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Enactment of the Insolvency and Bankruptcy Code (IBC) in 2016 marked a watershed event in the commercial credit landscape in India,and represented a major enhancement in the rights of creditors. In this paper we hypothesise that in the new regime, creditors would demand a lower price for credit now that the IBC has strengthened their rights in the event of a borrower defaulting. We focus on one class of creditors--investors in the bond market. We consider IBC as a quasi-natural experiment and empirically investigate its impact on credit spreads in the corporate bond market in India. We find that post IBC, credit spreads declined for the non-financial firms in the private corporate sector. However, even for these firms, bond investors seem to assign greater importance to firm-specific characteristics such as firm size and firm financial health compared to the impact of the new bankruptcy regime. It is plausible that a few years after IBC was implemented, the general discontentment in the financial markets regarding the effectiveness of the bankruptcy law may have dampened the effect on credit spreads. Ours is the first study to analyse the influence of the IBC on the cost of credit in the bond market. Currently, the bond market in India is skewed towards high rated bonds which account for bulk of all issuances. In order to develop a deep and liquid market for lower rated bonds, investor confidence in effective bankruptcy resolution will be crucial. This study provides us with valuable insights about the reaction of the bond investors to the IBC.

Key words: Bond pricing, Credit spreads, Bankruptcy law, Creditor rights, Credit rating, Maturity, Liquidity, Risk perception.

JEL Codes: G12, G32, G34

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1. Introduction

The enactment of the Insolvency and Bankruptcy Code (IBC) in May 2016 marked a watershed event in the commercial credit landscape in India. For a robust credit market to develop in India, IBC is a single unambiguous law that covers the insolvency of all classes of debtors and gives clarity to all classes of creditors about their rights when a debtor becomes insolvent. Consequently, this seminal change in the Indian bankruptcy framework is expected to alter the behaviour of creditors. We hypothesise that in the new bankruptcy regime, creditors demand a lower price for credit now that the IBC has strengthened their rights in the event of a borrower defaulting.

We focus on one specific class of creditors--investors in the corporate bond market. We aim to assess the change in the risk perception of an average corporate bond investor pre and post-IBC. More specifically, we are interested in empirically investigating the impact of the IBC on credit spreads in the corporate bond market in India. To the best of our knowledge, no empirical studies have so far examined whether the implementation of the IBC has had any impact on the corporate bond market. In this paper we fill this gap by putting together a novel, comprehensive dataset that contains granular information on every bond issued in the primary corporate debt market in India over the last 11 years, from FY2011 to FY2021. This amounts to 13,360 bond issuances. For the purpose of this paper, we have focused on the bonds issued in the period from FY2015 to FY2020. This amounts to 5,646 issuances.[3] In order to expand the set of determinants of credit spreads, we match this dataset with the firm-level Prowess data provided by CMIE (Centre for Monitoring Indian Economy).

The resultant rich dataset that we create provides a unique opportunity to empirically examine the propagation of the impact of the IBC on the corporate bond market through credit spreads. In addition, IBC was a one-off, big-bang reform in a country which until then did not have a well defined, transparent resolution mechanism for firms. This is different from several other countries where bankruptcy reforms have been a gradual and incremental process (Sengupta and Sharma, 2015). This provides us with a quasi-natural experimental set up using which we can explore the impact of the IBC on corporate credit spreads. Moreover, when the IBC was enacted, it was intended as a resolution mechanism for non-financial firms. This design gives us the opportunity to identify the impact of the bankruptcy regime on a group of "treated" firms. We are able to compare the change in the credit spreads of the bonds issued by these "treated" firms i.e. non-financial firms in the post-IBC period, with that of the bonds issued by financial firms, which did not fall under the purview of the IBC, and hence form our "control" group.[4]

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3   This is because the data prior to this period has a large number of missing observations and we wanted to exclude the Covid-19 pandemic period. Also, this data does not include the D-rated bonds.

4   There exists an enabling section in the law which allows the central government to notify financial firms which maybe resolved under the IBC but for all practical purposes the financial markets knew that the IBC was meant to be a resolution mechanism for non-financial firms.

While the IBC as a law is applicable to non-finance firms owned both by the government and the private sector, it is likely that within the larger "treatment" group of non-finance firms, those in the private sector would face the brunt of the new bankruptcy regime significantly more than the public sector enterprises (or PSUs i.e. public sector units). This is because PSU firms by the virtue of being owned by the government enjoy an implicit credit guarantee and hence, the bond investors are unlikely to foresee a bankruptcy even when the financial health of such a firm is poor. In other words, IBC is likely to be less relevant for PSUs from the perspective of the bond investors. Hence, we hypothesise that IBC would lower the credit spreads of the non-finance, non-PSU firms compared to the finance firms owned by the government.

Also, within the broader "treatment" group of non-finance firms, IBC and the efficiency of bankruptcy resolution are likely to be more relevant for firms that are financially most stressed and hence closer to bankruptcy. This implies that, *ceteris paribus*, bond investors in low rated bonds would see relatively greater benefit from IBC that those in highly rated bonds, given that ratings assigned to bonds by credit rating agencies capture the default probability of a bond. Therefore, we hypothesise that the impact of the IBC in reducing credit spreads will increase as the credit rating of the bond decreases, other factors held constant.

In our empirical analysis we control for other potential determinants of credit spreads, both at the issue level (such as default probability implied by the credit rating of a bond, issue size and maturity of the bond) as well as at the issuer level (such as firm size, and firm financial health captured by interest coverage ratio). We also account for other macro-financial developments that might have affected the credit spreads, by using year fixed effects.

In this context it is worth noting that while financial intermediation predominantly happens through the banking sector in the Indian economy and banks disproportionately account for the debts on the corporate balance sheets, in this paper we focus on the bond market when analysing the impact of the IBC. This is because compared to banks, bond investors are arms-length creditors (Rajan, 1992). While banks are able to procure detailed information about their borrowers even after the loan has been made, bond investors cannot do so. Banks can write specific covenants in their loan contracts which guard their interests including the ability to to recover their debt, and they can also rely on the collateral in the event of secured credit. Bond investors on the other hand use standard covenants and majority of the bonds are unsecured.

Moreover, in the pre-IBC era, bond investors in India did not have well defined rights as creditors in the event of a corporate default, whereas banks could take recourse to legal

actions through SARFAESI or the various restructuring schemes designed by the Reserve Bank of India (RBI). This arguably was a critical factor responsible for the inadequate development of a liquid bond market in India. With the enactment of the IBC, bond investors are placed on an equal footing along with banks, when it comes to initiating insolvency proceedings against a defaulting debtor or in the committee of creditors. Hence it may be expected that with the implementation of IBC, the cost of borrowing, as reflected in the credit spreads in the bond market has come down.

We find that the IBC lowered the credit spreads for bonds issued by non-financial firms in the period from 2016-17 to 2019-20 compared to the bonds issued by the finance-firms in the years 2014-15 and 2015-16 especially when other issue-level determinants of credit spreads are taken into account. This is in line with our hypothesis that ushering in of the new bankruptcy regime would lower the cost of borrowing in the bond market. However, we find that once we account for firm-specific factors, the statistical significance of this effect disappears. In other words, investors in the bond market seem to pay more attention to firm balance sheet features (such as firm size and financial health) as opposed to access to the IBC led resolution, in assessing credit risk in bonds and hence determining credit spreads.

Within the "treatment" group of non-finance firms, the impact of the IBC on the credit spreads of the non-PSU firms, compared to the PSU, finance firms, has been in the expected direction but it is found to be statistically insignificant. On the other hand, IBC seemed to have had a marginal or weak impact on the credit spreads of the lower rated bonds issued by the non-finance firms in the "treatment" group. A plausible explanation of these results could be that soon after the enactment of IBC, the law in particular and the bankruptcy resolution process in general were subject to several legal and regulatory changes and witnessed various judicial and administrative hurdles, all of which may have hampered the *perceived* effectiveness of the IBC. This in turn could have played a role in dampening the impact of the law on credit spreads.

The kind of analysis we have done in this paper fits into the existing literature that finds effective reform of creditor rights is associated with a lower cost of credit (Armour et al, 2015). It is also related to the literature that explores the impact of the IBC on multiple aspects of the financial system including firms' financing behaviour (Mohanty and Sundaresan, 2018) as well as the literature that explores the impact of legal regime changes in the context of debt recovery and resolution in India (Vig, 2013). Our paper is also connected to the strand of literature that studies determinants of bond pricing.[5]

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5   See for example Elton et al (2001), Giampaolo and Sironi (2005), Paiva and Savoia (2009) among many others.

The main contribution of our work is that to the best of our knowledge ours is the first comprehensive, empirical analysis of the impact of the new bankruptcy law on an important class of creditors – the bond investors. Several regulatory changes in the recent past (such as the RBI's large exposure framework (LEF)) have tried to nudge large borrowers away from the banking system and towards the bond market. Effective bankruptcy resolution regime is critical for the bond investors to develop confidence in the Indian market. Currently, the bond market is skewed towards high rated (AAA and AA) bonds which account for more than 85% of all issuances. In order to develop a deep and liquid market for lower rated bonds, investor confidence in effective bankruptcy resolution will be crucial. In this context, our study can provide us with valuable insights about the reaction of the bond investors to the IBC.

Secondly, we use a novel dataset which is by far the most extensive and comprehensive dataset on corporate bond issuance in India. We describe the data in greater detail in Section 3. In this dataset, we have issuance-wise information on bond yield, credit rating, maturity, as well as ownership and sector of the issuing corporation. Finally, our study is the first one that along with the impact of the IBC, also throws light on other potential determinants of bond pricing or corporate credit spreads in the Indian context.

2. The Insolvency and Bankruptcy Code

In the pre-IBC era, the Indian framework for corporate insolvency resolution was a complex and fragmented one, fraught with deficiencies in the laws, their procedures, their implementation as well as in the capacity of the institutions supporting them. The absence of a coherent and effective mechanism for resolving corporate insolvency resulted in poor economic outcomes. There were significant problems in developing credit markets for example. Bond investors had to plan for near-zero recovery upon default, which in turn drove up the required rate of return. This led to few firms finding it cost effective to issue bonds. As a result, secured credit from banks and financial institutions had become the dominant source of debt financing for firms. In 2012-13, out of 22% of total borrowings by Indian non-financial firms, banks accounted for 15% (Sengupta, Sharma and Thomas, 2016), whereas bonds contributed a meagre 0.96%.

In contrast, the IBC is a clean, modern law that offers a well-defined, coherent answer to the insolvency resolution problems of non-financial firms. It prescribes a well-defined process with finite timelines and organised forums for the resolution of corporate bankruptcy. It has also set the foundations for crucial institutions such as insolvency professionals, and information utilities which are meant to impart efficiency to the overall bankruptcy

resolution process. The objective behind implementing this law was that it would potentially change not only the manner in which insolvency is resolved in India but also the entire credit landscape of the country.

In 2014, a significant effort at comprehensive bankruptcy reform was undertaken when the Ministry of Finance set up the Bankruptcy Law Reforms Committee (BLRC) under the Chairmanship of Dr. T. K. Viswanathan. This was the time when non-performing assets were piling up on bank balance sheets, especially for the public sector banks, owing to large scale defaults by finally stressed firms. The mandate of the BLRC was to recommend an Indian Bankruptcy Code, that would be applicable to all non-financial corporations and individuals, and would replace the earlier frameworks. The Committee submitted its report and a comprehensive draft Insolvency and Bankruptcy Code (IBC) to the government in November 2015. In May 2016, the IBC was enacted in the Parliament, and it superseded all the extant laws for all categories of debtors and creditors.

IBC is different from the labyrinth of extant Indian laws dealing with corporate insolvency, both in principle and in the design of the resolution framework. It is a single, consolidated code for insolvency resolution of all non-financial entities unlike the erstwhile laws such as the Companies Act 1956 or SICA (Sick Industrial Companies Act) 1985, or SARFAESI (Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act) 200h2, that applied selectively to a certain group of debtors and creditors. An important feature of the IBC is that it transfers the right to initiate insolvency resolution from the debtors to the creditors. The IBC empowers all creditors - secured, unsecured, financial and operational, to initiate insolvency proceedings. In contrast, under the older laws, unsecured financial creditors (such as investors in the bond market) and operational creditors (including the employees of the debtor firm) had no rights to seek resolution of an insolvent firm.

IBC provides a forum for collective recovery and resolution. It gives opportunity to all key stakeholders to participate in the insolvency proceedings and collectively assess the viability of the defaulting firm. Once the bankruptcy proceedings are triggered, the debtor loses possession of her firm and a committee of creditors, consisting of all classes of creditors, takes over the management of the firm with the help of an insolvency professional. There is also an automatic moratorium on all suits and claims against the debtor firm.

IBC also stipulates finite time limits within which the debtor's viability can be assessed. In the older system, judicial involvement in business decisions often caused inordinate delays in resolving insolvency and adversely impacted the recovery rates for the creditors. According to the "Doing Business Survey" of the World Bank, 2014, the average time taken in India to resolve corporate insolvencies was more than 4 years, compared to 1 year in UK

and Australia and 1.5 years in the US. According to Ravi (2015), under the earlier regime it took almost 10 years for creditors to receive a court judgement on insolvency litigation and about five years to wind up companies or recover debt. The average recovery rate for Indian creditors was only 25 cents per dollar, compared to more than 80 cents per dollar in UK, UK and Australia. The expectation was that IBC would improve these outcomes substantially by significantly shortening the time taken for resolution, and by also increasing the recovery rates for creditors.

In addition to the process improvements, IBC also set up new institutions to support the implementation of the law and ensure efficient outcomes. These include a cadre of regulated insolvency professionals (or Ips), regulated information utilities (IUs), and an insolvency and bankruptcy regulator (i.e. the Insolvency and Bankruptcy Board of India or IBBI). It was also decided that all IBC cases would be referred to the specialised National Company Law Tribunals (NCLT). In summary, IBC when it was enacted, represented a major departure from the erstwhile system of corporate bankruptcy resolution that existed in India, and was expected to herald a significant improvement in overall credit landscape.

2.1 Performance of the IBC

The performance of the IBC so far has been a mixed bag. The first IBC case was admitted to the NCLT in December 2016. In June 2017, the RBI identified 12 highly stressed debtors for insolvency resolution under the IBC. Since then cases admitted have steadily gone up. The law has also been six times so far, and a number of regulations (about 18 regulations which have been amended more than 80 times) with have been issued from time to time by the IBBI to govern the process.

As of September 2022, around 5,893 cases have been admitted under the IBC, according to data from the IBBI (IBBI, 2022). Of these, nearly 30% of the cases ended up in liquidation and only about 10% were effectively resolved. 43% of these cases were triggered by financial creditors. The performance of the IBC was comparatively better in the first two years (FY2017 and FY2018), but from FY2019 onwards, many problems began to resurface and the IBC cases for which resolution plans were approved began declining.

Moreover, IBC was supposed to initiate a time-bound process for resolution. Timeliness is critical in the context of insolvency resolution so that the viability of the business and the value of the underlying assets do not deteriorate further. At the time of enactment IBC stipulated a 180-day deadline to complete the resolution process. Eventually through multiple amendments, the timeline was increased to 330 days, i.e. nearly 1 year. In FY2018 (when the timeline was still 180 days with a maximum 90 day extension), most IBC cases

got resolved in less than 300 days. However, by FY2022, it took as many as 770 days to resolve cases involving firms that owed more than Rs 1,000 crore. The cases which have till date been resolved took on average 450 days for the conclusion of the process. And of the ongoing cases, around 65% have been pending for more than 270 days.

In the context of recovery rates, an important concept is "haircut". It is the debt foregone by a lender as a percentage of the total outstanding claim. In the first five years of the IBC, the creditors had to accept an 80% haircut for more than 70% of the cases. This could be a function of the financial condition a firm is in by the time it is admitted under IBC (for example about 35% of the cases which yielded resolution plans were legacy cases that had been languishing for years under the BIFR), but in general the haircuts have been on the higher side. In some cases, the haircuts have been as high as over 90%. Till September 30, 2022, the average haircut for creditors relative to their admitted claims was around 70%.

Several other issues have cropped up over the years, concerning the conduct of the insolvency professionals as well as of the committee of creditors as well as judicial delays in overburdened courts. There has been a growing concern over the last few years that the original objectives that the IBC was expected to achieve are not being met in a satisfactory manner, and that the law is slowly losing its effectiveness owing to excessive delays and loss of value in the resolution process.

3. Research design

Credit spreads reflect the expected loss to the corporate bond investor, which in turn can be expressed as a product of two parameters: probability of default (pD) and loss given default (LgD). Hence, arithmetically:

$$\text{Expected loss (EL)} = pD * LgD$$

The probability of default (pD) of any bond is captured by its rating. Accredited rating agencies rate most of the corporate bonds issued, and disclose (annually) the pD associated with each rating class. Our hypothesis is that the exogenous change of bankruptcy regime ushered in by the enactment of the IBC, made the bankruptcy resolution process more efficient and expedient thereby reducing the bond investors' *ex ante* estimates of loss given default (LgD). Thus, we would expect that credit spreads across rating classes would decline in the post-IBC regime compared to the pre-IBC regime.

For better identification, we consider the non-financial firms in our dataset as the "treated" group, and compare the average effect of the IBC on their credit spreads vis-a-vis that of the "control" group i.e. the finance firms. This is because the IBC, when it was enacted was intended as a resolution mechanism for non-financial firms.[6]

In our baseline model, we intend to estimate the change in the credit spreads for corporate bonds issued by the non-financial firms in the post-IBC period relative to those issued by the finance firms in the pre-IBC period. We also control for other potential determinants of credit spreads. The baseline model is specified below in equation 1.

(1) $$y_{jt} = b_0 a_t + b_1 IBC + b_2 NONFINANCE + b_3 IBC^* NONFINANCE + b_4 Z_{jt} + \epsilon_{jt}$$

Y_{jt} is the credit-spread of the issuance j in year t. We control for time fixed effects denoted by a_t. IBC is a dummy variable that takes the value 1 for years FY2017 to FY2020 and 0 otherwise. Given that IBC was suspended for one year during the Covid-19 pandemic in FY2021, we end our sample in FY2020. NONFINANCE is a dummy variable that takes the value 1 for all non-financial firms in our sample. Therefore, given our baseline hypothesis, we expect that the estimated coefficient b_3 will be negative. Z_{jt} is a vector of issue-level determinants of credit spreads such as default probability (as implied by the credit rating of the bond), issue size, and maturity period.

In order to expand the set of determinants of corporate credit spreads, we match this dataset on bond issuances with firm level balance sheet data as obtained from the Prowess database of CMIE. We then estimate equation 2 below.

(2) $$y_{ijt} = b_0 a_t + b_1 IBC + b_2 NONFINANCE + b_3 IBC^* NONFINANCE + b_4 Z_{jt} + b_5 X_{it} + +\epsilon_{ijt}$$

X_{it} is a vector of issuer-level determinants of credit spreads such as firm size, and firm financial health as proxied by interest coverage ratio. We estimate equation (2) for the matched dataset. Over and above the controls mentioned in equations (1) and (2), we also incorporate a dummy variable (REPEAT) which captures repeated issuers in the bond market, the idea being that familiarity of a particular bond issuer may lead to lower credit spreads demanded by the bond investors. REPEAT takes the value 1 if the firm has issued bonds in 3 consecutive years and 0 otherwise.

In addition to the baseline model, we dig deeper into the "treatment" group of non-finance bond issuers and hypothesise that within the group of non-finance firms, IBC would lower

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6   There is an enabling section in the law which allows the government to notify financial firms which maybe resolved under the IBC but for all practical purposes it was well understood that the IBC was a resolution mechanism for non-financial firms.

the credit spreads of bonds issued by the non-PSU firms and also of the lower-rated bonds compared to the corresponding "control' groups. This is because PSU firms by virtue of being owned by the government enjoy an implicit credit guarantee and hence, the bond investors are unlikely to foresee a bankruptcy even when the financial health of such a firm is poor. In other words, IBC is likely to be less relevant for PSUs from the perspective of the bond investors. Additionally, it is plausible that the decline in spreads will be greater for lower rated bonds that are arguably closer to default. This implies that, *ceteris paribus,* bond investors in low rated bonds would see relatively greater benefit from IBC that those in highly rated bonds, given that credit ratings capture the default probability of a bond. Accordingly we estimate equations 3 and 4 below.

$$(3) \quad y_{ijt} = b_0 a_t + b_1 IBC + b_2 IBC^* NONFINANCE + b_3 IBC^* NONPSU + b_4 IBC^* NONFINANCE^* NONPSU + b_5 Z_{jt} + b_6 X_{it} + +\epsilon_{ijt}$$

$$(4) \quad y_{ijt} = b_0 a_t + b_1 IBC + b_2 IBC^* NONFINANCE + b_3 IBC^* LOWRATED + b_4 IBC^* NONFINANCE^* LOWRATED + b_5 Z_{jt} + b_6 X_{it} + +\epsilon_{ijt}$$

NONPSU is a dummy variable that takes the value 1 for all firms in the private sector and 0 otherwise. LOWRATED is a dummy variable that takes the value 1 for all bonds rated A and below and 0 otherwise. All other variables are as in equations (1) and (2). As per our hypotheses, we would expect the estimated coefficient b_4 to be negative in both equations (3) and (4).

4. Data and Summary statistics

Data on the pricing of corporate bond markets can be obtained from two sources – primary markets, i.e. the pricing data at the time of issuance of the bond, or secondary markets where bonds are traded and their prices are 'discovered' every day. In any securities market, the secondary market data is more reliable as the prices in the secondary market, embody information from a large number of participants. In the case of corporate bonds in India however, the secondary market is highly illiquid; the average daily trading volume is less than 0.5% of the outstanding bonds. Further, even this limited secondary market trading is observed in a handful of highest rated bonds. As a result, there is very limited corporate bond price data available from the secondary market.

For this paper, therefore, we have used primary market data on the issuance of bonds. It is important to note that most (but not all) of the primary issuances are done through a book

building process which is akin to auctioning the bond. The participants in this process are highly informed investors and hence the process ensures a robust price discovery.

We hand-collect data on all corporate bonds issued in the last 11 years, from FY2011 to FY2021 using the IndiabondInfo (https://www.indiabondinfo.nsdl.com/) service of National Securities Depository Limited (NSDL). For our analysis we use the data from FY2015 (i.e. April 2014 to March 2015) to FY2020 (i.e. April 2019 to March 2020) because the data prior to FY2015 is sparsely populated and we want to avoid the impact of the Covid-19 pandemic in FY2021 when the IBC was also suspended for a year. This gives us data on 5,646 bond issuances (above C+ rating). The IBC was enacted as a law in May 2016 and the first case was admitted in the NCLT in December 2016. Therefore, we consider the first two years i.e. FY 2015 and 2016 as the 'pre-IBC' period and the period from FY 2017 to 2020 as the 'post IBC' period.

Our dataset contains bonds issued by a wide array of firms - industrial and financial, private and public sector. We eliminate all the bonds with D-rating, bonds with optionalities (i.e. embedded put and call options), and also a tiny fraction of bonds that had floating rates of interest. For each bond issue, we have detailed granular data on the credit rating of the bond, its maturity, its coupon rate, frequency of coupon payment (i.e. quarterly, semi-annual ,etc), name of the issuer, ownership and sector of the issuer, and the unique security number (ISIN no). We complement this data with the data on default probabilities disclosed by three leading rating agencies, namely, CRISIL, ICRA, and CARE. These agencies provide this data on an annual basis.

4.1. Descriptive statistics

In Table 1 we present a description of the data for the aggregate sample as well as for the bonds issued by the non-finance firms i.e. the "treatment" group in our analysis. We find that there has been a consistent growth in both the number as well as in the volume of bond issuances during the sample period, FY2015 to FY2020. We also see from Table 1 as well as from Figure 1 that financial companies (i.e. Non-banking finance companies or NBFCs) account for bulk of the issuances both in term of value and number. The share of non-finance companies in the total value of bonds issued during our sample period has been around 35%.

In Table 2, we present the total value of bond issuances, the number of issuances as well as the total number of unique issuers, pre- and post-IBC. Unique issuers are the firms that have issued bonds in the primary market at least once during the sample period. While the table shows that bond issuances have gone up in the aftermath of the IBC, we also have to take into consideration that our post-IBC sample consists of 4 years whereas the pre-IBC sample is only 2 years.

We next classify the bonds into rating categories. Often, the same bond is rated by multiple credit rating agencies and the ratings can also differ. We take the highest rating given to every bond issuance. We also condense the 14 rating categories in the original dataset to roughly 7. This is because we are interested in the associated default probabilities and we get default probabilities for 7 rating categories (i.e. AAA, AA, A, BBB, BB, B, C). To do this, we consider for example AA+ as AA, BB+ as BB and so on. The +/- signs depict the outlook and we are only interested in the main rating.

There is also a certain fraction of bonds in our dataset that are not rated by any rating agency and are denoted as NAs. We drop these bonds from our sample because we cannot assign default probabilities to them and default probability is an important determinant of corporate credit spreads. After excluding the NAs, our sample consists of 3,356 bond issuances. The rated bonds account for 61% of the total sample by number of issuances, and 90% of the total sample by value of issuances. In order to access issuer level balance sheet variables, we match our dataset with the firm-level Prowess data provided by the CMIE. We match firms by names. The matched firms account for 73% of the sample of rated bonds by number of issuances and 67% by value of issuances.

We provide a detailed distribution of the rated and unrated bonds in our dataset in Tables 3-6 and in Figure 2. It is clear that both by number and by volume of issuances, the bulk of the entire bond issuance takes place in the top two rating categories AAA and AA.

4.2 Credit spreads of bonds

In order to estimate the impact of the IBC on corporate bond pricing, we calculate the credit spreads for each bond. Specifically, we use the Zero-Coupon Yield Curve (ZCYC) data provided by Clearing Corporation of India Ltd (CCIL) to get the yield of zero coupon government security of the same maturity as the corporate bond. The difference between the annualised coupon of the corporate bond and the corresponding ZCYC yield is taken as the credit spread on the bond.

In Table 7, we show the summary statistics for the credit spreads across all rating categories for our sample period. For each of the 7 credit ratings we assign the corresponding default probabilities using the data disclosed by the three leading credit rating agencies – CRISIL, ICRA, and CARE. The same rating given by two different rating agencies can be associated with different default probabilities, especially for lower rated bonds. We assign the default probabilities for the agency that has given the highest rating to the bond. For a bond issued in year t we use the default probability for year t-1. We see from Table 7 the spread (and the default probability) is lowest for AAA rated bonds and increases as we go down the ratings curve, as expected.

In Figure 3, we show the average credit spreads across the 4 main rating categories for our sample period to depict the changes if any, potentially brought about by the IBC. IBC was

notified in May 2016. While the first cases were filed in December 2016-January 2017, it was only in FY2018 i.e. post April 2017, that major cases of non-financial firms defaults began to be brought to the IBC for resolution.[7]

We see that FY2017 i.e. the year when IBC was enacted and implemented, showed a sharp rise in risk spreads especially for the lower rated bonds. This could possibly be because of the rising NPAs (non-performing assets) in the banking sector which had raised the general risk aversion in the financial system. We find that after the IBC became effective in FY2017, there was a decline in average credit spreads which was most pronounced for the BBB rated bonds. This makes sense because these bonds by definition carry the highest probability of default and it is possible that once the new bankruptcy regime came in place, they benefitted the most from a decline in spreads. The decline is more muted for AA and A rated bonds. For the AAA bonds, the spreads show a slight upward shift in FY2018, and decline only with a lag.

For all categories of bonds however we find that from FY2019 onwards, average credit spreads began increasing, the rise being steepest for the BBB and A rated bonds. This could be because by then some amount of discontentment had set in as regards the effectiveness of the IBC as the operational bottlenecks, delays in resolution and low recovery rates started becoming evident. Also, this was the period when the bond market got affected by the repercussions of the NBFC crisis in the aftermath of the IL&FS (Infrastructure Leasing and Financial Services) default.

5. Empirical estimation

We use ordinary least squares regression to estimate our baseline model as specified in equations (1) and (2) in Section 3. Our objective is to uncover the impact of the new bankruptcy regime on the credit spreads and the overarching hypothesis is that as the IBC ushered in a more efficient bankruptcy resolution regime, it should lower the credit risk premium built into bond pricing. Given the the IBC was primarily applicable for non-financial firms, this impact should be visible for these "treatment" firms in comparison to the "control" group of firms i.e. the financial firms in our sample.

In Table 8 we report the results from estimating equation (1). Column 1 does not include year fixed effects which are added in column 2 and in column 3 we control for the issue level determinants of credit spreads. Our variable of interest is the interaction term IBC*NONFINANCE. We find that while the estimated coefficient for this term is negative in all specifications, it is statistically significant at the 1% level only for the specification where the issue level determinants are accounted for and the year fixed effects are added.

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7   See https://rbidocs.rbi.org.in/rdocs/notification/PDFs/NOTI299511AEAA9B6A24FED8633B679A44B8244.PDF.

Once we control for default probability, bond issue size and the maturity period, we find that in the post-IBC period, credit spreads for the non-finance firms went down, on average, by 66 basis points compared to the finance firms. The issue level controls are all statistically significant and have the expected signs as well. Higher the default probability, greater the credit spread. Also credit spread decreases with the issue size and increases with the maturity of the bond. The coefficient of the REPEAT dummy variable is negative implying that credit spreads are lower for repeated bond issuers i.e some premium is attached to the familiarity of the issuer as expected.

We test the parallel trends hypothesis as well by running the regression on the pre-IBC sample and interacting the "treatment" dummy of NONFINANCE with a pre-IBC dummy for FY2016. We do this in order to examine whether credit spreads were lower for this group of issuers even before the IBC was enacted. We report the results in Table 9 and find that this was not the case, because the coefficient of FY2016*NONFINANCE comes out to be statistically insignificant. This also holds true for the matched sample of firms but we have not reported the results here for brevity.

We then proceed to estimate equation (2) for the matched sample wherein we match the firms issuing bonds in our sample with firms in the Prowess database, and report the results in Table 10. We find that once firm-level determinants of credit spreads are accounted for (such as firm size and interest coverage ratio) the coefficient of the IBC*NONFINANCE dummy while still negative is no longer statistically significant. This potentially implies that the investors in the bond market pay more attention to firm balance sheet features as opposed to access to IBC led resolution, in assessing credit risk in bonds and hence determining credit spreads. Firm size has a negative coefficient which is intuitive; bigger firms experience lower credit spreads. ICR as a proxy of firm financial health has the right negative sign (higher the interest coverage ratio, better the financial health of the firm and hence lower the credit spreads) but is not statistically significant.

Next, we delve deeper into some more additional hypotheses and estimate equations (3) and (4) specified in Section 3, in order to examine the impact of the IBC for specific categories of bond issuers, within the broader "treatment" group of non-finance firms, i.e. non-PSU or private sector issuers and low-rated issuers. We report the results of these regressions in Tables 11 and 12, respectively, for the full sample of firms. For the non-finance, non-PSU firms, IBC has a negative effect on credit spreads but it is statistically insignificant. Whereas, for the low-rated issuers among the non-finance firms, the negative impact of the IBC on credit spreads is statistically significant at 10% level. The economic magnitude of the effect is also quite high. On average IBC seems to have lowered the credit spreads of these issuers by as much as 1.6%. This suggests that other factors held constant, IBC and the efficiency of bankruptcy resolution were much more relevant for firms that were financially most stressed and hence closer to bankruptcy. In all these specifications the issue-level

determinants have the expected signs, when significant. The results are the same when we estimate these two equations for the matched sample of bond issuers.

In summary, our analysis suggests that while there is some preliminary evidence of the IBC lowering corporate credit spreads, the effect of the new bankruptcy regime is at best, weak. We speculate that the milder than anticipated impact may have been due to the growing disillusionment about the effectiveness of the new bankruptcy regime in view of execution delays and other inefficiencies related to legal, procedural and judicial bottlenecks. This, over time, may have dampened the impact of the IBC on bond investors' risk perception.

6. Conclusion

The Insolvency and Bankruptcy Code (IBC, 2016), for the first time, established a well-defined process with timelines and forums for resolution of corporate bankruptcy in India. The overarching objective of the IBC was to alter the behaviour of the creditors, especially the financial creditors, and bring about a comprehensive improvement in the credit landscape in India, particularly in the context of corporate bond market development. Indian credit landscape has always been heavily bank dominated, and this was reflected in the erstwhile resolution framework that existed prior to the IBC and that was exclusively designed for recovery by banks. In contrast, IBC marked a welcome departure from this old system by strengthening the rights for all classes of creditors, including bond investors. This is of particular importance because the Indian corporate bond market is small and less developed in comparison to not only developed markets, but also some of the other emerging market economies.

In this context, we empirically investigate whether the enactment of the IBC had any effect on credit spreads in the Indian corporate bond market. We use a novel dataset on primary bond issuances for the period from FY2015 to FY2020, and exploit the unique quasi-natural experimental set-up offered by the IBC as well as the fact that the law is predominantly applicable to non-finance firms which in turn allows us to separate bond issuers into "treatment" and "control" groups. We find that there is some evidence that IBC did indeed help to lower the borrowing costs in the bond market but the impact has been milder than perhaps what was anticipated. We conjecture that this weak effect could be because right after the enactment of IBC, the law in particular and the bankruptcy resolution process in general were subject to several legal and regulatory changes and witnessed various judicial and administrative hurdles, all of which may have hampered the *perceived* effectiveness of the IBC from the perspective of the bond investors. Further, the institutional development needed to ensure the effectiveness of the IBC such as the capacity and functioning of the NCLT, number and efficiency of resolution professionals, effectiveness of information utilities, etc is not yet complete. This in turn could have played a role in dampening the impact of the law on credit spreads.

In order to develop a deep and liquid market for corporate bonds, investor confidence in effective bankruptcy resolution will be crucial. Hence our analysis can throw light on

valuable insights about the reaction of the bond investors to the IBC. Our empirical results show that while the IBC may have been implemented with a strong intent to bring about favourable changes in India's credit landscape, over time weaknesses in the execution of the law may have hampered that process and therefore attention needs to be paid to rectify some of these problems in order for the new bankruptcy regime to have its intended impact.

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Tables and Figures

Figure 1: Distribution across Finance and Non-Finance issuers, FY15-FY20
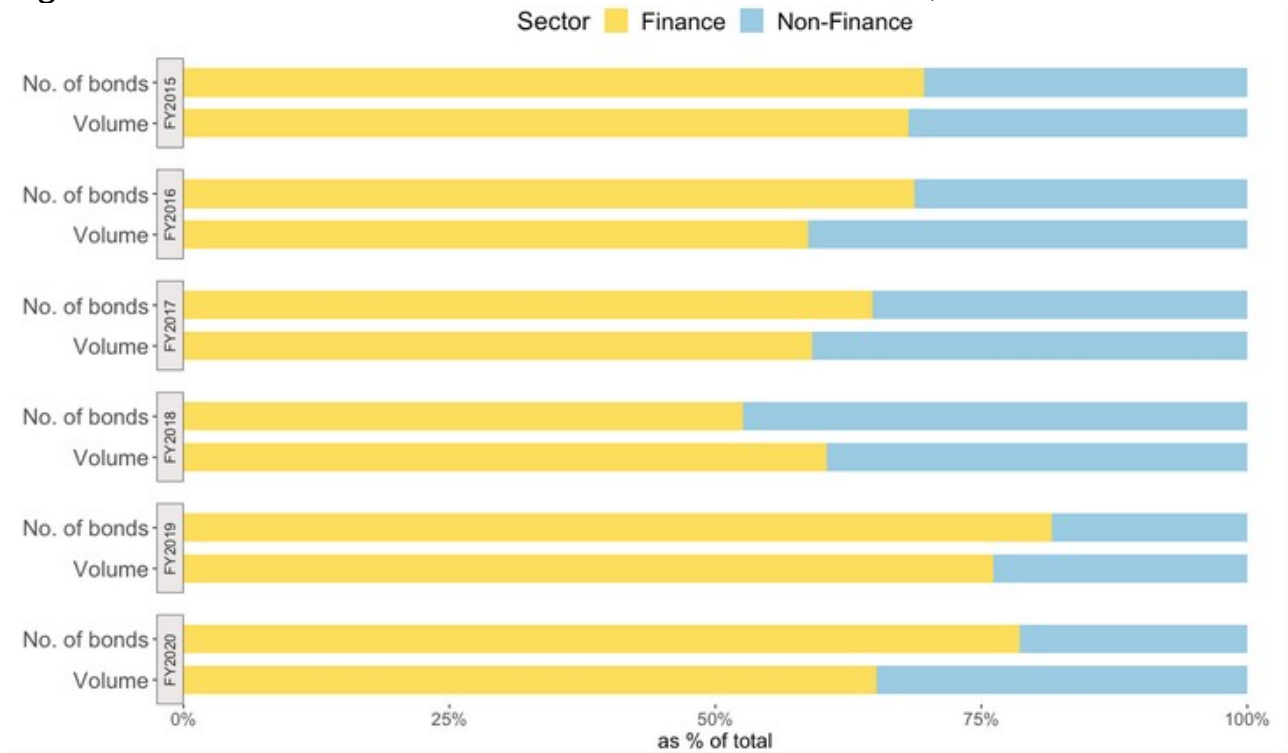
Figure 2: Distribution of bond issuances by rating categories, FY15-FY20
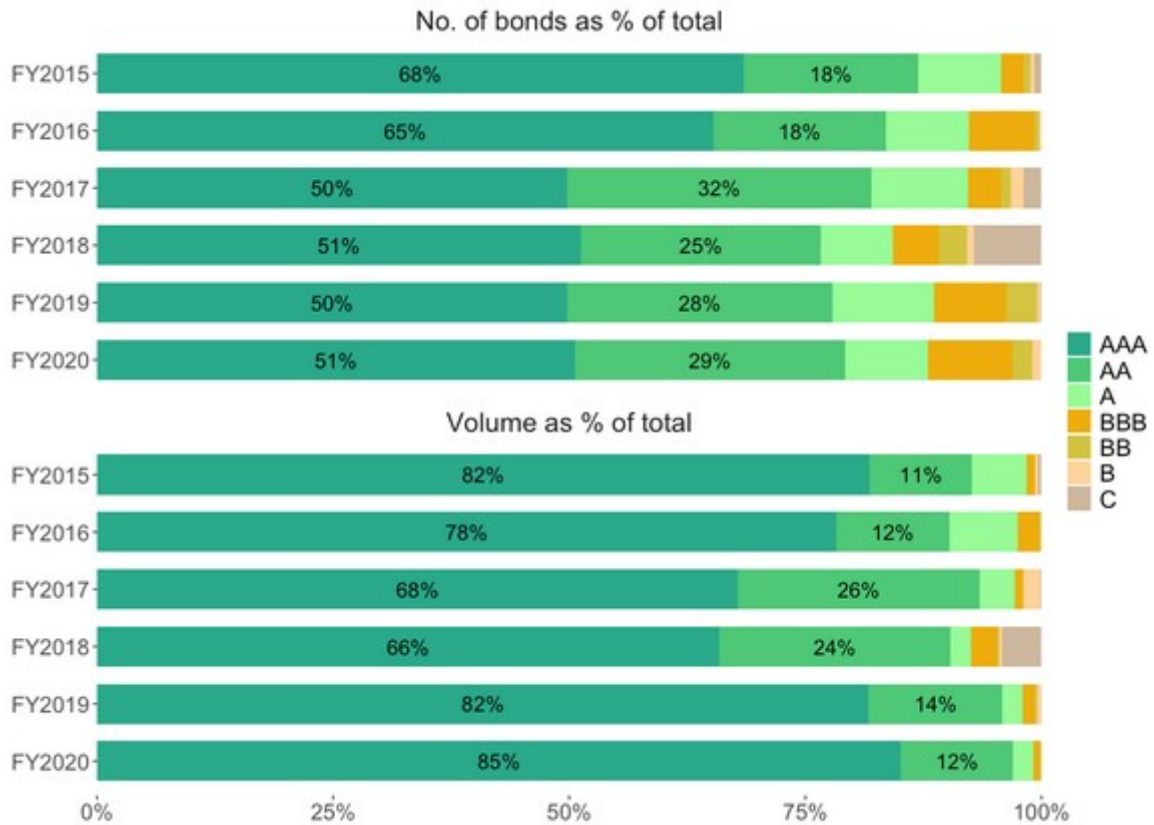
Source for both Figures: NSDL, authors' calculations

Figure 3: Corporate credit spreads and IBC
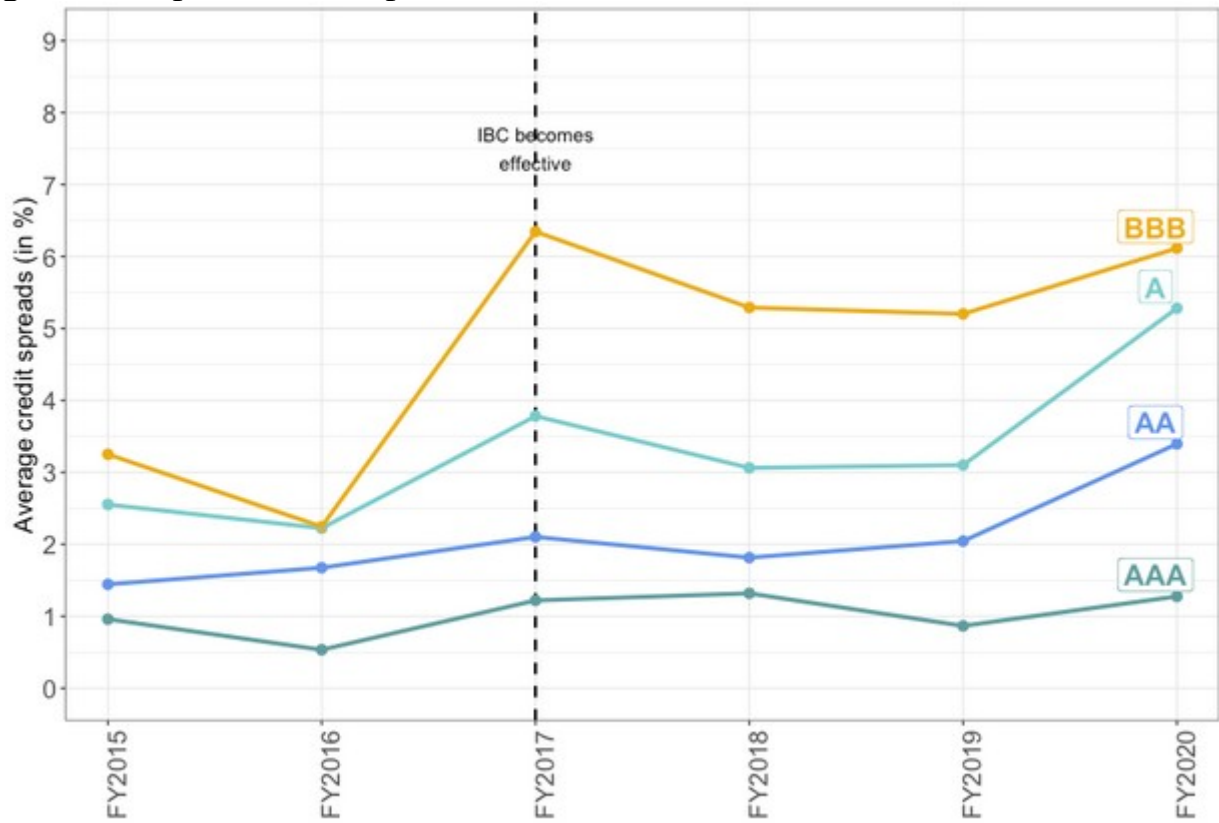
Source: NSDL, authors' calculations

Table 1: Descriptive statistics for total bond issuance, FY2015-FY2020

Year	FY15	FY16	FY17	FY18	FY19	FY20
Aggregate						
No. of issuances	260	377	743	660	587	729
Aggregate volume (Rs. bn)	1897.2	1477.5	3678.7	3142.4	4973.3	5319.0
Avg coupon rate (%)	9.5	8.9	9.1	9.1	9.5	9.1
Sector						
Share of non-finance firms in number of bonds issued (%)	30.4	31.3	35.3	47.4	18.4	21.4
Share of non-finance firms in total value of bonds issued (%)	31.8	41.3	40.9	39.5	23.9	34.8
Avg coupon rate (%)	9.3	9.0	9.0	9.3	9.7	8.4

Source: NSDL, authors' calculations

Table 2: Patterns of bond issuances before and after IBC

Pre-IBC

	All firms	Finance	Non-Finance
Total value of issuances	3374.7	2160.9	1213.8
Number of issuances	637	440	197
Number of unique firms	118	68	50

Post-IBC

	All firms	Finance	Non-Finance
Total value of issuances	17113.3	11326.9	5786.4
Number of issuances	2719	1880	839
Number of unique firms	373	202	171

Source: NSDL, authors' calculations

Table 3: Distribution of rated and unrated bond issuances (by number) across the years

	2015	2016	2017	2018	2019	2020	Total
Total N	408	568	1072	1042	956	1471	**5517**
Rated	260	377	743	660	587	729	**3356**
Unrated	148	191	329	382	369	742	**2161**

Source: NSDL, authors' calculations

Table 4: Distribution of bonds (by number) across rating categories

AAA	AA	A	BBB	BB	B	C
1793	897	309	201	66	26	64

Source: NSDL, authors' calculations

Table 5: Rated and unrated bond issuances across sectors and ownership categories

	Finance	Non finance
Rated	2320	1036
Unrated	348	1813
Total	**2668**	**2849**

	PSU	Non PSU
Rated	680	2676
Unrated	8	2153
Total	**688**	**4829**

Source: NSDL, authors' calculations. The table shows number of bond issuances

Table 6: Distribution of bonds across rating categories for every year, FY2015-FY2020

	2015	2016	2017	2018	2019	2020	Total
AAA	178	246	370	338	292	369	**1793**
AA	48	69	239	168	165	208	**897**
A	23	33	76	50	63	64	**309**
BBB	6	26	26	32	45	66	**201**
BB	2	2	8	20	19	15	**66**
B	1	1	10	5	2	7	**26**
C	2	0	14	47	1	0	**64**
Unrated	148	191	329	382	369	742	**2161**
Total	**408**	**568**	**1072**	**1042**	**956**	**1471**	**5517**

Source: NSDL, authors' calculations. The table shows number of bond issuances for each year for each rating category.

Table 7: Descriptive statistics by rating categories, FY15-FY20

Year	FY15	FY16	FY17	FY18	FY19	FY20
	AAA					
Credit spread (average)	0.93	0.62	1.39	1.63	1	1.35
Credit spread (sd)	0.46	0.73	0.58	0.86	1.16	0.91
Default probability (average)	0	0	0	0	0	0.12
	AA					
Credit spread (average)	1.43	1.78	2.24	1.98	2.12	3.4
Credit spread (sd)	0.66	0.91	0.86	0.8	0.88	1.02
Default probability (average)	0.55	0.55	0.69	0.44	0.35	0.25
	A					
Credit spread (average)	2.45	2.32	3.88	3.19	3.19	5.27
Credit spread (sd)	1.84	1.12	3	3.06	2.29	2.44
Default probability (average)	3.25	3.49	2.93	2.2	2.08	1.83
	BBB					
Credit spread (average)	3.16	2.31	6.41	5.42	4.68	5.86
Credit spread (sd)	4.94	1.65	2.82	1.98	3.63	2.56
Default probability (average)	6.83	6.12	6.3	5.87	6.04	5.86
	BB					
Credit spread (average)	1.99	10.66	8.29	5.95	5.5	6.09
Credit spread (sd)	0.47	3.7	1.64	1.99	2.57	1.05
Default probability (average)	12.32	11.96	10.77	11.34	10.74	10.02
	B					
Credit spread (average)	-1.09	13.94	3.51	2.8	5.93	3.43
Credit spread (sd)	5.77	NA	3.69	2.13	4.34	1.88
Default probability (average)	17.11	15.04	17.45	17.2	17.23	13.64
	C					
Credit spread (average)	5.13	-7.49	4.27	2.89	2.44	NA
Credit spread (sd)	5.53	NA	2.73	0.79	NA	NA
Default probability (average)	26.28	40.5	38.25	35.32	30.73	NA

Table 8: Impact of IBC on credit spreads—Baseline model in full sample

	(1)	(2)	(3)
IBC	1.127***		
	(0.165)		
NON-FINANCE	0.037	0.039	-0.263
	(0.286)	(0.277)	(0.200)
IBC*NON-FINANCE	-0.225	-0.157	-0.660**
	(0.269)	(0.273)	(0.242)
Default probability			0.094*
			(0.041)
Issue size			-0.035***
			(0.005)
Maturity period			0.0001***
			(0.00003)
REPEAT			-1.273***
			(0.193)
Num.Obs.	3356	3356	3356
Year fixed effect	No	Yes	Yes
R2 Adj.	0.046	0.070	0.307

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Note: This table reports the regression result from estimation equation (1) in the paper. IBC is a dummy variable that takes the value 1 for years FY2017 to FY2020 and 0 otherwise. NON-FINANCE is a dummy variable that takes the value 1 for all non-financial firms in our sample. All other variables are as explained in Section 3. Standard errors are clustered at the firm level.

Table 9: Testing the parallel trend hypothesis for the baseline model

	(1)	(2)	(3)
FY2016	-0.258		
	(0.160)		
NON-FINANCE	-0.090	-0.090	-0.269
	(0.324)	(0.314)	(0.211)
FY2016*NON-FINANCE	0.216	0.216	0.142
	(0.408)	(0.400)	(0.343)
Default probability			0.250***
			(0.066)
Issue size			-0.023**
			(0.008)
Maturity period			-0.067***
			(0.016)
REPEAT			-0.609***
			(0.179)
Num.Obs.	637	637	637
Year fixed effect	No	Yes	Yes
R2 Adj.	0.001	0.001	0.393

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Note: This table reports the regression result from testing the parallel trend hypothesis i.e. estimating equation (1) specified in Section 3 on only the pre-IBC sample period. FY2016 is a dummy variable that takes the value 1 for the year 2015-16 and 0 otherwise. NON-FINANCE is a dummy variable that takes the value 1 for all non-financial firms in our sample. All other variables are as explained in Section 3. Standard errors are clustered at the firm level.

Table 10: Impact of IBC on credit spreads—Baseline model in matched sample

	(1)	(2)	(3)
IBC	1.066***		
	(0.184)		
NON-FINANCE	0.028	0.024	-0.814*
	(0.306)	(0.287)	(0.361)
IBC*NON-FINANCE	-0.138	0.037	-0.069
	(0.294)	(0.284)	(0.332)
Default probability			0.053**
			(0.020)
Issue size			0.011*
			(0.006)
Maturity period			0.0003***
			(0.00003)
REPEAT			-0.603**
			(0.219)
Firm size			-0.514***
			(0.061)
ICR			-0.029
			(0.024)
Num.Obs.	2441	2441	2376
Year fixed effect	No	Yes	Yes
R2 Adj.	0.037	0.076	0.478

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Note: This table reports the regression result from estimation equation (2) in the paper on the matched sample wherein bond issuers are matched with firms in the Prowess database. IBC is a dummy variable that takes the value 1 for years FY2017 to FY2020 and 0 otherwise. NON-FINANCE is a dummy variable that takes the value 1 for all non-financial firms in our sample. All other variables are as explained in Section 3. Standard errors are clustered at the firm level.

Table 11: Impact of IBC on credit spreads—Non-PSU, non-finance firms in full sample

	(1)	(2)	(3)
IBC	0.551*		
	(0.231)		
IBC*NON-FINANCE	-0.469	-0.512	-0.211
	(0.332)	(0.319)	(0.259)
IBC*NON-PSU	0.584*	0.586*	0.535
	(0.289)	(0.277)	(0.287)
IBC * NON-FINANCE * NON-PSU	-0.287	-0.090	-0.709
	(0.566)	(0.532)	(0.477)
Default probability			0.091*
			(0.040)
Issue size			-0.022***
			(0.006)
Maturity period			0.0002***
			(0.00004)
REPEAT			-1.116***
			(0.200)
Num.Obs.	3356	3356	3356
Year fixed effect	No	Yes	Yes
R2 Adj.	0.177	0.207	0.355

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: This table reports the regression result from estimation equation (3) in the paper. IBC is a dummy variable that takes the value 1 for years FY2017 to FY2020 and 0 otherwise. NON-FINANCE is a dummy variable that takes the value 1 for all non-financial firms in our sample. NON-PSU is a dummy variable that takes the value 1 for all bond issuers in the private sector and 0 otherwise. All other variables are as explained in Section 3. Standard errors are clustered at the firm level.

Table 12: Impact of IBC on credit spreads—Low-rated, non finance firms in full sample

	(1)	(2)	(3)
IBC	0.649***		
	(0.111)		
IBC*NON-FINANCE	0.251	0.284	-0.016
	(0.206)	(0.215)	(0.172)
IBC*LOW-RATED	1.865***	1.813***	1.733***
	(0.519)	(0.506)	(0.507)
IBC * NON-FINANCE * LOW-RATED	-1.895*	-1.771*	-1.574+
	(0.947)	(0.896)	(0.894)
Default probability			0.013
			(0.025)
Issue size			-0.026***
			(0.004)
Maturity period			0.0001***
			(0.00002)
REPEAT			-0.797***
			(0.190)
Num.Obs.	3356	3356	3356
Year fixed effect	No	Yes	Yes
R2 Adj.	0.388	0.412	0.464

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Note: This table reports the regression result from estimation equation (4) in the paper. IBC is a dummy variable that takes the value 1 for years FY2017 to FY2020 and 0 otherwise. NON-FINANCE is a dummy variable that takes the value 1 for all non-financial firms in our sample. LOW-RATED is a dummy variable that takes the value 1 for all bonds rated A and below and 0 otherwise. All other variables are as explained in Section 3. Standard errors are clustered at the firm level.