrowing by the lower-rated firms reduces

by about 1.34 percent of their assets in the post-Basel II period. We also observe a 34% increase in the impact of credit ratings on incremental borrowing during the same period. These results suggests that the bank lending to riskier firms, which invite higher capital charges, has declined in the post-Basel II period.

Second, we find a nearly 25% increase in the impact of credit ratings on the interest cost of debt in the post-Basel II period. We also find that lower-rated firms, across the sample of countries, have 46 basis points higher cost of debt relative to higher-rated firms in the post-Basel II period. Taken together, the above findings on the flow of credit and the cost of credit imply that access to debt financing has become difficult for lower-rated firms. While our findings on the impact of Basel II norms are based on the aggregate firm-level debt and not exclusively on the bank debt, these would be reliable as long as the sample firms have a significant reliance on bank credit. In our attempt to estimate the impact with a sample of firms which are significantly reliant on bank debt, we re-estimate our baseline model with a subsample of firms that are covered in the Loan Pricing Corporation (LPC) database. The cross-sectional impact of the Basel implementation on firms' access to debt in the baseline sample is found to be greater for only bank borrowing in the subsample of firms in the LPC database, supporting our main findings. Our findings on the impact of Basel regulations on firms' credit access and cost of debt are (a) robust to additional covariates in the estimation (b) pervasive across subsample of countries and (c) significant with controls for the 2008-09 Global Financial Crisis and other banking crises episodes, used as proxies for country-specific credit supply shocks. Overall, our results on the impact on financing of firms show that the risk-sensitive bank capital requirements has adverse distributional consequences on firms as predicted by earlier studies (Allen et al., 2012; Diamond & Rajan, 2000).

Third, we find that lower-rated firms have significantly increased their reliance on accounts payables as a source of credit in the post-Basel II period. The increased reliance on expensive trade credit could indicate a substitution from bank credit, which was in short supply or became more expensive in the post-Basel II period. The results imply that the firms with relatively low credit ratings addressed a shortage of credit from the

formal channels with trade credit, consistent with findings from earlier episodes of shocks to bank credit supply (Casey & O'Toole, 2014; Ferrando & Mulier, 2013). Fourth, we find that firms with relatively low credit ratings which face more severe adverse distributional impacts of implementation of Basel norms, reduce their payouts to shareholders, possibly in an effort to maintain their liquidity and capital needs in the post-Basel II period. A similar reduction in payouts has been documented during other episodes of financing constraints by Bliss, Cheng, and Denis (2015) and Campello, Graham, and Harvey (2010).

Finally, we find that the relatively lower-rated firms have significantly reduced their investments in the post-Basel II period, possibly as a result of reduced access to credit as compared to the higher-rated firms. The variation in capital investment between firms with high and low-creditworthiness significantly widened in the post-Basel II period. Such a response is consistent with findings of other studies that have found instances of decline in investments by firms faced with increased financing constraints due to credit supply shocks (Aghion, Angeletos, Banerjee, & Manova, 2010; Chava & Purnanandam, 2011; Fernández et al., 2013). The indirect impacts of Basel II implementation on the dependence on trade credit, shareholder payouts and capital investment, suggest that firms which are adversely affected by the risk-sensitive bank capital charges, attempt to mitigate the fallout through a combination of changes in supplier credit and reliance on internal capital, as well as adjustments to their capital investments.

The remainder of the document is as follows. In the next section, we give an overview of the conceptual background and the hypotheses developed for the study. Next, we describe the data and the methods employed for our empirical estimations. The subsequent section discusses the findings from the econometric analysis and provides an analysis of the results. Finally, we conclude the paper with a discussion on the key findings of the study.

2 Conceptual background and hypotheses

2.1 Risk-sensitive capital requirements and credit supply

The change in bank lending behaviour under capital regulation has been examined in the literature largely under three different approaches (a) optimization of the asset portfolio of banks when it is driven by capital-constraints (b) bank behaviour in the presence of incentives and moral hazard, where banks balance the costs and benefits of decisions across the entire balance sheet including both assets and liabilities and (c) portfolio choice under capital regulation influenced also by adverse selection and monitoring (VanHoose, 2007). In the first approach, banks strive to maintain an optimal asset portfolio which alters the ratio of risk-weighted assets to capital so as to meet risk-sensitive capital requirements. The second approach mostly takes into account the manner in which banks may attempt to balance the costs of regulatory breach against the expected benefits of certain portfolio decisions. Under the third approach, the influence of adverse selection and monitoring costs are also accounted in the asset portfolio decisions of the bank as a result of capital regulations.

The portfolio optimization approaches of Furlong and Keeley (1989) and Flannery (1989), characterised by a state-preference model, conclude that a value maximizing bank, facing stringent capital requirements, would reduce the risk of its asset portfolio. Rochet (1992) and Kahane (1977) argue that capital regulations can potentially reduce asset risk if the risk weights in the proposed capital ratio are proportional to the market beta of the asset. The bank capital theory of Diamond and Rajan (2000) also argued that binding capital requirements would have varying implications across borrowers depending on their creditworthiness. In particular, banks would prefer to extend relatively favourable terms to cash-rich borrowers. Consequently, an increase in bank capital requirements can lead to adverse distributional consequences for cash-poor borrowers. Calem and Rob (1999), who examine a the portfolio choice in a dynamic set up, suggest a U-shaped relationship between the level of capital and risk appetite of the bank over time. In the short run,

banks would prefer a less risky portfolio so as to preserve capital under binding capital regulations, whereas, in the long run, as they accrue more capital, banks would increase the riskiness of their asset portfolio. Substantiating the role of monitoring costs under a regulated capital regime, Thakor (1996) suggests that the likelihood of credit rationing to a borrower with higher monitoring needs would increase with more stringent capital requirements. Cohen and Scatigna (2016) argue that replacing riskier loans with safe loans is one of the adjustment strategies that banks can pursue to meet the risk-sensitive capital requirements.

Overall, the literature on bank behaviour under risk-sensitive capital requirements uniformly suggests that minimum capital regulations lead to a drop in exposure to riskier assets, create a preference for holding alternative lower-risk assets, and increase in lending rates for riskier borrowers. Given the above arguments on the possible impact of risk-sensitive regulatory capital requirements on the asset allocation choice of banks, the following responses are possible on account of the Basel II and III implementation:

(i) Bank may decrease their loan exposure to firms with higher risk and reallocate capital to firms with lower risk to meet risk weighted capital requirements. Hence we hypothesize that:

Hypothesis 1 *Firms with relatively lower (higher) credit ratings would have lower (higher) access to credit in the post-Basel II implementation period on account of the higher (lower) contribution to risk-weighted capital charge of banks.*

(ii) Banks may increase the pricing of the loans to firms with higher credit risk due to higher capital charges for such firms under Basel II, and may reduce their lending rates for better-rated firms. Hence we hypothesize that:

Hypothesis 2 *Firms with relatively lower (higher) credit ratings would have higher (lower) cost of debt in the post-Basel II implementation period on account of their higher (lower) risk weighted capital charge required by banks.*

The two different channels of adjustment in response to changes in bank capital regulations, as identified above, could also be inferred from the risk adjusted return on capital

(RAROC) framework (Stoughton & Zechner, 2007) that is widely employed in banking to evaluate risk-sensitive lending decisions.[5]

If banks are expected to make significant adjustments to the supply or pricing of credit to firms in the post-Basel II period, it is also possible that firms with financing constraints would be forced to seek alternative sources of credit. In this context, we examine the possible spillover effects of Basel II implementation on the demand for trade credit. Trade credit is known to serve as a key short-term source for the non-financial firms (Petersen & Rajan, 1997), especially in the less developed countries (Fisman & Love, 2003; Ge & Qiu, 2007). In subsection 2.2 we evolve the research hypothesis related to the spillover impact on trade credit demand. In subsection 2.3 we develop the research hypothesis on the substitution of bank credit with internally generated funds.

2.2 Trade credit

Several studies have found that firms address the shortage of external finance, particularly in periods of financial crisis, with suppliers' credit (Casey & O'Toole, 2014; Coulibaly, Sapriza, & Zlate, 2013; Love, Preve, & Sarria-Allende, 2007). For instance, Casey and O'Toole (2014) found that trade credit was the main substitute for bank credit for financing the working capital needs of credit-rationed firms during the European sovereign debt crisis. Ferrando and Mulier (2013) found that the firms which face uncertainties in tapping formal financing channels prefer trade financing channels to manage their growth. Coulibaly et al. (2013) show that firms with greater reliance on trade credit in emerging markets were able to better weather the financial crisis of 2008. However, trade credit supply is partly linked to access to bank credit itself. For instance, Love et al. (2007) found that while aggregate trade credit in emerging economies increased immediately after the

[5] RAROC is defined as follows:

$$RAROC = \frac{\text{Net Expected Revenue} - \text{Expected Losses}}{\text{Regulatory Capital}}$$

where the net expected revenue is the sum of net interest income and the fee based income, expected loss is measured as the product of probability of default (PD), loss given default (LGD) and exposure at default (EAD), and the regulatory capital is the mandated capital as per Basel regulations, set aside to cover for unexpected losses. RAROC is used as a hurdle rate for credit decisions.

global financial crisis, it declined significantly in the following months. They attributed the increase in trade credit during the crisis to the reduced supply of bank finance to the financially stronger supplier firms, which would have otherwise redistributed the bank finance through the trade credit channel to their weaker trade partners. Similarly, based on a matched supplier-client data of firms in the United States, Garcia-Appendini and Montoriol-Garriga (2013) shows that suppliers with greater pre-crisis liquidity levels supplied higher trade credit to constrained firms. It has been also documented that wherever a firm is able to obtain cheaper bank financing, the demand for expensive trade credit is lower (Ng, Smith, & Smith, 1999). On the other hand, holding customers' demand for trade credit constant, wherever a supplier has easier access to bank financing, the latter has a greater propensity to extend trade credit to its customers (Shenoy & Williams, 2017).

Given the documented evidence of substitution between trade credit and bank credit by firms, a shock to bank lending, such as the credit risk-sensitive capital charges in the Basel II norms, is likely to indirectly impact the trade credit dependence of firms. Therefore, as the Basel II implementation is expected to make bank credit less accessible to firms with lower credit ratings, it is possible that this regulatory change indirectly impacts the use of trade credit by firms. For instance, in a closely related study, Demir et al. (2017) show that since the Basel II implementation, banks in Turkey reduced trade credit sanctioned through letters of credit to trading partners based in countries which have higher sovereign risk. Hence, we hypothesize that:

Hypothesis 3 *Firms with relatively lower (higher) credit ratings would have greater (lesser) reliance on trade credit in the post-Basel II period.*

Out of the two observables for trade credit, the accounts payables and accounts receivables; the former is regarded as an indicator of trade credit demand (Petersen & Rajan, 1997), as it helps to mitigate financial market imperfections faced by a firm (Ferrando & Mulier, 2013). On the contrary, accounts receivables help a firm to manage product market imperfections (Ferrando & Mulier, 2013).[6] Therefore, we track the trade credit

[6] Product market imperfection arise due to the information asymmetry regarding the quality of the

dynamics through outstanding accounts payables.

2.3 Payout policy

Firms are known to increase the precautionary holdings of cash, when faced with a greater uncertainty in the financial markets (Bliss et al., 2015; Campello et al., 2010; Sun & Wang, 2015), in an attempt to mitigate the expected contraction in the supply of funding. Several empirical studies find that firms decrease payouts, particularly equity repurchases, in response to credit supply shocks. For instance, Bliss et al. (2015) found that firms which were more likely to encounter a reduction in formal credit supply reduced their payout during the 2008 global financial crisis, which originated in the financial sector. The reduced payouts were implemented by the firms to maintain their liquidity and desired investment levels. Similarly, Sun and Wang (2015) show that firms increased their precautionary savings by way of lower payouts during the financial crisis and this was more pronounced among the financially constrained firms. Based on a field survey of CFOs across US, Europe and Asia, Campello et al. (2010) document that financially constrained firms significantly reduced dividend payments during the global financial crisis. Therefore, it is reasonable to conjecture that when faced with any anticipated adverse credit shock, firms are likely to shore up their liquidity through a lower payout.

The implementation of credit risk-sensitive Basel II norms were expected to impact the overall supply of credit and the cost of credit. However, as discussed earlier, unlike a common negative shock to credit supply similar to that experienced during a financial crisis, the implementation of Basel II norms is expected to have a strong cross-sectional effect, wherein relatively low credit risk firms would receive credit on more beneficial terms. On the contrary, the relatively high credit risk firms would face a more restricted supply of credit. Additionally, unlike a financial crisis which would be accompanied by a negative demand shock, the Basel II implementation is predominantly a supply shock. Hence there is a stronger incentive for financially constrained firms to lower their payouts in order to maintain their investment levels. Therefore, we hypothesize that:

product. Hence, the supply of trade credit serves as a signalling tool on the quality of the product.

Hypothesis 4 *Firms with relatively lower (higher) credit ratings would have a greater (lower) reduction in their payout in the post-Basel II implementation period.*

2.4 Investment intensity

It is well documented that financial frictions impact the investment activities of firms (Aghion et al., 2010; Campello et al., 2010; Chava & Purnanandam, 2011; Cingano, Manaresi, & Sette, 2016; Duchin, Ozbas, & Sensoy, 2010; Fernández et al., 2013; Heid, 2007). Aghion et al. (2010) show that the anticipation of a financing shock reduce firms' investment appetite, especially for long-term investments, as the expected increase in financing constraints raises the probability of a liquidity shock. Campello et al. (2010) found that the credit-constrained firms scaled down their investments during the global financial crisis. Similarly, Duchin et al. (2010) found a decline in corporate investments following the financial crisis of 2008, mostly among firms with low liquidity and those from industries dependent on external finance. Chava and Purnanandam (2011) provide evidence that adverse shocks to banks in the United States during the 1998 Russian debt crisis negatively affected investments of their borrowers. In a cross-country study on systemic banking crises during the 1989-2007 period, Fernández et al. (2013) found that the the contraction in credit supply during these crises adversely negatively affected the intangible investments of the firms. Cingano et al. (2016) show that firms in Italy had to reduce their capital expenditure during the financial crisis of 2008 due to the credit supply shock from the bank lending channel, which was adversely affected by the liquidity crunch in the interbank markets.

Although not a financial crisis, the implementation of rating-contingent Basel regulations and its predicted impact on the supply of credit or its pricing (Cosimano & Hakura, 2011; VanHoose, 2007), could amount to a financial friction and impact capital investments of firms. Heid (2007) argue that the capital requirements of the Basel regulations will negatively affect firms' investments, especially in bank-based economies. Underscoring the potential cyclical implication of Basel II capital standards, Kashyap, Stein, et al. (2004) state that "if it is expensive for banks to raise and/or hold additional capital,

a too-stringent capital requirement will lead to a reduction in bank lending, with the associated underinvestment on the part of those borrowers who are dependent on bank credit."

If the debt financing options of lower-rated firms have been significantly affected by the implementation of rating-contingent Basel regulations, it would adversely impact the investment decisions of these firms, and conversely for higher-rated firms. Hence we hypothesize that:

Hypothesis 5 *Firms with relatively lower (higher) credit ratings would have lower (higher) investment intensity in the post-Basel II implementation period owing to a decrease (increase) in credit supply.*

3 Data and methodology

3.1 Data

We examine the firm-level impact of implementation of Basel II regulations with a dataset that covers many advanced and emerging economies. The multi-country dataset offers the following advantages. Firstly, since the timeline of the Basel II implementation varies across countries, the multi-country data would help to control any country-specific events which may coincide with the implementation. Secondly, it would allow us to quantify the variation in the impact on firms attributable to country level factors, such as the degree of dependence of firms on the banking system. Finally, the estimation across multiple countries would ensure the robustness of our results.

Our sample of countries includes the set of countries which have agreed to implement the Basel II recommendations, including both BCBS member countries and others. The timeline of Basel II implementation in each country is ascertained from the Bank for International Settlements (BIS) Progress Updates on the implementation of the accord. The updates give detailed information on the implementation timelines for each of the Basel II recommendations for about 100 countries worldwide.

We estimate the impact of Basel II implementation on firm-level outcomes with firm-specific data over a 23-year period between 1995 and 2017. The period chosen somewhat equally spans around the Basel II implementation period. The universe of firms is the set of non-financial firms covered in the Worldscope database across 116 countries.[7] The Worldscope data covers 56,646 unique firms in these countries for the sample period based on their country of domicile. Firms are matched with issuer credit ratings obtained from the Thomson Reuters Eikon database, which provides information on Standard & Poor's *issuer ratings* since 1995. However, firm-level external credit ratings are available only for a sub-sample of the universe of firms. After excluding those firms without any rating information, we are left 34,132 firm-year observations representing 3,804 firms. We also excluded (a) firms from seven countries with less than five firm-year observations (b) firm-years which have missing information on the variables required for the analysis (c) firm-years that were not rated and (d) firm-years with negative book value of equity. The final sample of unbalanced panel data employed in the analysis has 25,524 firm-years, corresponding to 3,129 unique firms spread across 52 countries.

The sample represents about 55% of the overall market capitalization and about 57% of the overall asset size (based on 2017 data) of the universe of non-financial firms covered in Worldscope. Our final sample is comparable to the that used by Almeida, Cunha, Ferreira, and Restrepo (2017) to study the firm-level impact of sovereign rating changes through the credit rating channel.[8]

The year of the implementation of the standardized approach to credit risk, which is the basic risk-sensitive approach specified in Basel II, in each of the 52 countries is given in Table A1. The table gives the number of firm-years covered in each country, the average ratings of sample firms and the standard deviation of the ratings. Out of the 52 countries, 27 implemented the Basel II regulation before the onset of the 2008 Global Financial crisis. Emerging markets account for about 10% of the firm-years in the final sample, while about 61% of the firm-years represent US firms. As indicated by the standard deviation of the credit ratings, we observe a significant cross-sectional variation

[7] We omit all the financial firms which are represented by the two-digit SIC code between 60 and 67.
[8] Almeida et al. (2017) uses the Factset database for their study.

of ratings within each country, which makes the sample appropriate for examining the distributional consequences of rating-contingent banking regulations. The distribution of the sample firms across the credit rating categories is shown in Figure A.1. About 41% of the firm-year observations represent ratings below the investment grade ratings. The rating distribution has remained more or less stable throughout the sample period (see Figure A.1).

The firm-level control variables included in the study are largely based on those employed in earlier studies on the determinants of corporate borrowings (Baghai, Servaes, & Tamayo, 2014; Berger, Ofek, & Yermack, 1997). The country-level macroeconomic variables are GDP growth rate, private credit to GDP, per capita GDP and bank capital to assets ratio, all at an annual frequency. The macroeconomic variables are obtained from the World Development Indicators of the World Bank and the FRED database of the Federal Reserve Bank of St. Louis. Finally, we obtain global variables, including the VIX index, a proxy for risk aversion, and the Federal Funds rate, a price-based measure of liquidity, from the FRED database.

The description of the variables and sources, and the item codes in the corresponding source databases, are given in appendix Table A2. The summary statistics of all the variables employed in the study are described in Table 1. In order to limit outliers, we winsorize all the firm-specific variables, except for credit ratings, at the 1^{st} percentile and 99^{th} percentile. The average firm size based on total assets is \$4.7 billion and \$ 3.6 billion based on market capitalization. As suggested by the indicators of growth, the sample period coincides with a growth phase of the firms in the sample. The average real GDP growth rate across the sample countries is 2.42%. Across the sample period, the median firm had an annual sales growth of 5.86% and Market-to-Book (M/B) ratio of 2.01. This firm-level growth is reflected in capital investments. The median firm's annual capital investment is 16% of fixed assets.

The median firm is profitable, cash flow positive and has a cash balance of six percent of assets. However, both on the growth and profitability characteristics, there is a significant variation across the sample, as suggested by the corresponding values at the 10^{th}

and the 90^{th} percentile. Nearly a quarter of the earnings of the median firm is paid out as dividends to shareholders and the level of payout rises to nearly half of the earnings, when repurchases are included along with the dividends.

The sample firms appear to significantly rely on debt for financing. The average firm has an annual net debt issuance of 3.2% of assets and a leverage ratio (debt:equity ratio) of 1.02. The average annual interest cost incurred on debt is about 6% per annum. The sample firms also rely on trade credit for financing their operations. For the median firm accounts payables are about 6.5% of assets. The median firm also extends credit to its customers as indicated in the outstanding accounts receivables of about 15% of sales.

3.2 Methodology

3.2.1 Distributional impact on credit supply

The impact of Basel regulations on the supply of long-term and short-term debt financing to firms, as given in Hypothesis 1, is empirically examined by modelling the net debt issuance by a firm. The dependent variable in the baseline model is the annual net debt issuance of a firm, scaled by total assets of the firm in the same year. The dependent variable is similar to that used by Berger et al. (1997) to analyze the determinants of change in the debt structure of firms. Accordingly, the estimation equation is given below:

$$\begin{aligned} ID_{it} = {} & \alpha_0 + \alpha_1 CR_{it-1} + \alpha_2 Basel\_Dum_j \times CR_{it-1} + \alpha_3 Basel\_Dum \\ & + \sum_j X_{i,jt-1} \times \alpha_{4j} + \sum_k Y_{i,kt-1} \times \alpha_{5k} + \sum_g Z_{t-1} \times \alpha_{6g} + \mu_i + \tau_t + \epsilon_{it} \end{aligned} \tag{1}$$

where i represents the firm, ID_{it} is the incremental debt raised by the firm i in the year t scaled by total assets of the firm in the beginning of the year, CR_{it-1} is the issuer credit rating of the firm i in the beginning of the year t, $Basel\_Dum$ is a dummy variable which takes the value 1 if country j has implemented the standardized approach to credit risk specified in the Basel II regulations, and 0 otherwise.[9] X is a vector of firm-level

[9] Hasan et al. (2015) have constructed a Basel implementation dummy similarly for their study on

controls that can affect the financing capacity of firms, Y is a vector of country-specific factors that can potentially affect the credit supply to firms, and Z is a vector of time variant global factors. Our choice of the X, Y and Z variables employed in the estimation are described below.

As the net debt growth is likely to be impacted by the demand growth of a firm, we control for the difference in the demand growth across firms. We employ lagged sales growth and the M/B ratio as proxies of demand growth. Profitable firms and firms with higher internal cash flows are likely to have lower demand for external financing, therefore, we control for both EBITDA ($EBITDA\_asset$) and operating cash flows ($Op.CF\_assets$) of the firm. We also control for firm size (Log_Sales) as larger firms are known to have easier access to the formal sources of finance. As a control for the debt overhang of the firm, we employ the level value of $Leverage$. Finally, we control for the capacity of firms to offer collateral by employing the level of fixed or tangible assets as a share of total assets ($Tangibility$). The above firm-level variables are known to affect the capital structure decisions of firms and had been employed commonly in prior empirical research (Baghai et al., 2014; Berger et al., 1997; Titman & Wessels, 1988). The vector of country-specific factors (Y) include GDP growth, private credit to GDP and per capita GDP. The GDP growth rate is used as a proxy for the overall demand for credit in the economy, the private credit to GDP ratio is an indicator of the development of banking sector, and per capita GDP proxies for the overall economic conditions of a country (Demirguc-Kunt & Maksimovic, 2001). The vector of global time-varying factors (Z) are the VIX index (VIX_index), a measure of global risk aversion, and the Fed Funds rate (Fed_funds_rate), a measure of global funding liquidity. The firm fixed-effect μ_i represents time invariant unobserved firm-specific heterogeneity. All the explanatory variables are lagged by one year to avoid potential endogeneity concerns.

We have used net debt issuance by firms as the dependent variable to capture the impact of Basel II implementation. It is possible that the estimated effect on the net debt growth could reflect the changes in debt raising from non-bank sources. Therefore,

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to ensure a more reliable identification of the firms which are reliant on bank financing, we employ the aggregate bank loans taken by firms (*Loan_asset*) annually from the Loan Pricing Corporation (LPC) database. In alternative estimations, we also estimate the effect of Basel II implementation with a panel fixed effects model that controls for time varying industry effects. This latter estimation controls for any time varying industry-specific demand fluctuations.

3.2.2 Impact on cost of debt

As banks may pass on the incremental capital charge on account of the rating-contingent binding regulatory requirements to their borrowers, particularly to lower-rated firms (2), we estimate the impact of the Basel regulations on the interest cost of debt. We estimate the following equation for interest cost of debt:

$$\begin{aligned} IC_{it} = \beta_0 + \beta_1 CR_{it-1} + \beta_2 Basel\_Dum_j \times CR_{it-1} + \beta_3 Basel\_Dum_j \\ + \sum_j X_{i,jt-1} \times \beta_{4j} + \sum_k Y_{i,kt-1} \times \beta_{5k} + \sum_g Z_{t-1} \times \beta_{6g} + \mu_i + \tau_t + \epsilon_{it} \end{aligned} \tag{2}$$

where IC_{it} is the interest cost of debt of the firm i in the current year t. IC_{it} is calculated as a percent of the total interest expense in year t as a percent of the total debt in the year t. The firm-specific, country-specific and global control variables are similar to those employed in the baseline specification described in section 3.2.1. A panel data fixed effects model is used to estimate equation after controlling for year effects.

In alternative estimations, in order to improve the identification of the sample of impacted firms which are reliant on bank debt, we use the subsample of firms that are matched with the LPC database. The estimation follows the same methodology as presented in Equation 2.

3.2.3 Alternative source of financing - Trade credit

In order to test hypothesis 3 on the spillover effects on trade credit usage, we employ a model with the dependent variables as either the total accounts payables scaled by

the assets or the accounts receivables scaled by sales. These variables have been used in earlier empirical studies on trade credit (Fisman & Love, 2003; Petersen & Rajan, 1997). Since the accounts payables are used to finance the assets, the total assets is used as the deflator for the estimations (Fisman & Love, 2003; Petersen & Rajan, 1997). In alternative estimations, we use total liabilities as a deflator, similar to the scaling done in Fisman and Love (2003).

We estimate the effects effects of Basel regulation on changes in trade credit as follows:

$$\begin{aligned} TC_{it} = \gamma_0 + \gamma_1 CR_{it-1} + \gamma_2 Basel\_Dum_j \times CR_{it-1} + \gamma_3 Basel\_Dum_j \\ + \sum_j X_{i,jt-1} \times \gamma_{4j} + \sum_k Y_{i,kt-1} \times \gamma_{5k} + \sum_g Z_{t-1} \times \gamma_{6g} + \mu_i + \tau_t + \epsilon_{it} \end{aligned} \tag{3}$$

where TC_{it} is the scaled value of outstanding trade credit of the firm i in the year t proxied by either accounts payable or accounts receivable. X include a range of firm-specific factors which could influence the level of trade credit of firms. As suggested in the study on the determinants of trade credit by Petersen and Rajan (1997), we control for the age of the firm as a proxy for reputation and credit worthiness, size of the firm since small firms with lower access to financial institutions may rely more on trade credit, cash holdings to account for the ability of a firm to not rely on trade credit, sales growth to control for operational shocks faced by the firm, and profitability as a proxy for internal cash generation as profitable firms have higher capacity to offer credit. In addition, we control for the industry revenue share of the firm to account for the bargaining power of the firm (Wilner, 2000), Tobin's q to account for the possibility that firms with higher growth opportunities tend to maintain relationships with suppliers and customers and book value of leverage as a proxy for the financing capacity (Shenoy & Williams, 2017). Fabbri and Menichini (2010) show that firms reliant on purchase of goods (industrial firms) make more purchases on credit than the firms that are reliant on services. Fabbri and Menichini also show that services firms supply more trade credit (receivables for the firms) than the firms supplying finished goods (industrial firms). As trade credit requirements can vary by industry sectors, we segregate the variables by broad industry

classification, into industrial firms (2 digit SIC codes 10-39 & 50-59) and services firms that includes utilities (2 digit SIC codes 40-49 & 70-99).

Y is a vector of country-specific factors and Z is a vector of global time variant variables employed in earlier models. Similar to earlier, we use a panel data fixed effects model to estimate the equation and control for year effects.

3.2.4 Impact on payout policy

We test the possible impact of Basel II regulations on the level of payout to shareholders by way of dividends and repurchases (Hypothesis 4) with the following empirical approach:

$$\begin{aligned} Payout_{it} = \delta_0 + \delta_1 CR_{it-1} + \delta_2 Basel\_Dum_j \times CR_{it-1} + \delta_3 Basel\_Dum_j \\ + \sum_j X_{i,jt-1} \times \delta_{4j} + \sum_k Y_{i,kt-1} \times \delta_{5k} + \sum_g Z_{t-1} \times \delta_{6g} + \mu_i + \tau_t + \epsilon_{it} \end{aligned} \tag{4}$$

where $Payout_{it}$ refers to the total payout that includes repurchases and dividends of firm i in year t scaled by the net income in year t. Data on firm-level repurchases and dividends data are obtained from the Worldscope database. The yearly firm-level stock repurchase amount corresponds to the cash outflow for purchase of common and preferred stock given in the Worldscope database (variable $WC04781$). The cash outflow on account of the purchase of preferred stock is included in the repurchase amount, as we intend to examine the impact of Basel II on the total cash outflows and not just the equity repurchases. The same Worldscope variable had been employed by Manconi, Peyer, and Vermaelen (2014) in a study of equity repurchases around the world. In particular, the average dividend payout and the total payout we obtain here for the US market are comparable to those reported by (Bliss et al., 2015). X refers to a set of firm-level controls, which are considered as potential determinants of firms' payout policy in the literature. Specifically, we employ Tobin's q as a proxy for future growth opportunities (Fama & French, 2001), earnings volatility, leverage and size of the firm (Brav, Graham, Harvey, & Michaely, 2005; Chay & Suh, 2009). The macroeconomic controls and the global time

variant controls are similar to those employed in section 3.2.1. The estimation is carried out as a panel data model with firm and year fixed effects.

3.2.5 Impact on Capital Investments

We test the impact of risk-sensitive Basel regulations on capital investments by firms (hypothesis 5) by estimating the spillover impact of rating-contingent regulations on the investments of the firms. The dependent variable we use is investment intensity, the total capital expenditure in year t as a percent of the total fixed assets as of the beginning of the year t. The estimation model is as follows:

$$\begin{aligned} Inv_{it} = \theta_0 + \theta_1 CR_{it-1} + \theta_2 Basel\_Dum_j + \theta_3 Basel\_Dum_j \times CR_{it-1} + \\ + \sum_j X_{i,jt-1} \times \theta_{4j} + \sum_k Y_{i,kt-1} \times \theta_{5k} + \sum_g Z_{t-1} \times \theta_{6g} + \mu_i + \tau_t + \epsilon_{it} \end{aligned} \tag{5}$$

where Inv_{it} is the investment intensity of the firm i in the current year t. X is a vector of firm-level controls that are considered as potential determinants of firm-level investments. The controls are marginal cost of capital (Modigliani & Miller, 1958), proxied by Tobin's q , leverage as a measure of debt overhang (Hennessy, 2004), cash flows from operations as an indicator of credit constraints (Fazzari, Hubbard, Petersen, Blinder, & Poterba, 1988), and credit ratings as a measure of the ability of a firm to collateralize future loans that may invite stringent debt covenants (Hennessy, 2004; Rauh, 2006). Other common proxies for financial constraints include size, profitability, growth prospects and industry classification (Beck, Demirgüç-Kunt, Laeven, & Maksimovic, 2006; Campello et al., 2010; Cleary, 2006). The macroeconomic control variables and the global time variant controls are similar to those shown in section 3.2.1. We use a panel data fixed effects model and control for year effects.

4 Findings and discussion

4.1 Impact on Debt financing of firms

4.1.1 Impact on debt issuances

A univariate comparison of the change in debt scaled by assets ($\Delta Debt\_asset$) in the pre- and post-Basel II period indicates only a marginal decline (Table 2) in the incremental debt funding after Basel II implementation. However, the univariate comparison could mask any significant cross-sectional impact that rating-contingent regulations may have on debt financing of firms. The cross-sectional impact of the rating-contingent Basel regulations on the debt financing of firms is estimated as specified in Equation 1. The baseline estimation results given in Table 3 (column 1) suggest that the dependence of debt issuance on credit ratings has increased significantly since the Basel II implementation. In other words, the sensitivity of debt growth to credit ratings is significantly higher in the post-Basel II period compared to the pre-Basel II period. For instance, the results in column (1) show an increase in the sensitivity of the dependent variable to ratings of about 34%, from 0.872 (coefficient of $Rating_{t-1}$) to 1.172 (coefficient of $Basel\_Dum \times Rating_{t-1}$), in the post-Basel II period. As our sample period partially coincides with the Global Financial Crisis (GFC), which had a negative impact on the real sector, we control for the impact of GFC in the estimation of Equation 1. The results presented in column (3) accounts for the effect of GFC on debt funding for the years 2008 and 2009. The 32% increase in the sensitivity of debt funding to credit ratings in the post-Basel II period is consistent with the earlier result even after controlling for the effect of GFC. The increase in the sensitivity of debt funding to credit ratings observed for the sample of 52 sample countries around the Basel implementation period, even after controlling for factors known to affect the debt funding, suggests that Basel II implementation had a stronger impact on the debt funding of firms with lower ratings, which attract higher capital charges for banks.

While we observe an increase in the sensitivity of debt funding to ratings in the post

-Basel II period in the above estimations, it is possible that the risk-sensitive regulation may either have adversely impacted lower-rated firms which incur high capital charges or may have favourably impacted higher rated firms which attract lower capital charges. We bring more clarity on this aspect through a difference-in-difference analysis between the two groups of firms (using a dummy variable HCC_Dum), which incur differential capital charges in the post-Basel II period. The Basel II implementation led to higher capital charges for rating categories below B+ and the same or lower capital charges for ratings higher than B+ (as indicated in Figure 1). Accordingly,the HCC_Dum takes value of 1 if the credit rating of the firm is between B+ and selective default (SD) and 0 otherwise (BB- to AAA).

The results of the re-estimation of the impact of Basel II with the HCC_Dum are presented in column (2) of Table 1. The results indicate that relative to the control group, firms in the lower-rated group face a significantly lower access to credit in the period following the implementation of Basel II. As indicated by the $HCC\_Dum \times Basel\_Dum$, debt growth is 1.34 percentage points lower (as a percent of assets) for the group of firms for which banks attract increased capital charges. At the same time, we observe almost no decline in the debt growth of the group of firms rated above B+ in the post-Basel II implementation period (Table 2). The lower debt growth of firms rated below B+ along with the somewhat similar growth of the higher rated firms imply that that the increased sensitivity to ratings revealed by the baseline estimation is driven significantly by a decline in the supply of debt to lower-rated firms. We also re-estimate the above result with a control for GFC. While the significant negative impact of GFC is as expected (3.4% lower debt growth), the differential impact of the rating contingent regulations on HCC_Dum group is largely unchanged (1.3 percentage points in column (4), similar to the 1.34 percentage points without GFC control). The relatively lower debt growth of the riskier rating cohort presented above is also valid if we re-group the firms according to the commonly employed definition of investment-grade (AAA to BBB-) and speculative-grade (BB+ to SD) in the debt markets (refer Table A3).

Overall, the results indicate that the access to credit for firms has deteriorated, espe-

cially for lower-rated firms, on account of the risk-sensitive bank capital regulations. The findings as discussed above support Hypothesis 1.

The results presented so far on the impact of Basel II implementation employs aggregate change in debt as the dependent variable. However, it is possible that for firms with issuer ratings, bank loans form one of several sources of debt. For instance, Rauh and Sufi (2010) and Denis and Mihov (2003)show that most creditworthy firms prefer public debt, the least creditworthy firms prefer non-bank private debt and it is the intermediate group that prefer bank credit. In the following section, we focus exclusively on a subsample firms that rely on bank debt to improve the identification of the distributional impact of the Basel II implementation.

4.1.2 Identification of bank channel

We identify a subset of firms that have undertaken bank borrowing during the sample period from data on syndicated loans available from the LPC Dealscan database (LPC). To construct a sample of firms with syndicated loans (LPC sample) which overlaps with the baseline sample, we match the loan information from the LPC database with firm-level information from the Worldscope database using firms' unique security identification codes (*ISIN*).

The LPC matched sample includes 1,844 firms across 45 countries. We estimate the total amount of annual borrowings for each firm by adding up the tranches of loans (*tranche amount in million USD*) taken by a firm in a year. The summary statistics for the LPC sample is provided in Table A4. The average firm in the LPC sample is relatively larger with $4.5 billion in net sales as compared to $3.6 billion for the baseline sample. As compared to the average firm in the baseline sample, the average firm in the LPC sample has higher sales growth, investment intensity, profitability, and operating cashflows. These firms also have higher leverage and M/B ratios. The average firm in the LPC sample has a similar risk profile to the overall sample as the average credit rating of 13.32 is more or less similar to credit rating of 13.17 for the baseline sample. The LPC sample has higher debt growth during the sample period compared to the baseline sample.

The average annual change in debt as a percent of the prior year assets ($\Delta Debt\_asset$) for the LPC sample is 5.5% as against 3.2% for the baseline sample. Similar to the trend observed for the baseline sample, there is a decline in the average $\Delta Debt\_asset$ in the post-Basel II period as compared to the pre-Basel II period in the LPC sample, especially for the lower-rated firms.

We re-estimate the baseline estimation in Equation 1 with the LPC sample to improve upon the identification of the effect of Basel II implementation on firms' debt financing. The dependent variable is the total loans taken in a year scaled by the assets in the beginning of the year. The key explanatory variable is the Avg_Rating, estimated as the annual loan-weighted average (with corresponding loan amounts used as weights) of issuer credit rating assigned by three major credit rating agencies (Avg_Rating_{it}).[10]

The results shown in Table 4 column (1) suggest that the sensitivity of loans to credit ratings have increased significantly in the risk-sensitive regulatory period for the LPC sample, similar to that observed for the baseline sample. This result is robust to additional controls for the GFC effect. These results lend support to the findings reported in section 4.1.1 for the baseline sample. For the LPC sample, we also extend the approach used in the baseline estimation with bank level controls, which could alter the response of a bank to the rating contingent regulations. The bank-level control variables employed are the equity to assets ratio to capture capital adequacy; net interest margin to proxy for profitability; cost to income ratio as a proxy for the efficiency; and loan loss reserves to total loans as a proxy for loan asset quality. All the above control variables are commonly employed in banking studies. The bank-level controls employed here correspond to those of the lead arranger banks in syndications.[11] The results shown in columns (5) and (7) of Table 4 support the finding of increased sensitivity of lending to credit ratings in the

[10]We first take the average rating across the three rating agencies, Standard & Poor, Moody's and Fitch, as available for each deal. Then we compute the loan-weighted rating for each firm-year, as the deals vary on rating. The coverage of the issuer rating is the highest for S&P, followed by Moody's and Fitch.

[11]The control variables for the lead arranger banks are taken from the Orbis Bank Focus (OBF) database by matching the *ISIN* of the lead banks. Where there are multiple lead arrangers for a syndicated deal, the control variables are averaged across the banks. We are able to obtain the control variables for 1,652 unique lead arranger banks, representing about 55% of the LPC sample, due to data availability issues. The final sample with bank-level controls consists of 4,925 firm-year-bank observations across 44 countries for 1,430 unique firms.

post-Basel II period as obtained for the baseline sample and the LPC sample without the bank-level controls.

The analysis of the baseline sample along with that of the LPC sample suggest that lower-rated firms faced a negative shock in their debt funding in the post-Basel II period across countries.

4.1.3 Lags and leads in effects of regulations

It is possible that banks may have taken into account the future implications of rating contingent Basel regulations in the years prior to the official implementation date, especially in the case of long-term loans. For instance, the exposure to lower-rated firms could have been restricted in the pre-Basel period itself to adjust in advance to the anticipated changes in the capital charges.

To account for the lagged effects of the Basel II implementation, we re-estimate the baseline results with $Basel\_Dum$ set in years prior to the actual year of implementation (t-1, t-2 and t-3). The impact on incremental debt to assets, shown in Table 5, indicate that there is a significant effect of the anticipated Basel implementation in the prior years. For example, the sensitivity to credit ratings increases by about 31% in three years prior to the actual Basel implementation time period. The corresponding increase in the year immediately prior to Basel implementation (t-1) is 37%. We also account for the delay in the response of the banks, if any, to the regulations in an analogous approach. As could be expected, the change in the sensitivity is insignificant for the lead years, except for year t+1.

Overall, the results suggests an 'inverted-U' shaped trend in the sensitivity of debt funding to rating in the years around the implementation time as given in Figure 2. This 'inverted-U' pattern is likely to be driven by the nature of the banks' response to risk-sensitive regulations over time. In the initial years, banks may attempt to reduce their risk exposure as a response to the increased capital, resulting in higher sensitivity in the earlier years. In later years, as the banks accumulate sufficient capital buffer, the risk appetite of the banks could increase, leading to a decline in the sensitivity. The

inverted 'U-pattern' also corroborates with the arguments of Calem and Rob (1999) and Diamond and Rajan (2000) that banks in the short-run would attempt to reduce the risk of the asset portfolio and followed by an increase in the portfolio risk as it builds up the requisite capital buffers.

4.1.4 Impact on interest cost of debt

While we observe reduced debt growth in the post-Basel II period for lower-rated firms, it is possible that banks also upwardly adjust the interest rate for lending to such firms. While the interest rates fell across countries largely on account of the global financial crisis in the post-Basel II period, we examine the cross-sectional variation in the extent of interest rate declines for firms in different risk categories.

The results of the estimation (Equation 2) given in Table 6 suggest that the higher-rated firms have received relatively lower loan pricing in the post-Basel II period. The significant and negative value of the coefficient of the rating sensitivity ($Basel\_Dum \times Rating_{t-1}$) (see columns (1) Table 6)) suggests an increase of about 27% in the sensitivity of interest rates to credit rating in the post-Basel II period. The increase implies that banks started to impose higher interest rates on lower-rated firms to adjust for the incremental capital that needed to be set aside, as per the new Basel regulations. The increase in interest costs for lower-rated firms observed here is robust to additional controls to capture the changes in the borrowing cost that could have been brought about by the global financial crisis of 2008-09 (column (3)). The results in columns (2) and (4) suggest that on average lower-rated firms as a group faced a relatively higher cost of debt. The cost is higher by about 46.5 bps ($Basel\_Dum \times HCC\_Dum$), in the period following rating-contingent regulation as compared to the remaining firms.[12] The findings on the estimation of the interest rate sensitivity to credit ratings (Equation 2) support Hypothesis 2 presented in section 2.1.

Analogous to the estimation of the impact of Basel II on the credit supply, we re-

[12] While we observe that the interest rates have declined on average for all the sample firms in the post-Basel II period, the decline is greater for higher-rated firms, as compared to lower-rated firms (Table 2).

estimate Equation 2 with the LPC sample. The estimation helps us reliably examine the impact of risk-sensitive regulations on interest cost of firms which have borrowed from banks. The results shown in columns (5) and (6) supports the findings reported for the baseline sample. The increase in the sensitivity of interest cost to credit ratings is close to 35% for the LPC matched sample of firms, slightly higher than the 27% for the baseline sample. The lower-rated firms in the LPC matched sample have an incremental interest cost of 56 bps relative to the higher-rated counterparts in the post-Basel II period.

4.2 Firm-level responses to changes in bank lending behaviour

As the analysis in section 4.1 suggests a sharp decline in the credit supply to the less creditworthy firms as an outcome of the Basel II implementation, we examine whether firms substituted the fall in bank credit with alternatives, such as trade credit and internal funds. We also examine the spillover effects of the fall in credit supply on the investment intensity of firms, especially for the less creditworthy firms.

4.2.1 Spillover effects on trade credit

We examine the impact of Basel II implementation on trade credit by estimating the extent to which credit rating, the key determinant of bank capital requirements, determine the reliance of a firm on trade credit. If the Basel II implementation has adversely impacted the flow of bank credit to lower-rated firms, we would expect an increase in their dependence on trade credit relative to their higher-rated counterparts. Alternatively, if the Basel II implementation has favoured higher-rated firms, they would have lower dependence on trade credit in the post-Basel II period. Our main results based on the estimation of Equation 3 presented in Table 7 are as follows.

First, higher-rated firms show a lower degree of reliance on the supplier's credit after the implementation of Basel II, relative to lower-rated firms. It suggests that the relatively easier access to bank credit available to higher-rated firms, allow them to lower their reliance on the expensive trade credit.[13] Whereas in the pre-Basel II period, the difference

[13]Based on a survey of 2,538 credit managers in the U.S, Ng et al. (1999) documents an effective interest rate of 43.9% to the borrower of supplier credit.

in the reliance on accounts payable, estimated as a percent of assets, is insignificant, the difference has increased by 10 basis points in the post-Basel period (indicated by the coefficient of $Basel\_Dum \times Rating_{t-1}$ in column (1) of Table 7). A one standard deviation decline in a firm's credit rating in the post-Basel II period translates into a 34 bps higher accounts payables (equivalent to 5% of the accounts payable of the median firm). As it has been documented that the accounts payables tend to increase during crisis periods (Casey & O'Toole, 2014), we control for the effects of the GFC in the estimation. The results given in column (3) of Table 7 suggest an overall increase in accounts payables during the the crisis period as argued in the literature. However, the lower reliance on accounts payable by higher-rated firms remains true even after accounting for the possible rise in accounts payables during the financial crisis. We also observe that firms in the lowest tercile of the rating distribution has significantly increased their payables by 99 bps compared to firms with higher ratings (column (2) in Table 7). The increase in the influence of credit rating on the level of payables tapped by a firm in the post-Basel II period is higher for the services sector (column (7)) compared to that of the manufacturing sector (column (4)).

Second, we find that accounts receivables have been impacted by the implementation of Basel II in a manner which is complementary to the results observed for accounts payables. We observe an increase in accounts receivables in the post-Basel II period, primarily for higher-rated firms. In the estimation of the sensitivity of credit rating to receivables (coefficient of $Basel\_Dum \times Rating_{t-1}$ in column (1) of Table 8), we find that the influence of credit ratings is positive and significant in the post-Basel II period. The increased sensitivity of ratings to receivables prevails even after controlling for the possible impact of the GFC. These results suggest that higher-rated firms offer higher amount of credit to their customers in the post-Basel II period. Most likely, the relatively greater demand for credit from their customers combined with their improved access to bank credit led to a greater flow of trade credit from these firms to their customers. Notably we observe that lower-rated firms which face the unfavourable impact of the Basel II implementation do not lower their accounts receivables. The stickiness of accounts

receivables could be the outcome of the competition in the product markets. The observed increase in the influence of credit ratings on the supply of trade credit is driven mainly by the services sector firms (columns (7)-(9)).

In summary, we observe that as an outcome of changes in risk-sensitive bank credit supply, the higher rated firms reduce their reliance on trade credit, but at the same time, extend greater trade credit to cater to the needs of their customers. The lower-rated firms which are adversely impacted by the banking regulations, on the other hand, depend more on trade credit as indicated by their greater reliance on accounts payables. These findings on the impact of Basel II implementation on trade credit support our Hypothesis 3.

4.2.2 Does bank capital structure changes affect payout policy of firms?

We examine the possible changes in the level of payout by firms to their shareholders in the post-Basel II period by estimating Equation 4. We calculate payouts from the total payout ratio than the dividend payout ratio, as the former is more relevant on account of the prevalence of share repurchases (Skinner, 2008). The results of the estimations are given in Table 9.

Our key result is that the impact of ratings on firms' payouts have significantly increased in the post-Basel II period. In other words, the payout to shareholders has become more sensitive to the credit ratings of firms in the post-Basel II period. The coefficient of the interaction term, $Basel\_Dum \times Rating$ (see column (4)), which indicates the sensitivity of payout to credit ratings, has increased by about 17% in the post-Basel II period. Given the observed decline in the average payout of lower-rated firms in the post-Basel II period (see Table 2), we can infer that the results are driven by the decline in the payout by lower-rated firms. Possibly, lower-rated firms attempt to compensate for the lower supply of bank credit by lowering their payout to shareholders. We also estimate payouts using the dividend payout ratio. The corresponding results for the increase in sensitivity of ratings, about 55% (see column (1)), is much higher than that for dividend payouts, and the difference between the dividend payouts of the lower-rated firms relative to higher-rated firms (see column (2)) is about 8.8%. Our findings on the

decline in payouts by the lower-rated firms following Basel II implementation are in line with the literature on the adverse impact of financial shocks on the payout of firms. For instance, Bliss et al. (2015) reported that during the 2008 financial crisis, firms increased their cash holdings to mitigate the heightened uncertainties in the environment through lower payouts. Our results indicate an incremental adverse impact of the Basel II implementation after controlling for the impact of financial crisis on payout policy (columns (3) and (6)).

Overall the results suggest that firms faced with a restricted supply or higher cost of credit attempt to maintain liquidity and investments by tapping greater amount of internal capital through lower payouts. The increased use of trade credit, reported in (section 4.2.1)in the paper, along with the lower payouts, appear to help the lower-rated firms to mitigate the adverse distributional consequences of Basel II regulations.

4.2.3 Spillover effects on Investment Intensity

In this section, we examine whether the decline in the credit availability for the relatively low rated firms adversely impacts the investment activity of these firms.

In line with the univariate comparison of the lower- and higher-rated firms, the results of the estimation based on Equation 5 shown in Table 10 provide evidence that the decline in the credit flow to lower-rated firms, on account of the changes in the banking regulation have had an adverse impact on the investment intensity of these firms. Both the sign and magnitude of the coefficient of the interaction term between credit ratings and Basel dummy ($Basel\_Dum \times Rating$ in column (1)) indicate a relative decline in the capital spending of lower-rated firms due to the risk-sensitive regulations. The extent to which the credit ratings influence capital investments of firms has increased by about 31% in the post-Basel II period. Analogous to the approach adopted for identifying the other dimensions of the impact, we employ an HCC_Dum investigate whether lower-rated firms were impacted more as a group. The results indicate that firms with lower ratings reduced their capital investments by about 1.68 percent points in the period following Basel II period, relative to their higher-rated counterparts. When viewed in conjunction

with the decline in the investment intensity of the lower-rated firms in the post-Basel II period (see Table 2) we can infer that the increase in sensitivity observed here (column (1)) is driven by the decline in the investment intensity of lower-rated firms. The findings of the estimations support the hypothesis 5 and is consistent with the anecdotal evidence (see section 1) that firms with difficulty in accessing bank debt have either delayed or cancelled investments.

As we find that the risk-sensitive regulations have an impact on the availability of credit through the ratings channel, we next attempt to examine the sensitivity of investment to changes in credit supply in the post-Basel II period. We employ a two-stage least square (2SLS) estimation, where we consider the contemporaneous $\Delta Debt\_asset$, as the endogenous regressor that affect $Capex\_intensity$. A similar approach was adopted by Cingano et al. (2016) to estimate the sensitivity of investment to credit supply on account of the inter-bank market crisis in Italy. In the first stage regression, we instrument the change in debt issuance with the lagged credit ratings.[14] The results of the second stage regressions are presented in Table 10.

We find that the sensitivity of investment intensity to $\Delta Debt\_asset$ is 0.57 (column (5)). In other words, for a one dollar increase in the credit supply, the firm's investments would increase by about 20 cents (0.57×0.36).[15]. We repeat the 2SLS estimation for the LPC sample with $Loan\_assets$ as the endogenous regressor and lagged credit rating as the instrument. The results shown in column (6) indicates that the sensitivity of investment intensity to $Loan\_assets$ is 0.91, which corresponds to an investment expenditure of 33 cents to a dollar of loan supply.

The economic impact of change in credit supply on capital investment is somewhat close to the results obtained by Cingano et al. (2016) for Italian firms. We estimate the impact of rating contingent regulations on capital investments by combining the impact

[14]We assume that the lagged credit rating would qualify as an instrument. As the literature has documented that credit ratings affects investments through the credit supply channel, it is expected to be correlated with $\Delta Debt\_asset$. We find the same in the first stage regression. The assumption that instrument affects $Capex\_intensity$ only through the change in $\Delta Debt\_asset$ would largely hold true in the case of credit ratings. We mitigate the issue of the endogeneity of credit ratings and $Capex\_intensity$ employing the lagged credit ratings.

[15]The average ratio of fixed assets to total assets for the estimation sample is 0.36.

of the credit supply on capital investments with the results of the baseline estimation, where we find that a one notch drop in rating is associated with 0.3 percentage point decline in the $\Delta Debt\_asset$ on account of the Basel II implementation. For the average firm in the sample, with an asset size of $4.7 billion, the results suggest a drop of $14.1 million in the credit supply when the rating declines by a notch. This translates into a $2.82 million reduction in capital expenditure, given the estimated impact of credit supply on investments for the average firm. The overall results supports the argument that the risk-sensitive bank capital regulations could adversely affect investment and growth in the real sector (Allen et al., 2012).

5 Robustness of the findings

We ensure robustness of our results with several additional tests.

5.1 Additional covariates

We examine robustness of the results by controlling for the sovereign ratings of the country, where the firm is headquartered, as the spillover effects of sovereign rating downgrades could affect the financing ability of firms (Almeida et al., 2017). The sovereign ratings issued by S&P for long-term debt securities, available since the year 2000, were collected from the Bloomberg database. The results of the estimations are shown in Table 11 columns (1)-(2). The baseline results presented in Table 3 are mostly unaffected by the additional control variable. Further, we re-estimate the baseline results with a country-level banking indicator, proxied by the ratio of bank capital to assets of the country. The indicator is calculated from the data available from the FRED database. The country-level bank capital ratio controls for the overall risk-taking ability of banks (see estimations in columns (3)-(4)). The baseline results on the impact of Basel II regulations on lending behaviour remain intact after including this indicator. We observe that the net debt issuance by firms in countries with higher bank capital to assets is significantly higher, which is in line with the expectation that a well-capitalized banking system would be

able to take on higher risk as compared to an under-capitalized one. In unreported results, we re-estimate Equation 1 with $Industry - year$ and $Country - year$ interactions as additional controls. These controls would account for any industry-specific demand fluctuations overall time and also address country-specific fluctuations in the overall net credit demand by firms. The results are consistent with the findings reported in Table 3.

5.2 Controlling for the effect of banking crises

Bank lending behaviour is expected to change significantly during periods of banking crises. We have only accounted for the 2008-09 global financial crisis in our main analysis. Here, we take into account the impact of a range of banking crises by controlling for the effects of all the documented banking crises during the sample period.

Banking crises are identified by a country-specific dummy variable ($Bank\_Crisis$), which takes the value 1 for the years in which there was a banking crisis, as per the Laeven and Valencia (2013) database on systemic banking crises and 0 otherwise. We limit the estimation sample to the period between 1995 and 2011 as the database on banking crises is available only until 2011. The truncated sample also serves to isolate the impact of the risk-sensitive regulations that are part of Basel II regulations from the possible impact of the implementation of Basel III norms that were agreed by the BCBS member countries in 2011. The results of the estimations after controlling for banking crises (Table 12) are consistent with the findings reported earlier on the post-Basel II increase in the impact of credit ratings on debt issuance and interest cost.

5.3 Is the impact on debt financing driven by US?

Since U.S. firms account for 61% of our baseline sample, it is possible that the effects discussed earlier are driven only by the US firms and the impact is not a pervasive phenomenon. Additionally,, the capital requirements in the U.S. have been extended to other financial institutions under the Dodd-Frank Act. In order to verify whether our results hold for non-US firms, we exclude U.S. firms and re-estimate our main baseline model related to credit supply (Table 13 columns (1)-(3)) and interest cost (columns (4)-

(6)). The sensitivity of debt issuance and interest costs to credit ratings for the non-U.S. sample is consistent with our baseline results.

5.4 Exclusion of speculative grade firms

As the nature of risk and monitoring required for speculative-grade firms is different as compared to investment-grade firms, it is possible that our main results are influenced by the presence of such firms. Hence, we re-estimate our baseline model after excluding all speculative grade firms, which constitute roughly 45% of our baseline sample. The results shown in Table A5 are broadly consistent with our baseline results discussed in section 4. The increase in sensitivity in the post-Basel II period is lower for credit supply, but significantly higher for the interest cost of debt, for the subsample of speculative grade firms. A possible reason is that banks may be more willing to adjust their loan pricing based on credit risk than to adjust the quantity of credit for the investment-grade firms.

5.5 Are the effects driven by rating changes?

Is the shock to the supply of bank credit documented here affected by a decline in average rating? Both Hasan et al. (2015) and Almeida et al. (2017) show that the credit supply is sensitive to rating changes (downgrades or upgrades). It is possible that the increased sensitivity of debt issuance to credit ratings observed may be due decline in credit ratings in the post-Basel implementation period. The results of the analysis, which control for annual rating changes, is as observed in the baseline estimations (see Table 14).

5.6 Standardized vs. International Ratings Based (IRB) approaches

The credit risk assessment of a borrower could vary from the standardized approach when a bank employs the IRB approach, as the expected loss and the risk weights will be based on the historical loss distribution and the probability of default. In the analysis so far, we have not differentiated between the IRB approach and the standardized approach,

partly due to lack of publicly available information on IRB approach. Moreover, it is not possible to classify countries based on adoption of the two approaches as there is likely to be variation across banks in a country.[16] However, even if a bank chooses to implement the IRB approach, the ratings are still scrutinized under the Pillar II by a supervisory review process. Hence, the variation between the internal and external ratings is likely to be minimal, especially for firms that are close to the speculative grade. To the extent that internal risk assessments and the ratings assigned by external credit rating agencies are consistent, our main results, which use ratings a proxy for credit risk, are likely to hold for firms irrespective of whether banks lending to these firms follow an IRB or standardized approach.

6 Conclusion

Risk-sensitive capital regulations, implemented ever since Basel II accord, have impacted banks as well as borrowers in multiple ways. In this study, we examine the impact of changes in banking regulations on firms. In particular, we have attempted to quantify the impact on the distribution of credit flows and interest costs for the lower-rated firms. We also examined how firms have addressed the changes in the credit supply through alternative channels such as trade credit or internal funds secured from lower payouts. Finally, we examine how the changes in distribution of credit flow has impacted the capital investment intensity of firms in the post-Basel II period. We have employed a cross-country firm-level data that spans both advanced and developing economies over a 23-year period, which would help to identify the pervasiveness of the impact of the regulations.

The findings suggest that the influence of firm-level credit ratings on debt financing has substantially increased in the period following the implementation of the risk-sensitive

[16]For instance, a report tabled in the European parliament by the Economic and Monetary Affairs Committee indicates that the proportion of risk weighted capital originated by internal models ranges from 0% in Cyprus to 81.5% in Denmark; the weighted average proportion of such capital originated is 48.4% for the European Union countries.The detailed report published in November 2016 can be accessed from: http://www.europarl.europa.eu/RegData/etudes/IDAN/2016/587366/IPOL_IDA(2016)587366_EN.pdf.

Basel regulations. The result indicates that lower-rated firms face a more restricted access to debt financing during this period. We also find that the less creditworthy firms face a higher cost of debt in the post-Basel II period. These findings imply that the implementation of Basel II regulations had a significant cross-sectional impact on the credit supply.

We also find that lower-rated firms have started to rely more on internal sources of funding in the post-Basel II period. Lower-rated firms have decreased the payout to shareholders. At the same time, such firms have increased their reliance on trade credit from suppliers. The increased reliance on internal funds and trade credit suggests that firms have attempted to substitute the shock in the bank credit supply with alternatives sources of financing. Finally, we observe a spillover effect of the lower credit supply on the capital investments of firms. The sensitivity of capital investments to credit ratings has significantly increased in the post-Basel II period. Our main findings are robust to alternative estimation approaches and across various sub-samples.

The paper presents evidence consistent with the concerns that have been raised by various quarters on the impact of the changes in bank capital regulations on the real sector. While risk-sensitive bank capital regulations could help to achieve the desired objective of de-risking bank balance sheets, these regulations could adversely impact real-sector growth.

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Figure 1: **Risk weights under Basel I and Basel II - Corporate lending**
The figure portrays the risk weights applicable to banks for lending to firms with varying risk profiles (credit ratings) in the pre- and post-Basel II period. The horizontal bars indicate the risk weights in the post-Basel II period and the vertical line corresponds to the pre-Basel II risk weights. The changes shown in the figure corresponds to the standardized approach to credit risk under Basel II.

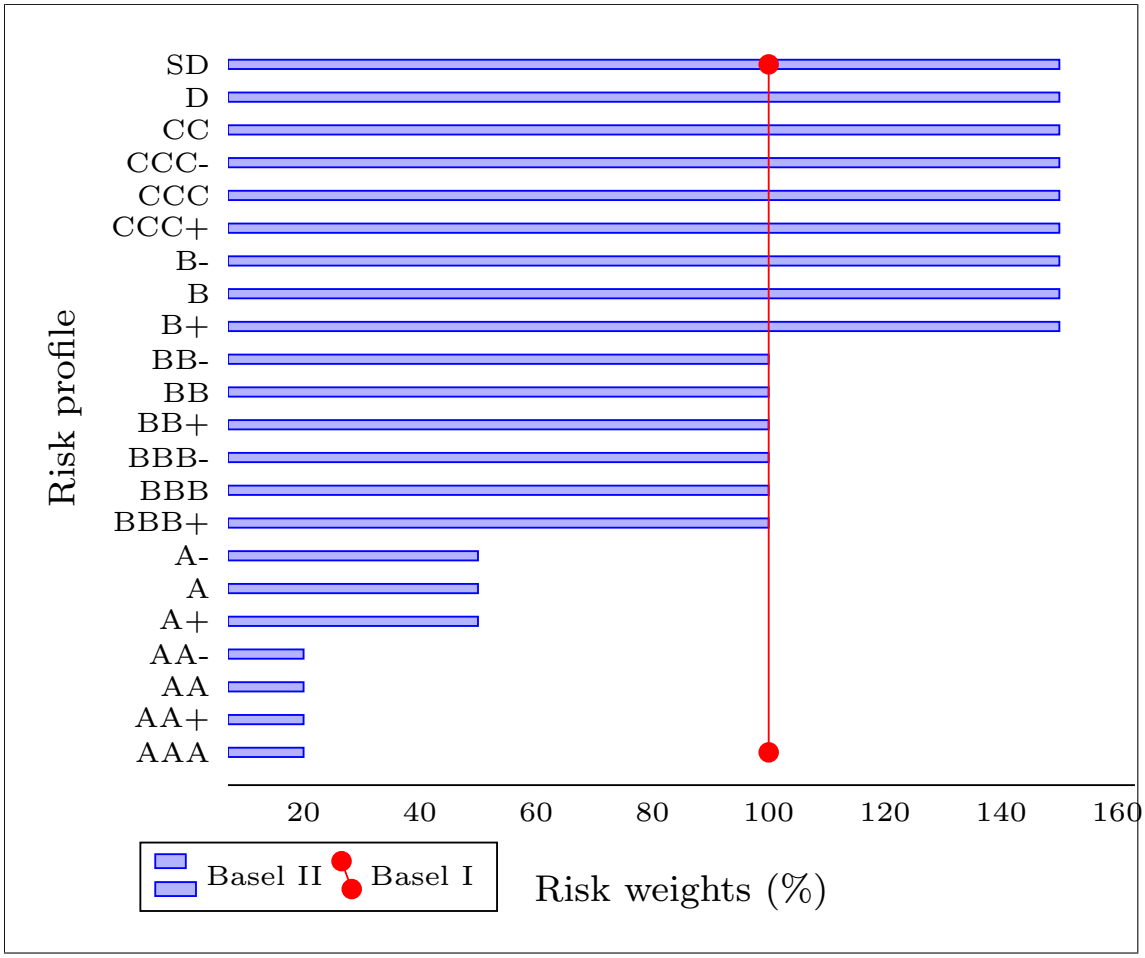

Figure 2: **Sensitivity change to Basel II implementation timelines**
The figure shows the sensitivity of credit growth ($\Delta Debt\_asset$) to credit risk ($Basel\_Dum \times Rating_{t-1}$) for different Basel II implementation timelines. The sensitivity values in the figure are taken from the estimation results shown in Table 5.

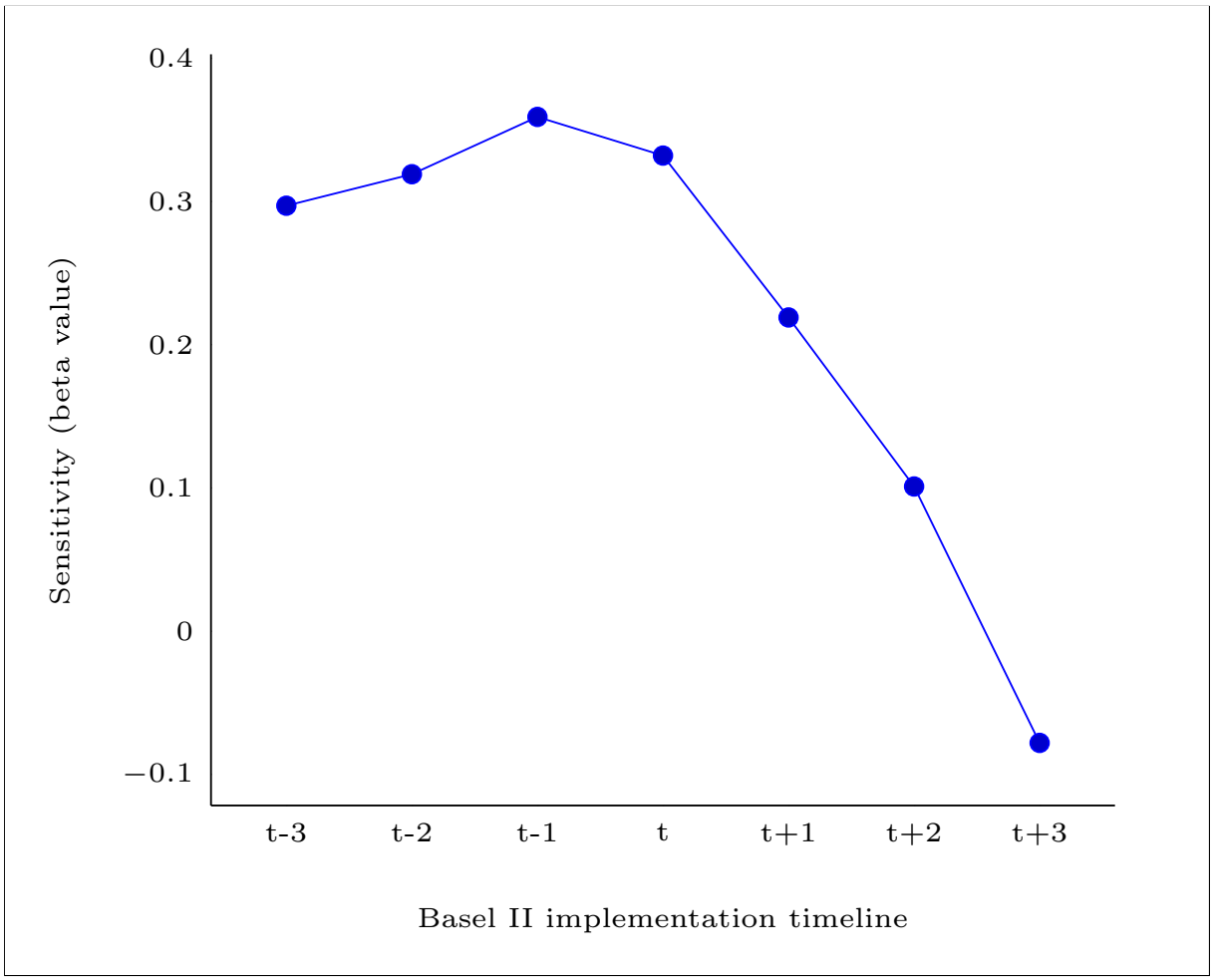

Table 1: **Summary Statistics**

All the variables are shown in percent. The definition of each of the variables is given in Table A2.

Variable	Obs.	Mean	Std. Dev.	Median	Min	Max	P10	P90
Firm-Level Variables								
Growth characteristics								
Sales_growth	25,524	7.45	19.86	5.86	-56.12	87.70	-10.99	28.48
M/B	25,524	2.94	3.19	2.01	0.00	20.40	0.86	5.45
Size characteristic								
Log_Sales	25,524	15.11	1.51	15.07	11.11	18.53	13.19	17.13
Log_Asset	25,524	15.47	1.47	15.37	12.20	20.36	13.60	17.44
Cashflow characteristics								
Op.CF_fixedassets	25,503	60.88	153.59	27.60	-114.41	1869.82	8.15	112.50
Cash_asset	25,428	8.89	9.13	6.05	0.03	50.62	0.79	20.78
Op.CF_assets	25,524	9.76	5.89	9.03	-6.63	29.14	3.50	17.31
Profitability								
EBITDA_assets	25,524	8.31	6.19	7.60	-9.66	28.74	1.84	16.09
Gross_margin	25,401	32.30	18.16	29.59	-3.35	92.45	11.12	57.14
Earnings_volatility	25,524	2.81	2.58	2.02	0.06	15.16	0.65	5.88
Financing								
Δ*Debt_asset*	25,524	3.20	12.19	0.38	-21.97	80.31	-5.93	13.60
Interest_cost	25,430	6.30	3.20	5.99	0.12	25.80	2.71	9.83
Loan_assets	8,905	13.11	16.13	8.28	0.00	366.56	1.69	29.82
AccPay_asset	25,018	8.18	6.78	6.46	0.33	36.73	1.78	16.80
AccRec_sales	24,847	16.61	11.48	14.92	0.83	82.24	5.32	27.62
Leverage (times)	25,524	1.02	0.62	0.92	0.19	14.97	0.53	1.55
Payout								
Total_payout	22,851	74.75	114.13	46.28	0.00	2440.10	0.00	156.46
Divident_payout	23,392	42.06	72.23	24.40	0.00	546.50	0.00	87.89
Investment								
Capex_intensity	25,417	20.37	16.79	16.42	0.00	143.98	6.48	37.24
Tangibility	25,524	38.11	24.92	33.91	0.07	93.88	7.69	74.94
Country-Level Variables								
Pvtcredit_GDP	25,524	192.65	61.53	201.26	-12.75	363.25	104.87	247.46
GDP_growth	25,524	2.42	2.27	2.46	-21.54	25.56	0.00	4.49
Ln_percapitaGDP	25,524	10.44	0.66	10.61	6.01	11.69	9.88	10.91
Global Variables								
VIX_index	25,524	20.19	5.98	17.80	12.39	32.69	12.80	27.29
Fed_funds_rate	25,524	2.25	2.21	1.35	0.09	6.24	0.10	5.35

Table 2: **Summary of Dependent variables - Pre- & Post-Basel II periods**

All the variables in column (1) are defined in Table A2. Post-Basel II (Pre-Basel II) refers to the period after (before) the implementation of Basel II regulations in the country of domicile of a firm. High rating (low rating) refers to the firms with a rating higher than or equal to (lower than) BB- that invites lower (higher) capital charge for banks. Each cell value is the average of the respective variable for the sub-periods and subsample indicated in the table.

Variables	Period	Overall Sample			Non-US firms			US firms		
		High Rating	Low Rating	All Firms	High Rating	Low Rating	All Firms	High Rating	Low Rating	All Firms
$\Delta Debt\_asset$	Pre-Basel II	3.19	4.07	3.31	2.11	3.53	2.27	3.71	4.25	3.80
	Post-Basel II	3.07	3.11	3.08	2.82	3.59	2.91	3.30	2.86	3.21
	Total	3.13	3.58	3.20	2.52	3.57	2.64	3.54	3.59	3.55
$Positive\_Debt\_Issuance$	Pre-Basel II	9.59	13.9	10.18	8.21	12.85	8.76	10.21	14.27	10.8
	Post-Basel II	7.69	10.38	8.08	7.32	9.86	7.62	8.03	10.68	8.49
	Total	8.64	12.08	9.13	7.67	11.03	8.06	9.28	12.57	9.8
$Interest\_cost$	Pre-Basel II	6.64	9.29	7.02	6.08	10.09	6.54	6.92	9.02	7.25
	Post-Basel II	5.07	7.91	5.52	4.88	8.30	5.28	5.24	7.71	5.72
	Total	5.89	8.59	6.30	5.40	9.06	5.82	6.22	8.39	6.60
$Total\_payout$	Pre-Basel II	60.00	19.84	54.21	52.90	25.10	49.75	63.48	18.09	56.28
	Post-Basel II	68.44	17.92	60.36	61.50	19.16	56.55	74.87	17.29	63.58
	Total	64.02	18.87	57.17	57.82	21.65	53.64	68.19	17.71	59.38
$Capex\_intensity$	Pre-Basel II	20.37	23.69	20.85	18.61	16.91	18.42	21.23	25.95	21.97
	Post-Basel II	19.89	19.70	19.86	19.90	17.97	19.67	19.88	20.56	20.01
	Total	20.14	21.67	20.37	19.35	17.52	19.14	20.67	23.38	21.14
$AccPay\_Asset$	Pre-Basel II	8.63	7.57	8.48	9.45	8.26	9.32	8.23	7.34	8.09
	Post-Basel II	7.96	7.61	7.90	8.88	9.38	8.94	7.12	6.73	7.04
	Total	8.31	7.59	8.20	9.13	8.91	9.10	7.77	7.05	7.64
$AccRec\_Sales$	Pre-Basel II	16.38	15.62	16.27	19.40	20.04	19.47	14.86	14.10	14.74
	Post-Basel II	17.51	17.19	17.46	20.55	24.29	20.99	14.66	13.54	14.44
	Total	16.92	16.42	16.84	20.05	22.49	20.34	14.78	13.83	14.62

Table 3: **Effect of risk-sensitive regulations on Debt funding**

The dependent variable in the estimations is the incremental debt in the year t scaled by prior period total assets of the firm in percent. Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. *HCC_Dum* takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. *Crisis_Dum* takes value of 1 for the years 2008 and 2009, and 0 for all other years. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels.

	(1)	(2)	(3)	(4)
$Rating_{t-1}$	0.872***	1.032***	0.859***	1.043***
	(0.096)	(0.096)	(0.096)	(0.096)
$Basel\_Dum$	-2.302**	1.853***	-2.215**	1.624***
	(0.968)	(0.512)	(0.970)	(0.512)
$Basel\_Dum \times Rating_{t-1}$	0.300***		0.272***	
	(0.063)		(0.064)	
HCC_Dum		1.052		1.444**
		(0.642)		(0.647)
$HCC\_Dum \times Basel\_Dum$		-1.335**		-1.297**
		(0.627)		(0.623)
$HCC\_Dum \times Crisis\_Dum$				-3.198***
				(0.699)
$Crisis\_Dum$			-12.688	-7.88
			(11.994)	(11.908)
$Crisis\_Dum \times Rating_{t-1}$			0.271***	
			(0.070)	
$Sales\_growth_{t-1}$	0.006	0.007	0.006	0.007
	(0.006)	(0.006)	(0.006)	(0.006)
Log_Sales_{t-1}	-6.246***	-6.273***	-6.238***	-6.281***
	(0.419)	(0.423)	(0.419)	(0.422)
$Leverage_{t-1}$	-1.118***	-1.131***	-1.130***	-1.132***
	(0.276)	(0.280)	(0.275)	(0.279)
$Op.CF\_assets_{t-1}$	21.461***	21.199***	21.463***	21.271***
	(4.098)	(4.085)	(4.099)	(4.089)
M/B_{t-1}	0.156**	0.151**	0.156**	0.147**
	(0.061)	(0.061)	(0.061)	(0.061)
$Tangibility_{t-1}$	2.362	2.104	2.396	2.159
	(1.503)	(1.507)	(1.505)	(1.508)
$EBITDA\_assets_{t-1}$	27.460***	27.728***	27.290***	27.534***
	(3.786)	(3.787)	(3.794)	(3.792)
$Pvtcredit\_GDP_{t-1}$	0.007	0.01	0.008	0.009
	(0.007)	(0.007)	(0.007)	(0.007)
GDP_growth_{t-1}	0.003	0.028	0.007	0.025
	(0.074)	(0.073)	(0.073)	(0.073)
$Log\_percapitaGDP_{t-1}$	6.543***	6.338***	6.499***	6.304***
	(0.867)	(0.863)	(0.866)	(0.859)
VIX_index_{t-1}	0.386	0.359	0.366	0.329
	(0.675)	(0.675)	(0.675)	(0.674)
$Fed\_funds\_rate_{t-1}$	0.521	0.447	0.461	0.37
	(0.552)	(0.553)	(0.551)	(0.550)
Firm years	25524	25524	25524	25524
Fixed Effects	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.086	0.085	0.086	0.086

Table 4: **Effect of risk-sensitive regulations on Loans**

The dependent variable in the estimations is the total loans in year t(aggregate tranche amount in U.S. dollars) scaled by assets at the beginning of the year t. Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. *HCC_Dum* takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. *Collateral* takes value of 1 if the loan is a secured loan and 0 if it is an unsecured facility. *Crisis_Dum* takes value of 1 for the years 2008 and 2009, and 0 for all other years. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels. We do not present the firm-specific, country-specific and global control variables for brevity. The definitions of the variables are shown in Table A2.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Avg_Rating_t	-0.309	-0.378*	-0.321	-0.382*	-0.342*	-0.335	-0.346*	-0.337
	(0.201)	(0.213)	(0.202)	(0.213)	(0.205)	(0.217)	(0.205)	(0.217)
$Basel\_Dum$	-3.098	0.881	-2.748	0.707	-3.395	0.921	-3.51	0.639
	(2.253)	(1.185)	(2.253)	(1.190)	(2.858)	(1.293)	(2.855)	(1.328)
$Basel\_Dum \times Avg\_Rating_t$	0.272**		0.227*		0.290*		0.285*	
	(0.136)		(0.137)		(0.166)		(0.166)	
HCC_Dum		-1.025		-0.925		-0.295		-0.124
		(1.113)		(1.117)		(1.670)		(1.684)
$HCC\_Dum \times Basel\_Dum$		-2.474*		-2.109		-2.509		-2.601
		(1.481)		(1.481)		(1.641)		(1.647)
$Crisis\_Dum$			-25.106	-19.282			-28.251	-25.406
			(20.968)	(20.746)			(22.845)	(22.527)
$Crisis\_Dum \times Avg\_Rating_t$			0.409**				0.165	
			(0.201)				(0.219)	
$HCC\_Dum \times Crisis\_Dum$				-3.558*				-3.903
				(1.870)				(2.891)
$Collateral$	0.337	0.387	0.369	0.38	1.18	1.204*	1.192	1.199*
	(0.628)	(0.621)	(0.624)	(0.621)	(0.725)	(0.723)	(0.725)	(0.723)
$Equity\_assets_{t-1}$					-0.039	-0.023	-0.036	-0.024
					(0.136)	(0.135)	(0.136)	(0.135)
LLR_loans_{t-1}					0.169	0.122	0.168	0.128
					(0.403)	(0.406)	(0.403)	(0.406)
$Net\_interest\_margin_{t-1}$					0.021	0.017	0.025	0.018
					(0.391)	(0.395)	(0.392)	(0.395)
$Cost\_income_{t-1}$					-0.039**	-0.036*	-0.039**	-0.036*
					(0.019)	(0.019)	(0.019)	(0.019)
$Constant$	68.144**	71.313***	68.161**	72.249***	44.646	46.464	44.072	46.896
	(27.378)	(27.473)	(27.401)	(27.495)	(29.832)	(29.896)	(29.862)	(29.893)
$Firm\ years$	8905	8905	8905	8905	4925	4925	4925	4925
$Fixed\ Effects$	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.121	0.121	0.121	0.122	0.106	0.106	0.106	0.107

Table 5: **Change in risk preferences**

The dependent variable in the estimations is the incremental debt in the year t scaled by prior period total assets of the firm in percent. Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. *HCC_Dum* takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels.

	t-3	t-2	t-1	t	t+1	t+2	t+3
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Rating_{t-1}$	0.956***	0.963***	0.970***	0.999***	1.052***	1.098***	1.139***
	(0.119)	(0.116)	(0.114)	(0.112)	(0.110)	(0.109)	(0.110)
$Basel\_Dum$	-3.889***	-4.075***	-5.402***	-2.788***	-0.285	-0.285	1.54
	(1.121)	(1.101)	(1.115)	(1.075)	(1.057)	(1.124)	(1.250)
$Basel\_Dum \times Rating_{t-1}$	0.297***	0.319***	0.359***	0.332***	0.219***	0.101	-0.078
	(0.072)	(0.071)	(0.071)	(0.070)	(0.068)	(0.072)	(0.077)
$Sales\_growth_{t-1}$	0.001	0.000	0.000	0.000	0.001	0.001	-0.003
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Log_Sales_{t-1}	-6.345***	-6.362***	-6.439***	-6.374***	-6.376***	-6.416***	-6.064***
	(0.529)	(0.532)	(0.535)	(0.530)	(0.531)	(0.534)	(0.532)
$Leverage_{t-1}$	-1.322***	-1.302***	-1.285***	-1.307***	-1.299***	-1.297***	-1.252***
	(0.322)	(0.321)	(0.320)	(0.320)	(0.320)	(0.325)	(0.318)
$Op.CF\_assets_{t-1}$	21.947***	22.061***	22.495***	22.033***	21.984***	21.807***	20.279***
	(4.796)	(4.814)	(4.799)	(4.775)	(4.783)	(4.780)	(4.816)
M/B_{t-1}	0.227***	0.224***	0.222***	0.220***	0.213***	0.211***	0.237***
	(0.081)	(0.081)	(0.081)	(0.080)	(0.080)	(0.080)	(0.081)
$Tangibility_{t-1}$	2.913	2.91	2.942	3.160*	2.956	2.696	2.787
	(1.833)	(1.837)	(1.844)	(1.830)	(1.825)	(1.833)	(1.870)
$EBITDA\_assets_{t-1}$	27.439***	27.715***	27.108***	27.332***	27.539***	27.807***	28.128***
	(4.521)	(4.550)	(4.537)	(4.507)	(4.527)	(4.528)	(4.534)
$Pvtcredit\_GDP_{t-1}$	0.001	0.001	-0.001	0.004	-0.004	-0.002	-0.001
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
GDP_growth_{t-1}	-0.092	-0.098	-0.121	-0.131	-0.152*	-0.094	-0.086
	(0.091)	(0.091)	(0.092)	(0.092)	(0.092)	(0.091)	(0.089)
$Log\_percapitaGDP_{t-1}$	6.761***	6.828***	6.890***	6.777***	6.320***	6.473***	5.681***
	(0.984)	(0.996)	(0.996)	(0.981)	(0.969)	(0.975)	(0.981)
VIX_index_{t-1}	-0.117	-0.118	-0.118	-0.109	-0.11	-0.12	-0.124
	(0.111)	(0.111)	(0.111)	(0.111)	(0.111)	(0.112)	(0.111)
$Fed\_funds\_rate_{t-1}$	-0.474**	-0.456*	-0.611**	-0.163	-0.177	-0.454**	-0.573***
	(0.239)	(0.236)	(0.239)	(0.250)	(0.230)	(0.225)	(0.220)
$Constant$	14.28	13.662	15.329	11.447	16.732	16.501	19.205*
	(10.983)	(11.107)	(11.112)	(11.107)	(10.911)	(10.977)	(11.120)
$Firm\ years$	18945	18880	18878	18945	18945	18945	18466
$Fixed\ Effects$	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.092	0.093	0.094	0.093	0.093	0.092	0.089

Table 6: **Effect of risk-sensitive regulations on Interest cost**

The dependent variable is the total Interest expense in the year t scaled by the total debt in percentage terms. Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. *HCC_Dum* takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. *Crisis_Dum* takes value of 1 for the years 2008 and 2009, and 0 for all other years. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels.

	(1)	(2)	(3)	(4)	(5)	(6)
$Rating_{t-1}$	-0.272***	-0.275***	-0.273***	-0.276***	-0.322***	-0.342***
	(0.025)	(0.025)	(0.025)	(0.025)	(0.035)	(0.031)
$Basel\_Dum$	1.360***	0.336***	1.365***	0.342***	1.898***	0.247
	(0.285)	(0.127)	(0.286)	(0.127)	(0.510)	(0.217)
$Basel\_Dum \times Rating_{t-1}$	-0.073***		-0.074***		-0.115***	
	(0.020)		(0.020)		(0.035)	
HCC_Dum		0.126		0.115		0.141
		(0.152)		(0.153)		(0.247)
$HCC\_Dum \times Basel\_Dum$		0.465***		0.464***		0.564*
		(0.170)		(0.170)		(0.303)
$HCC\_Dum \times Crisis\_Dum$				0.085		
				(0.170)		
$Crisis\_Dum$			-10.433***	-10.338***		
			(1.677)	(1.644)		
$Crisis\_Dum \times Rating_{t-1}$			0.016			
			(0.017)			
$Sales\_growth_{t-1}$	-0.003***	-0.003***	-0.003***	-0.003***	-0.004**	-0.004**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Log_Sales_{t-1}	0.161**	0.172***	0.162**	0.173***	0.171*	0.198**
	(0.063)	(0.063)	(0.063)	(0.063)	(0.093)	(0.092)
$Leverage_{t-1}$	0.250***	0.245***	0.249***	0.245***	0.254*	0.245*
	(0.080)	(0.080)	(0.080)	(0.080)	(0.133)	(0.135)
$Op.CF\_assets_{t-1}$	-2.521***	-2.355***	-2.521***	-2.357***	-2.429*	-2.176
	(0.847)	(0.844)	(0.848)	(0.843)	(1.374)	(1.376)
M/B_{t-1}	-0.028***	-0.028***	-0.028***	-0.028***	-0.039**	-0.039**
	(0.010)	(0.010)	(0.010)	(0.010)	(0.016)	(0.016)
$Tangibility_{t-1}$	0.378	0.398	0.38	0.396	0.383	0.45
	(0.385)	(0.381)	(0.385)	(0.381)	(0.513)	(0.515)
$EBITDA\_assets_{t-1}$	-0.656	-0.684	-0.666	-0.679	-1.787	-1.995
	(0.798)	(0.794)	(0.798)	(0.792)	(1.371)	(1.370)
$Pvtcredit\_GDP_{t-1}$	0.001	0.001	0.001	0.001	0.005*	0.005*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
GDP_growth_{t-1}	-0.034**	-0.039**	-0.034**	-0.039**	-0.009	-0.017
	(0.016)	(0.016)	(0.016)	(0.016)	(0.026)	(0.026)
$Log\_percapitaGDP_{t-1}$	-0.577*	-0.523*	-0.580*	-0.522*	-0.986***	-0.979***
	(0.306)	(0.310)	(0.306)	(0.310)	(0.370)	(0.376)
VIX_index_{t-1}	0.602***	0.603***	0.601***	0.604***	0.544***	0.533***
	(0.092)	(0.092)	(0.092)	(0.092)	(0.176)	(0.177)
$Fed\_funds\_rate_{t-1}$	1.100***	1.112***	1.097***	1.114***	1.082***	1.084***
	(0.099)	(0.099)	(0.098)	(0.098)	(0.165)	(0.166)
$Constant$	1.429	0.728	1.492	0.696	6.17	6.123
	(3.746)	(3.778)	(3.743)	(3.773)	(5.365)	(5.425)
$Firm\ years$	25430	25430	25430	25430	8318	8318
$Fixed\ Effects$	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.147	0.147	0.147	0.147	0.197	0.194

Table 7: **Effect of risk-sensitive regulations on Trade Payables**

The dependent variable is the accounts payables scaled by assets in the year t. Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. *HCC_Dum* takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels. *Crisis_Dum* takes value of 1 for the years 2008 and 2009, and 0 for all other years.

	All Firms			Industrial Firms			Services Firms		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Rating_{t-1}$	-0.041	-0.093***	-0.044	-0.088*	-0.145***	-0.091*	0.036	-0.015	0.033
	(0.036)	(0.035)	(0.036)	(0.049)	(0.049)	(0.049)	(0.049)	(0.048)	(0.049)
Basel_Dum	1.185**	-0.226	1.204**	0.758	-0.306*	0.77	1.855*	-0.133	1.899*
	(0.482)	(0.162)	(0.483)	(0.497)	(0.161)	(0.497)	(0.961)	(0.299)	(0.972)
$Basel\_Dum \times Rating_{t-1}$	-0.096***		-0.101***	-0.074**		-0.078**	-0.132**		-0.141**
	(0.031)		(0.032)	(0.036)		(0.037)	(0.057)		(0.060)
HCC_Dum		-0.653***			-0.639**			-0.745**	
		(0.223)			(0.280)			(0.360)	
$HCC\_Dum \times Basel\_Dum$		0.991***			0.612*			1.661***	
		(0.284)			(0.334)			(0.506)	
Crisis_Dum			3.559*			7.299***			-2.366
			(1.920)			(2.229)			(3.394)
$Crisis\_Dum \times Rating_{t-1}$			0.054***			0.050**			0.065*
			(0.020)			(0.022)			(0.039)
Log_Sales_{t-1}	0.243*	0.244*	0.245*	0.262	0.26	0.267	0.358*	0.370*	0.355*
	(0.142)	(0.141)	(0.142)	(0.196)	(0.195)	(0.196)	(0.212)	(0.207)	(0.212)
$Market\_share_{t-1}$	-1.122	-1.098	-1.117	-1.998*	-1.947*	-1.996*	-0.091	-0.134	-0.079
	(0.785)	(0.777)	(0.785)	(1.114)	(1.110)	(1.114)	(1.026)	(0.998)	(1.030)
$Sales\_growth_{t-1}$	0.009***	0.009***	0.009***	0.008***	0.008***	0.008***	0.010***	0.010***	0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
$Cash\_asset_{t-1}$	-0.748	-0.74	-0.731	-1.586**	-1.554**	-1.569**	1.001	0.961	1.018
	(0.660)	(0.656)	(0.660)	(0.758)	(0.757)	(0.757)	(1.310)	(1.305)	(1.311)
$Gross\_margin_{t-1}$	-1.755***	-1.775***	-1.750***	-2.466***	-2.527***	-2.473***	-0.903*	-0.878*	-0.886*
	(0.385)	(0.386)	(0.385)	(0.643)	(0.645)	(0.643)	(0.462)	(0.459)	(0.460)
$Leverage_{t-1}$	0.568***	0.570***	0.567***	0.538***	0.546***	0.537***	0.604**	0.592**	0.599**
	(0.154)	(0.156)	(0.154)	(0.200)	(0.202)	(0.200)	(0.238)	(0.235)	(0.236)
M/B_{t-1}	0.099***	0.100***	0.099***	0.137***	0.139***	0.137***	0.031	0.029	0.03
	(0.017)	(0.017)	(0.017)	(0.023)	(0.023)	(0.023)	(0.025)	(0.025)	(0.025)
$Pvtcredit\_GDP_{t-1}$	-0.008***	-0.008***	-0.008***	-0.006*	-0.007*	-0.006*	-0.012**	-0.012**	-0.011**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)
GDP_growth_{t-1}	-0.014	-0.019	-0.013	0.015	0.009	0.015	-0.049	-0.051	-0.046
	(0.019)	(0.019)	(0.019)	(0.021)	(0.021)	(0.021)	(0.032)	(0.033)	(0.031)
$Log\_percapitaGDP_{t-1}$	1.205***	1.224***	1.198***	1.220**	1.243**	1.211**	0.938*	0.938*	0.935*
	(0.367)	(0.367)	(0.366)	(0.497)	(0.500)	(0.497)	(0.560)	(0.559)	(0.557)
VIX_index_{t-1}	-0.293***	-0.290***	-0.297***	-0.504***	-0.497***	-0.507***	0.04	0.016	0.034
	(0.102)	(0.102)	(0.102)	(0.124)	(0.124)	(0.124)	(0.175)	(0.175)	(0.174)
$Fed\_funds\_rate_{t-1}$	-0.03	-0.02	-0.042	-0.192	-0.176	-0.202	0.266	0.251	0.253
	(0.136)	(0.135)	(0.135)	(0.159)	(0.157)	(0.159)	(0.246)	(0.245)	(0.243)
Constant	-1.514	-0.931	-1.322	3.487	4.092	3.666	-9.395	-8.292	-9.185
	(5.038)	(4.991)	(5.016)	(6.621)	(6.619)	(6.607)	(7.886)	(7.699)	(7.825)
Firm years	24860	24860	24860	16189	16189	16189	8671	8671	8671
Fixed Effects	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.049	0.049	0.049	0.057	0.057	0.057	0.056	0.06	0.057

Table 8: **Effect of sensitive regulations on Trade Receivables**

The dependent variable is the accounts payables scaled by assets in the year t. Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. $Basel\_Dum$ is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. HCC_Dum takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. $Crisis\_Dum$ takes value of 1 for the years 2008 and 2009, and 0 for all other years. The dependent variable in the estimations is the incremental debt in the year t scaled by prior period total assets of the firm in percent. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels.

	All Firms			Industrial Firms			Services Firms		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Rating_{t-1}$	-0.016	0.047	-0.017	-0.009	0.031	-0.008	-0.042	0.049	-0.045
	(0.068)	(0.074)	(0.068)	(0.092)	(0.103)	(0.092)	(0.102)	(0.102)	(0.102)
$Basel\_Dum$	-0.468	1.033***	-0.463	-0.203	0.805*	-0.208	-1.021	1.265**	-0.988
	(0.889)	(0.350)	(0.893)	(1.199)	(0.472)	(1.202)	(1.191)	(0.492)	(1.203)
$Basel\_Dum \times Rating_{t-1}$	0.111*		0.109*	0.074		0.075	0.171**		0.164**
	(0.059)		(0.060)	(0.079)		(0.081)	(0.081)		(0.083)
HCC_Dum		0.376			0.261			0.333	
		(0.382)			(0.464)			(0.660)	
$HCC\_Dum \times Basel\_Dum$		-0.263			-0.243			-0.124	
		(0.438)			(0.563)			(0.660)	
$Crisis\_Dum$			9.236*			10.607			5.786
			(5.265)			(6.843)			(8.291)
$Crisis\_Dum \times Rating_{t-1}$			0.015			-0.016			0.05
			(0.050)			(0.054)			(0.094)
Log_Asset_{t-1}	0.076	0.105	0.076	-0.022	-0.002	-0.024	0.225	0.261	0.227
	(0.295)	(0.292)	(0.295)	(0.386)	(0.378)	(0.386)	(0.459)	(0.460)	(0.459)
$Market\_share_{t-1}$	-4.170**	-4.222**	-4.169**	-4.027**	-4.065**	-4.028**	-4.077	-4.156	-4.073
	(1.947)	(1.952)	(1.947)	(1.785)	(1.780)	(1.786)	(4.037)	(4.080)	(4.041)
$Sales\_growth_{t-1}$	-0.023***	-0.023***	-0.023***	-0.032***	-0.032***	-0.032***	-0.011**	-0.011**	-0.011**
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
$Cash\_asset_{t-1}$	-1.234	-1.257	-1.229	-1.789	-1.841	-1.795	-1.419	-1.245	-1.404
	(1.224)	(1.227)	(1.225)	(1.387)	(1.390)	(1.388)	(2.541)	(2.558)	(2.540)
$Gross\_margin_{t-1}$	1.790*	1.831*	1.791*	4.531**	4.587**	4.533**	0.607	0.596	0.621
	(1.085)	(1.090)	(1.086)	(2.072)	(2.089)	(2.072)	(1.002)	(1.002)	(1.001)
$Leverage_{t-1}$	-0.161	-0.17	-0.162	-0.222	-0.23	-0.221	0.013	0.013	0.01
	(0.206)	(0.208)	(0.206)	(0.274)	(0.279)	(0.274)	(0.313)	(0.311)	(0.311)
M/B_{t-1}	-0.009	-0.01	-0.009	-0.016	-0.017	-0.016	0.002	0	0.002
	(0.024)	(0.024)	(0.024)	(0.030)	(0.030)	(0.030)	(0.039)	(0.039)	(0.039)
$Pvtcredit\_GDP_{t-1}$	0.004	0.005	0.004	0.006	0.007	0.006	-0.002	0	-0.002
	(0.008)	(0.008)	(0.008)	(0.011)	(0.010)	(0.011)	(0.014)	(0.014)	(0.014)
GDP_growth_{t-1}	-0.039	-0.028	-0.038	-0.091	-0.085	-0.091	0.044	0.067	0.046
	(0.048)	(0.047)	(0.048)	(0.064)	(0.063)	(0.064)	(0.070)	(0.072)	(0.069)
$Log\_percapitaGDP_{t-1}$	-0.143	-0.255	-0.145	0.549	0.482	0.553	-0.932	-1.146	-0.937
	(0.815)	(0.817)	(0.815)	(1.067)	(1.062)	(1.068)	(1.268)	(1.287)	(1.266)
VIX_index_{t-1}	-0.606**	-0.616**	-0.607**	-0.655*	-0.659*	-0.654*	-0.45	-0.481	-0.454
	(0.294)	(0.295)	(0.294)	(0.382)	(0.382)	(0.382)	(0.464)	(0.464)	(0.464)
$Fed\_funds\_rate_{t-1}$	0.005	-0.021	0.002	-0.002	-0.019	0.001	0.09	0.046	0.081
	(0.356)	(0.358)	(0.357)	(0.485)	(0.488)	(0.486)	(0.496)	(0.498)	(0.498)
$Constant$	26.106**	25.906**	26.160**	19.972	19.768	19.9	31.435*	31.935*	31.556*
	(12.580)	(12.676)	(12.584)	(17.130)	(17.163)	(17.150)	(17.809)	(18.079)	(17.799)
$Firm\ years$	24925	24925	24925	16197	16197	16197	8728	8728	8728
$Fixed\ Effects$	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.02	0.019	0.02	0.025	0.025	0.025	0.026	0.024	0.026

Table 9: **Effect of risk-sensitive regulations on Payout Policy**

The dependent variable in columns (1)-(3) is the dividend payout (%) in the year t and in columns (4)-(6) is the total payout ratio (including repurchases) for the year t . The dependent variable in the estimations is the incremental debt in the year t scaled by prior period total assets of the firm in percent. Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. *HCC_Dum* takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. *Crisis_Dum* takes value of 1 for the years 2008 and 2009, and 0 for all other years. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels.

	(1)	(2)	(3)	(4)	(5)	(6)
$Rating_{t-1}$	2.798***	2.941***	2.776***	6.053***	5.554***	6.020***
	(0.583)	(0.621)	(0.584)	(0.916)	(0.957)	(0.916)
Basel_Dum	-18.633***	3.588	-18.522***	-12.167	1.858	-11.939
	(5.853)	(3.455)	(5.875)	(9.198)	(4.888)	(9.252)
$Basel\_Dum \times Rating_{t-1}$	1.579***		1.531***	1.003*		0.925
	(0.333)		(0.342)	(0.558)		(0.575)
HCC_Dum		-2.615			-10.121	
		(3.489)			(6.689)	
$HCC\_Dum \times Basel\_Dum$		-8.883***			-5.231	
		(3.345)			(5.939)	
Crisis_Dum			-91.552			-234.864**
			(64.365)			(103.206)
$Crisis\_Dum \times Rating_{t-1}$			0.518			0.821
			(0.415)			(0.710)
$Earnings\_volatility_{t-1}$	14.434	16.583	14.482	32.096	33.754	32.356
	(27.693)	(27.732)	(27.710)	(53.710)	(53.831)	(53.734)
Log_Sales_{t-1}	5.244***	4.993***	5.264***	5.742**	5.463*	5.782**
	(1.876)	(1.865)	(1.877)	(2.926)	(2.897)	(2.928)
$Leverage_{t-1}$	-0.742	-0.645	-0.769	-5.932**	-5.773**	-5.978**
	(1.430)	(1.439)	(1.429)	(2.567)	(2.570)	(2.565)
$Op.CF\_assets_{t-1}$	29.639	25.835	29.657	124.700***	120.561***	124.679***
	(19.140)	(19.133)	(19.157)	(35.608)	(35.483)	(35.641)
M/B_{t-1}	-1.032***	-1.028***	-1.029***	-2.559***	-2.529***	-2.552***
	(0.234)	(0.234)	(0.234)	(0.432)	(0.433)	(0.432)
$EBITDA\_assets_{t-1}$	-81.562***	-80.503***	-81.916***	-107.788***	-108.375***	-108.265***
	(18.668)	(18.708)	(18.698)	(33.673)	(33.668)	(33.707)
$Pvtcredit\_GDP_{t-1}$	-0.031	-0.023	-0.03	0.026	0.027	0.027
	(0.051)	(0.051)	(0.052)	(0.072)	(0.072)	(0.072)
GDP_growth_{t-1}	0.514	0.623*	0.522	1.056*	1.119*	1.073*
	(0.372)	(0.373)	(0.373)	(0.577)	(0.574)	(0.578)
$Log\_percapitaGDP_{t-1}$	16.472***	15.237**	16.365***	5.073	3.947	4.901
	(5.901)	(5.942)	(5.899)	(7.669)	(7.705)	(7.667)
VIX_index_{t-1}	4.664	4.617	4.612	12.033**	12.090**	11.955**
	(3.639)	(3.645)	(3.642)	(5.851)	(5.853)	(5.854)
$Fed\_funds\_rate_{t-1}$	3.968	3.695	3.839	4.11	3.982	3.916
	(3.115)	(3.125)	(3.123)	(4.831)	(4.830)	(4.841)
Constant	-308.552***	-293.876***	-306.056***	-330.123**	-306.923**	-326.401**
	(91.644)	(92.432)	(91.689)	(131.294)	(131.852)	(131.401)
Firm years	23528	23528	23528	22982	22982	22982
Fixed Effects	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.022	0.021	0.022	0.024	0.024	0.024

Table 10: **Effect of risk-sensitive regulations on Investment activity**
The dependent variable in all the estimations is the capital expenditure in the year t scaled by the prior period fixed assets in percent. The dependent variable in the estimations is the incremental debt in the year t scaled by prior period total assets of the firm in percent. Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. *HCC_Dum* takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. *Crisis_Dum* takes value of 1 for the years 2008 and 2009, and 0 for all other years. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels. Rk LM statistic suggests that the instrument used in the first stage regression is relevant. Wald F statistic suggests that the instrument is strongly identified. Constant term is not reported for brevity.

	(1)	(2)	(3)	(4)	(5)	(6)
$Rating_{t-1}$	0.309**	0.349***	0.298**	0.357***		
	(0.121)	(0.117)	(0.120)	(0.117)		
$Basel\_Dum$	-2.414*	0.818	-2.342	0.636		
	(1.438)	(0.699)	(1.441)	(0.700)		
$Basel\_Dum \times Rating_{t-1}$	0.226***		0.205**			
	(0.085)		(0.086)			
HCC_Dum		0.151		0.46		
		(0.822)		(0.820)		
$HCC\_Dum \times Basel\_Dum$		-1.705*		-1.674*		
		(0.874)		(0.874)		
$Crisis\_Dum$			-11.255	-7.793		
			(10.992)	(10.962)		
$Crisis\_Dum \times Rating_{t-1}$			0.210**			
			(0.092)			
$HCC\_Dum \times Crisis\_Dum$				-2.517**		
				(1.020)		
$\Delta Debt\_asset_t$					0.570***	
					(0.103)	
$Loan\_assets_t$						0.914***
						(0.300)
$Cash\_asset_{t-1}$	23.961***	23.834***	24.038***	23.898***	21.896***	28.319***
	(3.118)	(3.122)	(3.117)	(3.124)	(4.080)	(6.629)
Log_Sales_{t-1}	-1.865**	-1.894**	-1.860**	-1.901**	0.544	2.284
	(0.758)	(0.760)	(0.758)	(0.760)	(0.964)	(2.065)
$Leverage_{t-1}$	-1.719***	-1.708***	-1.726***	-1.708***	0.51	-0.982
	(0.289)	(0.290)	(0.288)	(0.287)	(0.470)	(0.742)
$Op.CF\_fixedassets_{t-1}$	2.899***	2.898***	2.900***	2.898***	1.971***	0.642
	(0.568)	(0.569)	(0.568)	(0.569)	(0.414)	(0.874)
M/B_{t-1}	0.701***	0.700***	0.700***	0.697***	0.328***	0.192
	(0.065)	(0.064)	(0.065)	(0.064)	(0.112)	(0.302)
$Pvtcredit\_GDP_{t-1}$	0.001	0.002	0.001	0.001	-0.018	0.01
	(0.010)	(0.010)	(0.010)	(0.010)	(0.013)	(0.021)
GDP_growth_{t-1}	0.194**	0.209**	0.198**	0.207**	0.175**	0.345
	(0.089)	(0.091)	(0.089)	(0.091)	(0.089)	(0.275)
$Log\_percapitaGDP_{t-1}$	0.121	-0.01	0.09	-0.035	-6.078***	-8.552**
	(1.369)	(1.378)	(1.368)	(1.376)	(2.041)	(3.323)
VIX_index_{t-1}	0.416	0.407	0.398	0.384	-0.302*	-0.294
	(0.611)	(0.613)	(0.611)	(0.613)	(0.179)	(0.345)
$Fed\_funds\_rate_{t-1}$	1.573***	1.537***	1.526***	1.476**	0.602	1.077
	(0.585)	(0.587)	(0.584)	(0.588)	(1.411)	(2.533)
Firm years	25322	25322	25322	25322	11870	4158
Fixed Effects	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.123	0.123	0.123	0.123		
Rk LM statistic					89.23***	20.20***
Wald F Statistic					143.269***	22.369***

Table 11: **Baseline estimations with additional covariates**

The dependent variable is the incremental debt to assets in the year t in columns (1), and (3), and interest cost of debt in the year t in columns (2) and (4). We control for the sovereign credit rating in columns (1)-(2) and Bank capital to assets in columns (3)-(4). The dependent variable in the estimations is the incremental debt in the year t scaled by prior period total assets of the firm in percent. Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels.

	(1)	(2)	(3)	(4)
$Rating_{t-1}$	0.839***	-0.264***	0.759***	-0.269***
	(0.104)	(0.030)	(0.105)	(0.029)
$Basel\_Dum$	-1.834*	1.282***	-2.307**	1.468***
	(0.963)	(0.321)	(0.994)	(0.315)
$Basel\_Dum \times Rating_{t-1}$	0.288***	-0.072***	0.321***	-0.078***
	(0.062)	(0.023)	(0.064)	(0.022)
Sov_rating_{t-1}	-0.525***	-0.011		
	(0.196)	(0.038)		
$Bank\_capital\_assets_{t-1}$			0.701***	-0.017
			(0.119)	(0.031)
$Sales\_growth_{t-1}$	-0.009	-0.002*	-0.004	-0.002*
	(0.006)	(0.001)	(0.006)	(0.001)
Log_Sales_{t-1}	-6.096***	0.138*	-6.166***	0.119
	(0.429)	(0.075)	(0.435)	(0.075)
$Leverage_{t-1}$	-1.130***	0.114	-0.923***	0.131
	(0.337)	(0.098)	(0.289)	(0.086)
$Op.CF\_assets_{t-1}$	19.629***	-2.180**	23.035***	-2.459***
	(4.271)	(0.980)	(4.157)	(0.951)
M/B_{t-1}	0.084	-0.026**	0.072	-0.023**
	(0.067)	(0.011)	(0.063)	(0.011)
$Tangibility_{t-1}$	3.857**	-0.107	2.234	0.076
	(1.586)	(0.499)	(1.659)	(0.479)
$EBITDA\_assets_{t-1}$	29.887***	-0.708	29.398***	-0.52
	(3.958)	(0.909)	(3.956)	(0.899)
$Pvtcredit\_GDP_{t-1}$	0.014*	-0.001	0.018**	0.002
	(0.007)	(0.002)	(0.008)	(0.002)
GDP_growth_{t-1}	-0.026	-0.030*	-0.194**	-0.019
	(0.081)	(0.016)	(0.088)	(0.018)
$Log\_percapitaGDP_{t-1}$	8.887***	-0.503	8.902***	-0.451
	(1.267)	(0.330)	(1.060)	(0.351)
VIX_index_{t-1}	0.311	0.247***	0.569	0.267***
	(0.299)	(0.040)	(0.439)	(0.059)
$Fed\_funds\_rate_{t-1}$	0.052	0.024	0.325	0.227***
	(0.733)	(0.097)	(0.500)	(0.066)
$Constant$	-13.146	7.775**	-33.441**	6.494
	(13.694)	(3.463)	(15.497)	(3.958)
$Firm\ years$	20761	20682	20824	20749
$Fixed\ Effects$	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.078	0.118	0.081	0.125

Table 12: **Control for Crisis & Banking Crisis**

Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. *HCC_Dum* takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. *Crisis* is a dummy variable which takes the value 1 for the years 2008-2009 and 0 otherwise. *Bank_Crisis* is a country-specific dummy variable which takes the value 1 for all the years where a banking crisis had been reported by Laeven and Valencia (2013) database on systemic banking crises and 0 otherwise. We truncate the sample at year 2011 as the database on banking crises is available only until 2011. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels. We do not present the country-specific and global control variables for brevity.

	Inc. Debt to assets		Interest cost	
	(1)	(2)	(3)	(4)
$Rating_{t-1}$	1.127***	1.271***	-0.299***	-0.292***
	(0.128)	(0.131)	(0.029)	(0.030)
Basel_Dum	-3.423***	1.524**	1.316***	0.373**
	(1.225)	(0.621)	(0.324)	(0.153)
$Basel\_Dum \times Rating_{t-1}$	0.340***		-0.069***	
	(0.078)		(0.021)	
HCC_Dum		1.697**		0.143
		(0.752)		(0.165)
$HCC\_Dum \times Basel\_Dum$		-2.616***		0.324*
		(0.755)		(0.196)
Crisis_Dum	-4.220***	-0.003	-0.773***	-0.575***
	(1.323)	(0.877)	(0.294)	(0.195)
$Crisis\_Dum \times Rating_{t-1}$	0.282***		0.017	
	(0.073)		(0.017)	
Bank_crisis	1.435	1.400**	-0.391	-0.06
	(2.021)	(0.633)	(0.296)	(0.093)
$Bank\_crisis \times Rating_{t-1}$	-0.031		0.025	
	(0.134)		(0.020)	
$HCC\_Dum \times Crisis\_Dum$		-3.318***		0.143
		(0.752)		(0.173)
$HCC\_Dum \times Bank\_crisis$		-3.275**		0.141
		(1.321)		(0.204)
$Sales\_growth_{t-1}$	0.001	0.002	-0.002*	-0.002*
	(0.007)	(0.007)	(0.001)	(0.001)
Log_Sales_{t-1}	-7.403***	-7.474***	0.249***	0.263***
	(0.595)	(0.599)	(0.081)	(0.081)
$Leverage_{t-1}$	-1.217***	-1.215***	0.267**	0.265**
	(0.340)	(0.342)	(0.113)	(0.113)
$Op.CF\_assets_{t-1}$	26.288***	26.091***	-2.355**	-2.241**
	(5.398)	(5.373)	(0.995)	(0.992)
M/B_{t-1}	0.144*	0.134	-0.023*	-0.023*
	(0.082)	(0.082)	(0.013)	(0.013)
$Tangibility_{t-1}$	3.129	2.796	0.601	0.648
	(2.241)	(2.240)	(0.402)	(0.401)
$EBITDA\_assets_{t-1}$	28.173***	28.474***	-1.471	-1.515
	(4.980)	(4.971)	(0.952)	(0.948)
Firm years	17529	17529	17485	17485
Fixed Effects	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.103	0.103	0.09	0.089

Table 13: **Estimations by excluding the US**

The dependent variable is the incremental debt to assets in the year t in columns (1)-(3), and interest cost of debt in the year t in columns (4)-(6). Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. *HCC_Dum* takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels.

	Inc.Debt to Assets			Interest cost		
	(1)	(2)	(3)	(4)	(5)	(6)
$Rating_{t-1}$	0.752***	1.028***	-0.181***	-0.194***	0.758***	-0.181***
	(0.164)	(0.154)	(0.046)	(0.045)	(0.165)	(0.045)
$Basel\_Dum$	-2.119	1.809**	1.652***	0.427**	-1.893	1.670***
	(1.591)	(0.821)	(0.506)	(0.214)	(1.613)	(0.520)
$Basel\_Dum \times Rating_{t-1}$	0.276**		-0.082**		0.251**	-0.084**
	(0.108)		(0.035)		(0.112)	(0.037)
HCC_Dum		3.002**		-0.12		
		(1.357)		(0.408)		
$HCC\_Dum \times Basel\_Dum$		-1.996		0.949***		
		(1.246)		(0.363)		
$Crisis\_Dum$					-17.197	-13.118***
					(14.760)	(2.633)
$Crisis\_Dum \times Rating_{t-1}$					0.117	0.009
					(0.121)	(0.030)
$Sales\_growth_{t-1}$	-0.009	-0.009	0.000	0.000	-0.009	0.000
	(0.009)	(0.009)	(0.002)	(0.002)	(0.009)	(0.002)
Log_Sales_{t-1}	-4.395***	-4.420***	-0.021	-0.011	-4.397***	-0.021
	(0.613)	(0.612)	(0.122)	(0.122)	(0.614)	(0.122)
$Leverage_{t-1}$	-0.965***	-0.983***	0.061	0.063	-0.976***	0.06
	(0.313)	(0.318)	(0.089)	(0.089)	(0.314)	(0.089)
$Op.CF\_assets_{t-1}$	11.692**	12.061**	-1.719	-1.661	11.692**	-1.718
	(5.574)	(5.547)	(1.384)	(1.390)	(5.574)	(1.385)
M/B_{t-1}	0.439***	0.433***	-0.074***	-0.073***	0.440***	-0.074***
	(0.122)	(0.122)	(0.027)	(0.027)	(0.122)	(0.027)
$Tangibility_{t-1}$	2.327	2.213	-0.093	-0.121	2.343	-0.093
	(2.176)	(2.196)	(0.719)	(0.708)	(2.178)	(0.719)
$EBITDA\_assets_{t-1}$	26.891***	26.588***	0.6	0.641	26.803***	0.592
	(5.647)	(5.653)	(1.425)	(1.426)	(5.644)	(1.422)
$Pvtcredit\_GDP_{t-1}$	0.008	0.01	0.001	0.001	0.009	0.001
	(0.008)	(0.008)	(0.002)	(0.002)	(0.008)	(0.002)
GDP_growth_{t-1}	-0.031	-0.018	-0.025	-0.027*	-0.025	-0.025
	(0.081)	(0.081)	(0.015)	(0.015)	(0.081)	(0.015)
$Log\_percapitaGDP_{t-1}$	5.619***	5.256***	-0.706**	-0.628*	5.588***	-0.708**
	(1.081)	(1.048)	(0.342)	(0.373)	(1.079)	(0.340)
VIX_index_{t-1}	0.844	0.811	0.753***	0.764***	0.835	0.753***
	(0.823)	(0.823)	(0.145)	(0.144)	(0.822)	(0.144)
$Fed\_funds\_rate_{t-1}$	1.01	0.869	1.278***	1.308***	0.979	1.275***
	(0.676)	(0.671)	(0.152)	(0.150)	(0.674)	(0.151)
$Constant$	-18.15	-17.816	1.52	0.561	-17.675	1.556
	(18.304)	(18.506)	(4.458)	(4.618)	(18.267)	(4.436)
$Firm\ years$	9835	9835	9781	9781	9835	9781
$Fixed\ Effects$	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.086	0.086	0.108	0.109	0.086	0.108

Table 14: **Rating change controls**

The dependent variable is the incremental debt to assets in the year t in columns (1), (3) and (5), and interest cost of debt in the year t in columns (2), (4) and (6). Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes value of 1 if the country of domicile of a firm has implemented Basel II regulations and 0 otherwise. *HCC_Dum* takes value of 1 if the rating is lower than BB- that invites higher capital charge for banks, and 0 if the rating is BB- or higher. Robust standard errors clustered at firm-level are presented in the brackets. ***, ** and * indicates p-values at the 1%, 5% and 10% significance levels.

	Overall Sample		Positive Debt Issuance		Match with LPC data	
	(1)	(2)	(3)	(4)	(5)	(6)
$Rating_{t-1}$	0.884***	-0.279***	0.288*	-0.209***	1.231***	-0.334***
	(0.100)	(0.026)	(0.161)	(0.026)	(0.172)	(0.033)
$Basel\_Dum$	-2.006**	1.401***	-3.417**	1.462***	-4.626**	2.050***
	(0.990)	(0.299)	(1.414)	(0.328)	(2.131)	(0.469)
$Basel\_Dum \times Rating_{t-1}$	0.269***	-0.078***	0.360***	-0.082***	0.389***	-0.121***
	(0.063)	(0.021)	(0.094)	(0.023)	(0.121)	(0.032)
$\Delta Rating_{t-1}$	-0.117	0.064**	-0.437*	0.048*	-0.285	0.091**
	(0.150)	(0.027)	(0.242)	(0.027)	(0.213)	(0.040)
$Basel\_Dum \times \Delta Rating_{t-1}$	-0.026	0.004	0.306	-0.019	-0.298	-0.04
	(0.201)	(0.034)	(0.337)	(0.035)	(0.322)	(0.048)
$Sales\_growth_{t-1}$	0.001	-0.003**	-0.008	-0.002	-0.002	-0.003*
	(0.006)	(0.001)	(0.009)	(0.001)	(0.011)	(0.002)
Log_Sales_{t-1}	-5.878***	0.132*	-6.981***	0.198***	-8.120***	0.210**
	(0.446)	(0.072)	(0.656)	(0.077)	(0.730)	(0.089)
$Leverage_{t-1}$	-0.934***	0.215***	-0.515*	0.223***	-1.100**	0.260**
	(0.260)	(0.077)	(0.289)	(0.076)	(0.464)	(0.122)
$Op.CF\_assets_{t-1}$	20.955***	-2.298**	23.226***	-4.551***	34.728***	-2.274*
	(4.116)	(0.897)	(5.986)	(0.988)	(8.242)	(1.270)
M/B_{t-1}	0.143**	-0.026**	0.210**	-0.019	0.362***	-0.040**
	(0.063)	(0.010)	(0.094)	(0.013)	(0.131)	(0.016)
$Tangibility_{t-1}$	1.300	0.41	-3.586	0.58	-4.687	0.472
	(1.583)	(0.417)	(2.713)	(0.500)	(3.236)	(0.480)
$EBITDA\_assets_{t-1}$	26.672***	-1.022	30.496***	0.87	35.604***	-2.680**
	(4.013)	(0.833)	(6.096)	(0.959)	(7.747)	(1.298)
$Pvtcredit\_GDP_{t-1}$	0.003	0.001	0.011	0.001	-0.019	0.006**
	(0.007)	(0.002)	(0.011)	(0.002)	(0.016)	(0.003)
GDP_growth_{t-1}	0.000	-0.023	-0.054	-0.023	0.059	-0.003
	(0.077)	(0.016)	(0.115)	(0.023)	(0.138)	(0.025)
$Log\_percapitaGDP_{t-1}$	5.973***	-0.451	6.014***	-0.528*	7.831***	-0.800**
	(0.884)	(0.329)	(1.220)	(0.296)	(1.642)	(0.353)
VIX_index_{t-1}	0.143	0.465***	0.374	0.480***	0.414	0.466***
	(0.516)	(0.074)	(0.777)	(0.108)	(1.037)	(0.130)
$Fed\_funds\_rate_{t-1}$	0.291	0.688***	0.476	0.642***	-0.47	0.754***
	(0.233)	(0.056)	(0.336)	(0.061)	(0.496)	(0.079)
$Constant$	9.153	3.002	34.568*	1.291	22.896	4.71
	(13.753)	(3.888)	(19.993)	(3.933)	(26.626)	(4.720)
$Firm\ years$	23186	23102	12541	12505	9137	9114
$Fixed\ Effects$	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.08	0.146	0.078	0.17	0.121	0.199

A Appendix

Figure A.1: **Distribution of firms in the overall sample across rating categories**

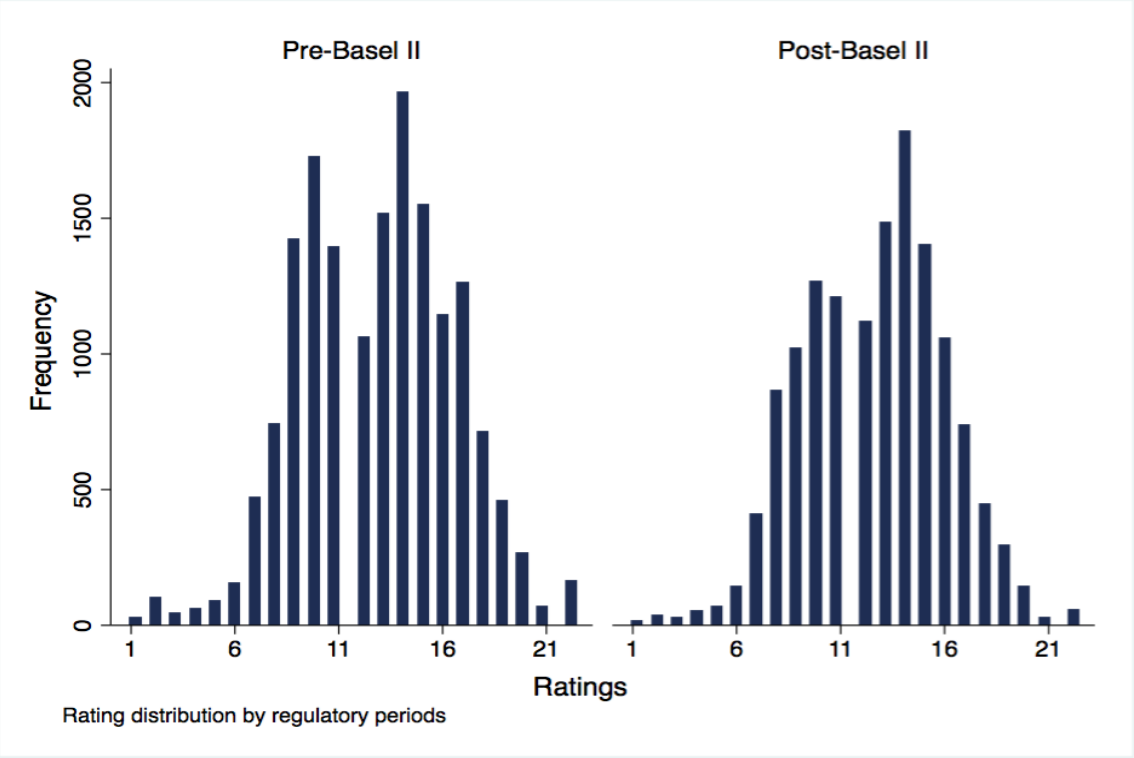

Table A1: **Country Statistics and Implementation timeline**

The Basel II implementation timelines for the BCBS member countries has been obtained from the BIS progress reports: https://www.bis.org/bcbs/implementation.htm?m=3%7C14%7C656.The implementation years for all non-member countries has been obtained from https://www.bis.org/fsi/fsiop2015.htm. We have validated the implementation years with that of Hasan et al. (2015) who use similar implementation timeline for their analysis on cross-border flows from G-10 countries. We consider all countries with a minimum of 5 firm-year observations (the lag ratings requirement reduces the minimum observations to 4).

Country name	Implementation Year	Firm-years	Average Rating	Std. Dev. Rating
Argentina	2013	138	6.80	3.64
Australia	2008	617	14.42	2.20
Austria	2007	66	14.71	2.24
Bahamas	2016	9	7.56	0.53
Bahrain	2008	4	12.50	0.58
Belgium	2007	58	15.55	2.20
Brazil	2013	450	11.24	2.18
Canada	2008	719	13.23	2.91
China	2012	315	11.56	3.05
Colombia	2007	35	13.06	0.68
Cyprus	2007	4	8.00	1.15
Czech Republic	2007	37	15.65	0.82
Denmark	2007	38	15.08	2.44
Finland	2007	112	13.38	2.58
France	2007	674	14.69	2.68
Germany	2007	533	14.16	2.80
Greece	2007	63	11.19	3.20
Hong Kong	2007	391	13.69	3.44
India	2008	144	12.30	1.94
Indonesia	2012	220	8.50	2.67
Ireland	2007	96	13.23	2.69
Israel	2009	22	13.95	1.81
Italy	2007	227	14.17	2.99
Japan	2008	1,482	16.23	2.86
Kazakhstan	2016	18	11.56	0.78
Luxembourg	2007	33	11.45	2.46
Macao	2013	4	11.25	0.96
Malaysia	2008	93	14.59	1.85
Mexico	2008	348	11.91	2.91
Mongolia	2005	5	5.80	2.59
Netherlands	2007	210	14.25	3.47
New Zealand	2008	57	15.67	2.47
Norway	2007	99	14.02	3.71
Peru	2010	44	9.00	4.02
Philippines	2007	27	9.81	2.20
Poland	2007	48	11.44	3.47
Portugal	2007	61	14.64	2.38
Qatar	2006	11	17.18	1.25
Romania	2007	9	12.00	0.87
Russian Federation	2008	301	10.77	2.09
Saudi Arabia	2008	23	16.70	3.48
Singapore	2008	108	15.10	4.63
South Africa	2008	44	12.30	1.34
Spain	2007	183	14.25	3.17
Sri Lanka	2007	13	9.46	0.52
Sweden	2007	258	14.72	2.10
Switzerland	2007	270	15.53	3.35
Thailand	2008	114	13.25	3.19
Turkey	2012	69	10.32	2.19
United Arab Emirates	2009	22	16.64	2.74
United Kingdom	2007	909	14.69	3.03
United States	2009	15,689	12.79	3.29
Total	NA	25,524	13.17	3.39

Table A2: **Variables Description & Source**

Variables	Definition and construction	Data Source
$\Delta Debt\_asset$ (%)	Change in total debt of the firm in a year t scaled by the total assets of the firm in the beginning of the year (Δ*(WC03251 + WC03051)/Lag.WC02999*).	Worldscope
Loan_assets (%)	Aggregate loans (sum of all U.S. dollar tranche amounts of the syndicated loans of the firm) obtained by the firm in a year t scaled by the total assets of the firm in the beginning of the year	Loan Pricing Corporation Dealscan
Basel_Dum	A dummy variable which takes the value one from the year the country has implemented the standardized (risk-sensitive) approach to credit risk and 0 otherwise.	BIS
Interest_cost (%)	Total interest expense in a year t divided by the total debt of the firm	Worldscope
Total_payout (%)	Total payouts of the firms including repurchase of shares and dividend paid by the firm divided by the net income (*((WC04781+WC04551)/WC01551)*).	Worldscope
Divident_payout (%)	Total cash dividends paid by the firm in the current year divided by the net income before payouts (*(WC04551/WC01551)*).	Worldscope
Capex_intensity (%)	Capital expenditure in a year t scaled by the prior period total fixed assets of the firm (*(WC04601/Lag.WC02501)*)	Worldscope
Rating	Issuer credit ratings of the firm publicly disclosed by S& P. We have coded the ratings from 1 to 22 with 1 standing for default and 22 for AAA.	Thomson Reuters Eikon

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Table A2 – *Continued from previous page*

Variables	Definition and Construction	Data Source
Sov_rating	Sovereign credit rating of the country and is coded from 1 to 22 with 1 for default and 22 indicating AAA status.	Bloomberg
GDP_growth (%)	GDP growth of the country where the firm is headquartered in.	World Bank WDI
Pvtcredit_GDP (%)	Ratio of private credit to the GDP of the country	World Bank WDI
Ln_percapitaGDP	Log of the annual GDP per capita of a country	World Bank WDI
VIX_index	Annual average implied volatility of the S&P index options	FRED St. Louis Fed
Fed_funds_rate	Average annual effective overnight lending rates of the banks in the U.S.	FRED St. Louis Fed
Bank_capital_asset (%)	Average bank capital to assets of the country	World Bank WDI & FRED St. Louis Fed
Log_Sales	Natural logarithm of total sales in USD (*WC07240*, a key item in USD in the database) of the firm	Worldscope
Log_Asset	Natural logarithm of total assets in USD (*WC07230*, a key item in USD in the database) of the firm	Worldscope
Leverage	Ratio of total liabilities to book value of equity (*WC03351/WC03998*)	Worldscope
Op.CF_assets	Ratio of total operational cash flow of the firm divided by the total assets (*WC04201/WC02999*)	Worldscope
Op.CF_fixedassets	Ratio of total operational cash flow of the firm divided by the net property plant and equipment in the beginning of the year (*WC04201/Lag.WC02501*)	Worldscope

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Table A2 – *Continued from previous page*

Variables	Definition and Construction	Data Source
M/B	Ratio of market value of the equity to book value of equity (*WC07210/WC07220*)	Worldscope
Tangibility (%)	Fixed assets to overall assets of the firm (*WC02501/WC02999*).	Worldscope
EBITDA_assets	Profitability of the firm computed by the ratio of EBITDA to assets of the firm (*WC01250/WC02999*).	Worldscope
Earnings_volatility	Standard deviation in the EBITDA to assets measure for the last 5 years including the current year.	Worldscope
AccPay_asset (%)	Total accounts payables of the firm scaled by the total assets of the firm (*WC03040/WC02999*).	Worldscope
AccRec_sales (%)	Total accounts receivables of the firm scaled by the total sales of the firm (*WC02051/WC01001*).	Worldscope
Cash_asset	Total cash holdings of the firm scaled by the total assets of the firm (*WC02001/WC02999*).	Worldscope
Gross_margin	Gross income of the firm scaled by the total sales of the firm (*WC01100/WC01001*).	Worldscope
Market_share	Net sales of the firm to the total sales of the industry (2digit SIC codes) grouped by each country	Worldscope
Net_interest_margin	Net interest income of the bank scaled by the interest earning assets, averaged over all the lead banks	Orbis Bank Focus
LLR_loans	Total loan loss reserves of the bank scaled by the aggregate loans, averaged over all the lead banks; a measure of the portfolio stress of the bank	Orbis Bank Focus

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Table A2 – *Continued from previous page*

Variables	Definition and Construction	Data Source
Cost_income	Operating costs of the bank to the operating income, averaged over all the lead banks; a measure of the efficiency of bank operations	Orbis Bank Focus
Equity_assets	Total book value of equity to the total assets of the bank, averaged over all the lead banks; a measure of the leverage and capital cushion of the bank	Orbis Bank Focus

Table A3: **Alternate categorization of High Risk**

In the estimations below we use a *Spec_Dum* which takes the value 1 if the rating is below BBB- (BB+ to SD) and 0 if it is above BBB- (BBB- to AAA). Rating takes the value from 1 to 22 depending on the credit rating of the firm, 1 indicates default and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes the value 1 if the firm's country of domicile has implemented Basel-II regulations and 0 otherwise. Robust standard errors clustered at firm level are presented in the brackets. ***, ** and * indicates p-values at 1%, 5% and 10% levels. In all the models we control for firm fixed effects and year effects.

	Overall sample				LPC sample		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Rating_{t-1}$	0.956***	-0.270***	0.434***	-0.224***	-0.104	-0.217***	-0.073
	(0.101)	(0.027)	(0.154)	(0.027)	(0.226)	(0.039)	(0.176)
Spec_dum	0.175	0.273**	0.522	0.145	-0.106	0.19	1.868*
	(0.493)	(0.124)	(0.826)	(0.137)	(1.120)	(0.175)	(1.035)
Basel_Dum	2.282***	0.347**	1.951***	0.319**	1.71	0.213	1.133
	(0.535)	(0.137)	(0.747)	(0.140)	(1.423)	(0.220)	(1.188)
$Basel\_Dum \times Spec\_Dum$	-1.541***	0.144	-1.479**	0.188	-3.297***	0.391**	-1.503
	(0.434)	(0.117)	(0.679)	(0.129)	(0.928)	(0.155)	(0.915)
$Sales\_growth_{t-1}$	0.006	-0.003***	-0.001	-0.002**	0.002	-0.004**	-0.014
	(0.006)	(0.001)	(0.009)	(0.001)	(0.011)	(0.002)	(0.009)
Log_Sales_{t-1}	-6.255***	0.173***	-7.412***	0.236***	-8.426***	0.200**	-6.338***
	(0.421)	(0.063)	(0.611)	(0.067)	(0.709)	(0.088)	(0.930)
$Leverage_{t-1}$	-1.128***	0.259***	-0.480*	0.244***	-1.926***	0.316**	-0.759*
	(0.278)	(0.080)	(0.288)	(0.080)	(0.534)	(0.134)	(0.443)
$Op.CF\_assets_{t-1}$	21.456***	-2.465***	28.081***	-3.883***	54.430***	-3.875***	39.531***
	(4.094)	(0.839)	(5.971)	(1.074)	(10.448)	(1.378)	(11.183)
M/B_{t-1}	0.152**	-0.027***	0.211**	-0.018	0.245*	-0.016	0.567***
	(0.061)	(0.010)	(0.090)	(0.012)	(0.147)	(0.016)	(0.152)
$Tangibility_{t-1}$	2.092	0.461	-3.306	0.651	2.741	0.191	3.000
	(1.508)	(0.384)	(2.444)	(0.443)	(3.738)	(0.501)	(4.418)
$EBITDA\_assets_{t-1}$	27.424***	-0.705	27.537***	0.523	37.405***	-2.419*	30.079***
	(3.782)	(0.797)	(5.681)	(0.985)	(9.594)	(1.383)	(8.652)
$Pvtcredit\_GDP_{t-1}$	0.008	0	0.016	0.001	-0.017	0.006**	-0.031*
	(0.007)	(0.002)	(0.010)	(0.002)	(0.017)	(0.003)	(0.016)
GDP_growth_{t-1}	0.014	-0.039**	-0.038	-0.036*	-0.111	0.003	-0.181
	(0.073)	(0.016)	(0.104)	(0.019)	(0.149)	(0.027)	(0.112)
$Log\_percapitaGDP_{t-1}$	6.315***	-0.510*	6.545***	-0.697**	10.851***	-1.291***	2.759**
	(0.864)	(0.307)	(1.180)	(0.277)	(1.850)	(0.355)	(1.399)
VIX_index_{t-1}	0.379	0.606***	0.554	0.607***	2.232	0.515***	0.914
	(0.676)	(0.092)	(1.012)	(0.132)	(1.617)	(0.178)	(1.172)
$Fed\_funds\_rate_{t-1}$	0.478	1.116***	0.54	1.042***	1.01	1.212***	-0.22
	(0.552)	(0.099)	(0.838)	(0.125)	(1.379)	(0.184)	(1.169)
Constant	4.91	0.395	29.083	0.426	-20.736	7.799	65.761**
	(15.297)	(3.737)	(22.485)	(3.987)	(36.205)	(5.374)	(27.292)
Firm years	25524	25430	13909	13867	8917	8892	8917
Fixed Effects	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr	Firm, Yr
R^2	0.085	0.146	0.084	0.171	0.13	0.166	0.121

Table A4: **Summary of Dependent variables - Pre- & Post-Basel II periods**

All the variables in column (1) are defined in Table A2. Post-Basel II (Pre-Basel II) refers to the period after (before) the implementation of Basel II regulations in the country of domicile of a firm in the LPC sample. High rating (low rating) refers to the firms with a rating higher than or equal to (lower than) BB- that invites lower (higher) capital charge for banks. Each cell value is the average of the respective variable for the sub-periods and subsample indicated in the table.

		Overall			Without US firms			Only US firms		
		Low Risk	High Risk	All Firms	Low Risk	High Risk	All Firms	Low Risk	High Risk	All Firms
$\Delta Debt\_asset$	Pre-Basel II	4.98	10.13	5.72	2.62	5.79	2.87	5.79	10.76	6.61
	Post-Basel II	4.85	8.25	5.30	4.26	4.49	4.28	5.22	9.26	5.90
	Total	4.92	9.30	5.53	3.56	5.06	3.67	5.55	10.14	6.31
Interest_cost	Pre-Basel II	6.36	8.44	6.66	5.54	7.79	5.72	6.64	8.53	6.95
	Post-Basel II	4.80	7.26	5.13	4.41	7.69	4.67	5.05	7.14	5.40
	Total	5.64	7.92	5.96	4.90	7.74	5.12	5.98	7.95	6.31
Payout	Pre-Basel II	59.88	27.25	55.17	50.06	23.75	48.04	63.23	27.76	57.38
	Post-Basel II	72.54	26.97	66.45	60.95	14.97	57.41	80.02	30.19	71.71
	Total	65.75	27.13	60.36	56.27	18.73	53.39	70.17	28.77	63.31
Capex_intensity	Pre-Basel II	21.02	24.13	21.47	18.02	20.11	18.19	22.04	24.72	22.48
	Post-Basel II	19.69	22.56	20.07	19.29	21.97	19.49	19.94	22.71	20.40
	Total	20.40	23.44	20.82	18.74	21.15	18.93	21.17	23.88	21.62
AccPay_Asset	Pre-Basel II	8.81	8.43	8.75	9.98	10.18	10.00	8.41	8.18	8.37
	Post-Basel II	8.22	7.70	8.15	9.61	10.28	9.66	7.34	7.00	7.28
	Total	8.53	8.11	8.48	9.77	10.24	9.81	7.97	7.69	7.92
AccRec_Sales	Pre-Basel II	16.63	15.15	16.42	20.24	19.95	20.22	15.39	14.43	15.23
	Post-Basel II	17.15	15.78	16.97	20.72	22.24	20.83	14.86	14.06	14.73
	Total	16.87	15.42	16.67	20.51	21.23	20.57	15.17	14.28	15.02

Table A5: **Exclusion of speculative grade firms**

Rating takes values from 13 to 22 depending on the credit rating of the firm, 13 indicates BBB- and 22 indicates AAA rating. *Basel_Dum* is a dummy variable which takes the value 1 if the firm's country of domicile has implemented Basel-II regulations and 0 otherwise. *LCC_Dum* takes the value 1 if the rating is higher than BBB+ that invites lower capital charge for banks and 0 if the rating between BBB+ and BBB-. Robust standard errors clustered at firm level are presented in the brackets. ***, ** and * indicates p-values at 1%, 5% and 10% levels. In all the models we control for firm fixed effects and year effects.

	(1)	(2)	(3)	(4)	(5)	(6)
$Rating_{t-1}$	1.046***	-0.141***	1.046***	-0.141***	1.042***	-0.125***
	(0.139)	(0.038)	(0.139)	(0.038)	(0.158)	(0.047)
$Basel\_Dum$	-3.174*	2.162***	-3.195*	2.155***	0.665	0.377***
	(1.789)	(0.596)	(1.800)	(0.627)	(0.715)	(0.143)
$Basel\_Dum \times Rating_{t-1}$	0.270**	-0.125***	0.271**	-0.124***		
	(0.106)	(0.038)	(0.107)	(0.041)		
$Crisis\_Dum$			2.042	-8.827***		
			(14.590)	(1.934)		
$Crisis\_Dum \times Rating_{t-1}$			-0.009	-0.003		
			(0.123)	(0.037)		
LCC_Dum					0.155	-0.147
					(0.542)	(0.129)
$LCC\_Dum \times Basel\_Dum$					0.882**	-0.389***
					(0.424)	(0.133)
$Sales\_growth_{t-1}$	-0.008	-0.003**	-0.008	-0.003**	-0.008	-0.003**
	(0.007)	(0.001)	(0.007)	(0.001)	(0.007)	(0.001)
Log_Sales_{t-1}	-4.613***	0.186**	-4.614***	0.186**	-4.625***	0.190***
	(0.474)	(0.073)	(0.474)	(0.074)	(0.475)	(0.073)
$Leverage_{t-1}$	-0.688**	0.217	-0.688**	0.217	-0.679**	0.213
	(0.337)	(0.137)	(0.337)	(0.137)	(0.339)	(0.135)
$Op.CF\_assets_{t-1}$	22.489***	-1.106	22.491***	-1.105	22.570***	-1.141
	(5.976)	(1.046)	(5.975)	(1.044)	(5.970)	(1.044)
M/B_{t-1}	0.154**	-0.043***	0.153**	-0.043***	0.147**	-0.040***
	(0.075)	(0.015)	(0.075)	(0.015)	(0.075)	(0.014)
$Tangibility_{t-1}$	0.122	0.208	0.122	0.208	0.106	0.21
	(1.912)	(0.377)	(1.912)	(0.377)	(1.911)	(0.372)
$EBITDA\_assets_{t-1}$	28.781***	-0.834	28.783***	-0.833	28.705***	-0.8
	(5.420)	(0.993)	(5.421)	(0.992)	(5.420)	(0.996)
$Pvtcredit\_GDP_{t-1}$	0	0.003	0	0.003	0	0.003
	(0.008)	(0.002)	(0.008)	(0.002)	(0.008)	(0.002)
GDP_growth_{t-1}	-0.044	-0.006	-0.044	-0.006	-0.042	-0.007
	(0.072)	(0.016)	(0.072)	(0.016)	(0.072)	(0.016)
$Log\_percapitaGDP_{t-1}$	5.508***	-0.474*	5.507***	-0.475*	5.461***	-0.446
	(1.004)	(0.285)	(1.004)	(0.286)	(1.008)	(0.283)
VIX_index_{t-1}	-0.207	0.526***	-0.207	0.526***	-0.204	0.525***
	(0.821)	(0.101)	(0.821)	(0.101)	(0.822)	(0.101)
$Fed\_funds\_rate_{t-1}$	-0.311	1.080***	-0.312	1.080***	-0.317	1.083***
	(0.659)	(0.109)	(0.659)	(0.109)	(0.659)	(0.109)
$Constant$	-0.507	-1.594	-0.482	-1.586	0.103	-2.109
	(17.579)	(3.994)	(17.583)	(4.009)	(17.662)	(3.924)
Firm years	15088	15035	15088	15035	15088	15035
Fixed Effects	Firm, yr	Firm, yr	Firm, yr	Firm, yr	Firm, yr	Firm, yr
R^2	0.077	0.172	0.077	0.172	0.077	0.172