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THE IMPACT OF COVID-19 ACROSS CORPORATE DEBT STRUCTURES

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Abstract

This paper investigates the impact of the COVID-19-induced financial crisis across corporate debt structures. I uncover that firms with a high bond-to-total debt ratio tend to have higher stock returns during noncrisis periods, but face lower returns with the onset of the pandemic. I suggest various explanations for why this is the case, including the most likely hypothesis that borrowing from the market is associated with higher volatility in returns. The analysis relies on an original and comprehensive database built on bond offering amounts matched with company fundamentals and stock price data from US firms.

Keywords

Unexpected disasters; Bond ratio; Loan premium; Pandemic resilience; Debt structure;

Chapter 1: Introduction

The COVID-19 outbreak and the measures taken to prevent its spread have brought an abrupt financial crisis onto the world's economy. With social distancing coming into the picture, firms are hit with record output losses, giving way to widespread unemployment and bankruptcies. In March 2020, the US stock market saw one of the most inordinate crashes in history. In just over four trading days, Dow Jones Industrial Average (DJIA) fell by 6,400 points, an equivalent of approximately 26%. This crisis differs from the last few financial crisis, in that the previous ones have been the result of multiple years, or even decades, worth of build up until systemic collapse was inevitable; while this pandemic was brought about in just a few months and entirely due to the spread of an unanticipated virus.

Although it may be an extraordinary event, the COVID-19 pandemic affords us the singular opportunity to effectively analyse the impact of macroscale, unexpected economic shocks on firms. The premise of this study was to discern whether or not a company's bond ratio - defined as debt in the form of bonds over total debt - had any influence on their resilience to the most recent global economic disaster we have faced. The wider implications of this research are that, in theory, any all-embracing phenomena that we discover are likely to pertain not only to this particular crisis, but rather be indicative of corporate mechanisms and behaviour at the micro and macroeconomic level that should apply to any economic catastrophe wherein incalculable risk materializes.

In this thesis, I investigate whether stock returns are impacted differently by the pandemic according to firms' choice of debt structure. Sorting firms by terciles according to their bond ratio, I discover that companies fostering a medium level of bond to total debt ratio have 0,37% higher quarterly stock returns than firms with low bond ratios, and further that companies with high bond ratios have 2,11% higher returns than those in the low bond ratio category (Table

3). I attribute these findings to the primary concept that firms issuing bond debt rather than borrowing from banks have less expensive debt (Schwert, 2018), and therefore will have higher returns as a product of the lower costs.

Breaking the stock return analysis into the pre-outbreak, which I defined as the time period from January 2017 to February 2020, and post-outbreak period, defined as the months following February 2020 until August of the same year, I was able to study corporate behaviour as maintained by both normalcy and shock periods. During noncrisis periods, my tests sustain that firms with medium and high bond to total debt ratios will on average have 1,52% and 3,06% higher returns than those with a low bond ratio, respectively. For these results I volunteer the same explanation as before.

Moreover, I uncover that the same two terciles of corporations that see these higher returns appear to pay the price for them during the COVID-19 outbreak, with firms in the medium bond ratio tercile suffering a 8,47% fall in quarterly stock returns and those in the high tercile range experiencing a 5,28% decrease in returns, while firms in the low bond ratio tercile see a 2,67% increase in returns. Accompanying this outcome, I observe that firms in the higher bond tercile experience the highest volatility in returns out of the three groups. Correspondingly, the justification follows that acquiring bond debt instead of borrowing from banks consists in a tradeoff between risk and return, and as such it is reasonable that, in the face of an unexpected global disaster, the higher risk present in the debt structure of firms with a higher bond ratio would materialize. The higher fall in returns experienced by the middle tercile is backed by the assumption that these firms would see the lowest degree of debt specialization out of the three groups, leading to higher bankruptcy costs due to the larger renegotiation costs associated with the necessity to deal with multiple lenders (Colla, Ippolito and Li, 2013).

Chapter 2: Review of Relevant Literature

2.1. The economic impact of COVID-19

Gormsen and Koijen (2020) present one of the first comprehensive analysis on the impact of the pandemic on stock prices and growth expectations. Using data on dividend futures jointly with data on stock prices, they reveal that, as of April 3rd, in the US, the forecast of annual growth in dividends decreased by 27%, and the forecast of GDP growth decreased by 6.1%. These findings have wider consequences than simple data on falling stock prices, as, rather than merely capture fluctuations that might be purely transitory, they imply long-term negative effects on the economy. Conversely, being that we will be using data on stock prices for this study, we shall be investigating stock returns across bond ratios on companies only for the months in which we have data. However, as Gormsen and Koijen's findings derive similarly from the stock market and find changes in growth expectations for the future, we may by the same token theorise that the variations captured in our data have long-term reverberations as well.

2.2. Borrowing from Banks vs. Borrowing from the Bond Market

Schwert (2018) has shown through direct evidence that there are some inherent differences in borrowing from banks as opposed to in the form of bonds. Notably, his research has found that, in the syndicated bank facility market, yield spreads for a particular firm will tend to be significantly higher than those of the bonds issued by the same firm. Schwert then justifies this difference through subsequent analysis on the loan premium - defined as the premium paid for contracting a loan rather than seeking credit through the bond market - the results of which imply that firms value debt coming from banks not only for the benefit of obtaining debt capital, but also for the bank services associated with the loan contracting. Most importantly, banks

offer the ability to renegotiate at a lower cost, decreasing bankruptcy costs and increasing the company's room for manoeuvre. Together with the ability to draw on lines of credit, it is in accordance with these findings that borrowing from banks is a choice that favours firms' adaptability, which should promote risk mitigation when compared with borrowing from the bond market.

Considering the aspect that the loan premium itself exists, it might imply that corporations with a high bond ratio will, in general, have higher returns than those with low bond ratios. The explanation for this would be that, if we keep all other things equal, a company that pays less loan premium than the other will have lower costs, and consequently a higher profit margin.

Putting together all the concepts pioneered by Schwert, we may expect corporations with high bond ratios to have higher returns during noncrisis periods, but lower returns during an unexpected shock due to their higher risk materializing.

2.3. Debt Specialization

Colla, Ippolito and Li (2013) have discovered evidence that debt specialization is advisable to firms with high expected bankruptcy costs, as it will lead to lowering these costs. They attribute these findings to the fact that companies that borrow from multiple creditors have higher renegotiation costs, which is a main contributor to them having higher expected bankruptcy costs. As fundament to this reasoning, we may look to Ivashina, Iverson, and Smith (2016), who demonstrate that corporations with few creditors will tend to have quicker debt restructuring after filing for chapter 11 bankruptcy, as well as have a lower probability of liquidation.

This goes hand in hand with the ideas put forth by Bolton and Scharfstein (1996), who estimate that firms with low credit rating will maximize their liquidation value by reducing the number

of lenders that they borrow from, while firms with high credit rating will minimize the probability of defaulting on their debt by borrowing from multiple creditors. These two ideas, put together, give origin to the concept that the optimal debt structure is the one that minimizes the expected bankruptcy costs.

We may hypothesize that firms that borrow in the form of bonds are less specialized in their debt than firms that borrow in the form of loans, since they are highly tradeable and do not tie the firm to one specific creditor, as is the case with a loan. The larger implications of this would be that companies that have high bond ratios will have higher costs in the event of a bankruptcy. Assuming this line of logic, it would follow that during the COVID-19 induced economic crisis, where bankruptcies are abundant, we might be able to observe a larger fall in stock returns for companies with a high bond ratio than those with a low bond ratio. It should be noted that there is a degree of conjecture in this interpretation, as Colla, Ippolito and Li's study considers companies that contract mostly senior bonds or subordinated bonds to be specialized in senior bonds or subordinated bonds, respectively; and therefore may not consider companies with a high bond ratio to be unspecialized. However, as they suggest that *"firms with higher expected bankruptcy costs should be more specialized in their borrowing to reduce renegotiation costs associated with multiple lenders, while firms with lower expected bankruptcy costs should diversify across different debt types."*, and we have seen bond debt is associated with higher renegotiation costs and the need to deal with multiple lenders, this hypothesis may hold. To add on this, the brunt of their interpretation refers to firms with a high degree of debt specialization as having "few" or a "single creditor", and firms with a low degree of debt specialization as having "multiple creditors", such that their expositions may easily apply to this study.

The aforementioned assumptions tie into our earlier analysis of Schwert's (2018) research, which would also have corporations with a high bond ratio be affected more negatively by the unanticipated pandemic.

Continuing our scrutiny of Colla, Ippolito and Li's work, a broader look at their evidence entails that firms with a higher proportional amount of tangible assets will have lower expected bankruptcy costs and seek to contract debt from as few creditors as possible. To explain the relationship between tangible assets and the degree of debt specialization, we may look again to Bolton and Scharfstein, who demonstrate that corporations with a higher concentration of assets that can be relocated without difficulty – that is, assets that can be sold at higher values to interested parties, be it other organizations in the industry or investors that can manage the asset – will in general have a very high degree of debt specialization. They substantiate this discovery with the notion that, on one hand, having only one or few creditors makes it easier to bargain with outside buyers, and on the other that the creditor(s) benefit more from the higher liquidation value if there are few of them, which has larger implications regarding the ability to get better rates.

Intuitively enough, it is also exposed that cash flow volatility has a significant positive correlation with expected bankruptcy costs, such that a higher value of the former will by and large imply a higher value of the latter. This harmonizes with our later research on the relationship between the bond ratio and returns, where we infer that higher bond ratios are associated with higher volatilities in returns, which in turn may explain higher returns during noncrisis periods but lower returns during a crisis.

Due to the existence of information asymmetry, creditors must collect information and monitor the companies they are lending to, which has associated costs. As monitoring and screening costs increase with firm opacity, it follows that firms with high transparency may have a higher

degree of diversification in their debt, due to not having to incentivize prospective lenders to monitor their activity as closely. In contrast, opaque firms will most likely have a high degree of debt specialization in order to account for the high level of monitoring and information collection costs. Colla, Ippolito and Li use research and development expenses as a measure of cost for these bank activities, with the justification that, as a general rule, firms with high investment in R&D are less predictable in the possible outcomes of their activity, and therefore are more difficult to appraise. Accordingly, they find that firms with high R&D expenses will tend to be more specialized in their debt.

Regarding firm size, large rated firms will tend to have multiple types of debt, while small and unrated firms tend to borrow from few or only one source of debt. According to Colla, Ippolito and Li's research, this difference is due to smaller and unrated firms not having access to some sections of the debt market.

2.4. Corporate Resilience to the Pandemic

Pagano, Wagner and Zechner (2020) conduct a study analogous to the one that I render in this thesis. The object of their research is to evaluate whether the level of teleworkability of a firm helps in mitigating the shock of the pandemic, and whether this effect is visible in asset pricing. The major point of interest in this study is the association of the teleworkability variable with the concept of firm resilience to unexpected disasters. This teleworkability measure quantifies the extent to which jobs in each industry classification can be enacted from home, and are thus less impaired by adhering to the lockdown and social distancing regulations.

The outcomes of their tests show that, indeed, companies with higher disaster resilience outperformed companies with low resilience by a wide margin during the COVID-19 outbreak. Furthermore, it is also demonstrated that, even before the pandemic, there already prevailed a

differential of a similar nature in the returns between corporations with higher and lower disaster resilience. These last results can be portrayed as a manifestation of investor learning, that is, of an increasing appreciation of the potential economic peril that unexpected disasters might give way to, and of which companies will have a higher capability to withstand such scenarios.

Recalling that the measure used for resilience here is teleworkability, it is likely that it does not account for all factors that confer flexibility and adaptability to firms in the examined setting. The evidence found for investors' growing awareness of the pandemic threat may pertain only to the teleworkability component of the suggested resilience. I even venture to state the possibility that investors may have factored teleworkability into their pricing due to reasons other than the resilience to disasters that it confers companies, such as the ability to follow the global trend in our information era that every day sees more and more activities being performable from the comfort of one's home. For this reason, it shall be another core objective of this thesis to procure evidence in favour or against investors and firms factoring into their loan and bond pricing the possible disaster resilience that a certain distribution of these may confer to corporations.

One may anticipate that lack of liquidity and high leverage would precipitate companies' vulnerability to this financial crisis, while high availability of cash and reduced leverage should be beneficial to firms dealing with unexpected difficulties. Ramelli and Wagner (2020) have demonstrated that firms belonging to the same industry saw greater declines in stock prices if they had reduced cash holdings or operated under high leverage. Interestingly, they also found that cash and leverage have a higher impact within industries that suffered more severely from the pandemic. Inasmuch as low cash and high leverage may contribute to exacerbate the

disaster shock, so can it be speculated that high liquidity and reduced leverage confer resilience to corporations facing such circumstances.

Chapter 3: Data and Methodology

For the purposes of this study, I decided to use Stata to perform regressions of stock returns on bond ratios. Since there was no available dataset that had compiled all the information needed, the first step was to aggregate one.

I started out by downloading from The Center for Research in Security Prices (CRSP), through Wharton Research Data Services (WRDS), the data for the monthly closing stock prices (PRC) of all available US companies from January 2017 and onwards until December 2019, as this was the last available month on CRSP. Individual stocks were identified through their respective TICKER, PERMNO and CUSIP ID codes. Then, bringing the ticker symbol of all the corporations obtained in CRSP, I utilized Bloomberg to download the remaining closing stock prices (PX_Last) for each company from January 2020 to August of the same year. The data obtained here formed the basis for all dependent variables used in this research, acting as the instrument through which I depicted the economic impact of the pandemic across firms.

Next, to obtain information on company fundamentals, I used the CRSP/Compustat Merged database, through WRDS as well, to obtain the quarterly data for long term and current debt (DLTTQ and DLCQ), total and current assets (ATQ and ACTQ), total and current liabilities (LTQ and LCTQ), cost of goods sold (COGSQ), total revenue (REVTQ), capital expenditures (CAPXQ), cash and cash equivalents (CHECHQ), earnings per share (EPSPXQ), dividends per share (DVPSPQ), research and development expenses (XRDQ), intangible assets (INTANQ), and the PERMNO and PERMCO of every US company for which this data was available, as well as their industry NAICS code.

For the bond data, I used the Mergent fixed income securities database, through WRDS, to download the offering amounts for all available US corporate bonds. Then, I used the Bond CRSP linking tool from WRDS to match the offering amounts to their respective companies through their CUSIP ID codes, which also gave me the PERMCOs to which each offering amount pertained. In addition, the linking tool provided the link start and end dates, which delineated the time period in which each bond was active. Once this was done, I added up all the different bonds that were active between their respective link start and end dates, which gave me the data for total debt in the form of bonds for each available PERMCO, for every month from 2017 to 2019.

Lastly, I obtained the measures recently developed in labor economics by Dingel and Neiman (2020) for teleworkability, gaining a variable that represented estimates of the fraction of jobs that can be done from home for each three-digit NAICS industry code.

After matching the data in Stata, I proceeded to generate the variable that is the main object of study in this thesis – the bond to total debt ratio – by dividing the total offering amounts of active bonds per month by the total debt (DLTTQ + DLCQ).

Seeking to account for the effects of cash and leverage reported by Ramelli and Wagner (2020), I introduced the control variables "leverage ratio" ((DLTTQ + DLCQ)/(ATQ - DLTTQ - DLCQ)) and "cash ratio" (CHECHQ/LCTQ).

Following Ball, Gerakos, Linnainmaa and Nikolaev's (2015) study on the gross profit scaled by the book value of total assets' explaining power in regards to average returns, I generated the control variable for deflated profitability ((REVTQ - COGSQ)/ATQ).

Furthermore, retaining the discoveries of Colla, Ippolito and Li (2013) on the effects of research and development and tangible assets on debt specialization, I included R&D costs and tangible assets (ATQ - INTANQ) as control variables.

In accordance with the chief findings of Pagano, Wagner and Zechner (2020) on firm resilience to the pandemic, I introduced the teleworkability variable as a control in pursuance of removing the components of disaster resilience that do not pertain to the focus of my study.

Additional standard control variables include the ratio of capital expenditures to total assets (CAPXQ/ATQ), earnings per share, dividends per share, and size (ATQ).

I performed multiple regressions on the data, the primary focus being to analyse the effects of our independent variable "bond ratio" on varying dependent variables representing firm returns. Due to Mergent being distinctly precise in reporting the dates of bond issuances, while Compustat relies on quarterly financial statements of companies, which might not be completely up to date, some of the values for this bond ratio variable are greater than total debt. As, in practice, this is an impossibility, I dealt with this by sorting bond ratio at each point in time across firms in terciles. For summary statistics, I capped bond ratios at 100% of the total debt.

In order to study the effects of the bond ratio variable both before and during the pandemic, I created a dummy variable that took on the value 0 for all months up until February the 29th, 2020, and the value 1 for March through to August of this year. Subsequently, I interacted this dummy for pandemic months with the dummy variables representing bond ratio terciles. Accordingly, the base regression for this investigation consists in regressing the quarterly stock returns of the next quarter with the aforementioned dummies and the control variables. Since

the data for all dependent variables is from 2017 to 2019, the last available value for each variable is used for the year of 2020. All other tests presented build on this initial regression.

Chapter 4: Empirical Results

4.1. Hypothesis

The crux of this thesis lies in evaluating whether or not bond ratios have mitigating capabilities regarding the impact of the pandemic. Therefore, the first test that I will perform will be that of finding out if an increase or decrease in the bond to debt ratio is associated with a fall or increase in returns during the COVID-19 outbreak period (Equation 1; Table 3). On account of this, the first hypothesis I put forth is that firms with higher bond ratios shall be worse off during the months pertaining to the crisis, due to the higher risk as well as higher expected bankruptcy costs associated with borrowing in the form of bonds. This theory is based on Schwert's (2018) research, which finds a loan premium between bank debt and bond debt associated with the existence of bank services; and Colla, Ippolito and Li's (2013) study, which sees higher expected bankruptcy costs for firms with multiple lenders.

$$\begin{aligned} Returns_{q+1} = {} & \beta_0 + \beta_1 Medium\ Bond\ Ratio_q + \beta_2 High\ Bond\ Ratio_q + \beta_6 Total\ Assets_q + \beta_7 Earnings\ per\ Share_q + \\ & \beta_8 Dividends\ per\ Share_q + \beta_9 Leverage\ Ratio_q + \beta_{10} Cash\ Ratio_q + \beta_{11} Profitability_q + \beta_{12} CAPEX\ to\ Assets_q + \\ & \beta_{13} Research\ \&\ Development_q + \beta_{14} Tangible\ Assets_q + \beta_{15} Teleworkability_q + \mu \end{aligned} \quad (1)$$

My second hypothesis feeds into the first, and it is that firms with higher bond ratios see higher returns during noncrisis periods, which would explain why it is still an option for firms despite the higher risk associated with it, in the event that I find evidence in favour of the first hypothesis. This would be in accordance with Schwert's (2018) insights on the lower costs associated with bond debt, since, ceteris paribus, lower costs should imply higher returns. I test this hypothesis with the regression shown in Equation 2, and its results can be seen in Table 2.

$$Returns_{q+1} = \beta_0 + \beta_1 Medium\ Bond\ Ratio_q + \beta_2 High\ Bond\ Ratio_q + \beta_3 Covid\ Months_q + \beta_4 Medium\ Bond\ Ratio * Covid\ Months_q + \beta_5 High\ Bond\ Ratio * Covid\ Months_q + \beta_i Controls_{iq} + \mu \quad (2)$$

I submit also that I should encounter higher returns for firms with high teleworkability, significantly during the pandemic months but also, in theory, during the noncrisis periods preceding them due to investor learning. This hypothesis, should it be found likely using the data I have available, would confirm the work done by Pagano, Wagner and Zechner (2020), and afford this analysis the means to control for teleworkability, which is of paramount importance given the high impact that the referred authors have found for this variable. To this end, I generated a dummy for firms with high teleworkability and interacted it with the pandemic time period and bond ratio terciles (Equation 3; Table 4).

$$Returns_{q+1} = \beta_0 + \beta_1 Medium\ Bond\ Ratio_q + \beta_2 High\ Bond\ Ratio_q + \beta_3 Covid\ Months_q + \beta_4 Medium\ Bond\ Ratio * Covid\ Months_q + \beta_5 High\ Bond\ Ratio * Covid\ Months_q + \beta_{15} High\ Teleworkability_q + \beta_{16} High\ Teleworkability_q * Medium\ Bond\ Ratio + \beta_{17} High\ Teleworkability_q * High\ Bond\ Ratio + \beta_{18} High\ Teleworkability_q * Covid\ Months + \beta_{19} High\ Teleworkability_q * Medium\ Bond\ Ratio * Covid\ Months + \beta_{20} High\ Teleworkability_q * Medium\ Bond\ Ratio * Covid\ Months + \beta_i Controls_{iq} + \mu \quad (3)$$

My last central hypothesis shall be that smaller firms will take a larger hit to their returns due to the lack of access to some segments of the debt market prevalent in small and unrated firms (Colla, Ippolito and Li, 2013), which impedes them from acquiring the debt distribution that they desire. This hypothesis is tested through Equation 4 (Table 5), wherein the variable "Large" represents a dummy for firms with total assets over the median.

$$Returns_{q+1} = \beta_0 + \beta_1 Medium\ Bond\ Ratio_q + \beta_2 High\ Bond\ Ratio_q + \beta_3 Covid\ Months_q + \beta_4 Medium\ Bond\ Ratio * Covid\ Months_q + \beta_5 High\ Bond\ Ratio * Covid\ Months_q + \beta_{15} Large_q + \beta_{16} Large_q * Medium\ Bond\ Ratio + \beta_{17} Large_q * High\ Bond\ Ratio + \beta_{18} Large_q * Covid\ Months + \beta_{19} Large_q * Medium\ Bond\ Ratio * Covid\ Months + \beta_{20} Large_q * Medium\ Bond\ Ratio * Covid\ Months + \beta_i Controls_{iq} + \mu \quad (4)$$

4.2. Returns and Volatility Across Bond Ratios

Confirming my hypothesis that higher bond to debt ratios are, in general, associated with higher returns, I find that firms with medium bond ratios have 0,37% higher returns than firms with low bond ratios, and additionally that firms with high bond ratios have 2,11% higher returns

relative to the former (Table 3). These statistics are higher if I do not control for teleworkability, with medium and high bond ratios having 0,49% and 2,33% higher returns that low bond ratios, respectively (Table 3). The reason I may want to do this is due to the unintuitive results presented in Table 4, which show disparate effects for teleworkability during the covid months, somewhat discrediting this variable.

The results of the base regression (Table 2) submit that, during noncrisis periods and with all else being equal, firms with a medium bond ratio tend to have 1,52% higher returns than those with a low bond ratio, and that firms with a high bond ratio have a propensity for the highest returns out of the three categories, this being quantifiable at 3,06% higher returns than low bond ratio firms. This is in accordance with the theory behind the loan premium put forth by Schwert (2018). Furthermore, I observe that, on average, having a low bond ratio during the pandemic months has a positive impact on companies, while having a medium or high bond ratio lowers quarterly returns significantly. Specifically, low bond ratio companies are associated with a 2,67% increase in returns during the COVID-19 months, while medium and high bond ratios suffer an 8,47% and 5,28% fall in returns, respectively. This outcome offers evidence in favour of my first and second hypothesis, as I find that corporations with a high bond to debt ratio, despite having higher returns in noncrisis periods, see lower returns with the onset of an unexpected disaster as the threats associated with their higher risk take shape.

Interestingly, I find that firms with a medium bond ratio are the most negatively affected out of the three by their choice in distribution of bond debt. Concerning this reaction, I present the explication that firms with a bond to total debt ratio lying closer to the median are neither specialized in bond debt nor in any form of borrowing from banking facilities. Appropriately, I reflect on Colla, Ippolito and Li's (2013) work, from which it can be recalled that companies with a low degree of debt specialization have higher expected bankruptcy costs due to the larger

renegotiation costs associated with multiple lenders. Accordingly, in a time period where bankruptcies abound, the lower returns may be corroborated by the steeper bankruptcy costs. In a similar vein, while firms with higher bond ratios might be contemplated as specialized in bond debt, we have seen through Schwert's (2018) research that bond debt is nevertheless associated with higher renegotiation costs, such that the postulation that higher bankruptcy costs are driving down returns may likewise pertain to this bond ratio grouping.

Panel 1 depicts monthly returns across bond ratio terciles. In line with my previous reasoning, we may observe that returns for high bond ratios appear to be higher on average, as well as have higher volatility. The summary statistics in table 1 are also in congruence with my ongoing theorization, as we see higher returns for higher bond ratios, along with higher volatility.

In Table 5, I present the results of a regression where I included a dummy for firms that are large in size and interacted it with the dummies for bond ratio terciles and COVID-19 months. In opposition of what I had hypothesized, I find that large firms have 4,47% lower returns during noncrisis periods, and experience a further 5,62% fall in returns during the crisis months. I speculate that this is due to a stricter adherence of larger firms to the pandemic's regulations. As for the lower returns for larger firms before the pandemic, we may resort to the small firm effect theory, which states that small listed firms see higher returns than larger firms, on average.

4.3. Factors that Stimulate or Dissuade Debt Specialization

Table 1's summary statistics imply that large companies are more inclined to contract debt from banks than in the form of bonds, while smaller firms gravitate more towards bond debt. This predominance of bond debt in smaller firms is in character with the propositions put forth

by Colla, Ippolito and Li (2013), who document that small and unrated firms may not have access to some segments of the debt market.

Considering research and development expenses, the statistics suggest that firms with higher R&D costs show a preference for high bond ratios. This culmination is in accordance with what one might have expected from the reviewed literature (Colla, Ippolito and Li, 2013), as firms with more research and development costs are less transparent and hence creditors will have higher screening and monitoring costs when lending to these corporations. Following Schwert's (2018) study on the loan premium, it is to be expected that part of the screening and monitoring costs are transferred to the firm, which translates into a lower incentive to borrow from banks as opposed to the bond market.

Corporate leverage ratio has an interesting distribution across the bond ratio terciles, with firms with high leverage favouring lower bond ratios, and firms with lower leverage preferring higher bond ratios. A rationale for this could be that, since bond debt is associated with higher volatility and expected bankruptcy costs (Colla, Ippolito and Li, 2013), firms with a high concentration of bond debt opt to minimize their exposure by reducing their leverage.

Lastly, it prevails that firms with lower cash ratios gravitate towards high bond ratios. A suitable justification for this may be that firms low on cash have a higher difficulty in contracting debt from banks due to their higher probability of default.

Regarding firm level of teleworkability and fraction of assets which are tangible, I detect no tendency towards a particular proportion of bond debt .

4.4. Verifiable Corporate Resilience to the Pandemic

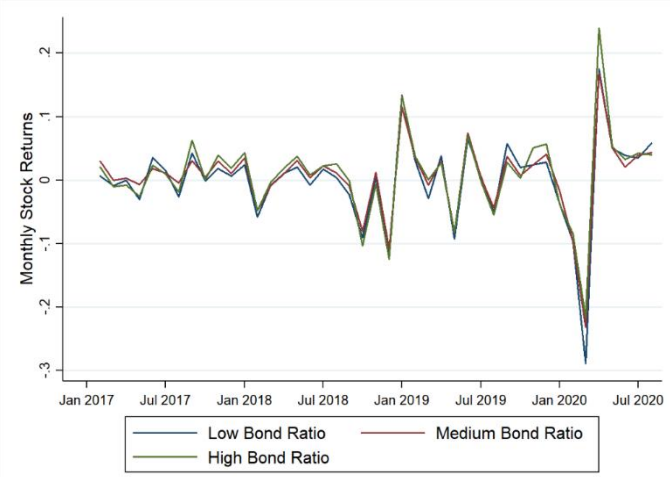
The results of my regressions constitute evidence that firms with a low bond ratio are more resilient to unexpected disasters, as these firms are shown to perform better than those with

medium and high bond ratios during the pandemic. Being that, according to my interpretation hitherto, a higher concentration of bond debt gives rise to higher returns at the price of higher volatility, it may by the same token be that opting for a lower bond ratio is equivalent to prioritizing risk and expected bankruptcy cost minimization at the price of the loan premium. I postulate that this relative resilience to unanticipated shocks that borrowing from banks offers firms is one of the ingredients that factors into the pricing of the loan premium. It is not unrealistic to suppose that debtors and creditors already considered the risk of pandemics and similar economic disasters before COVID-19. Bill Gates, along with many notable disease and flu experts, has been running extensive campaigns for awareness of the global threat that pandemics pose for years. Although it may have seemed a distant possibility, it is certain that there has been a growing consciousness of the perils that may arise in the event of an outbreak of a deadly and highly contagious disease.

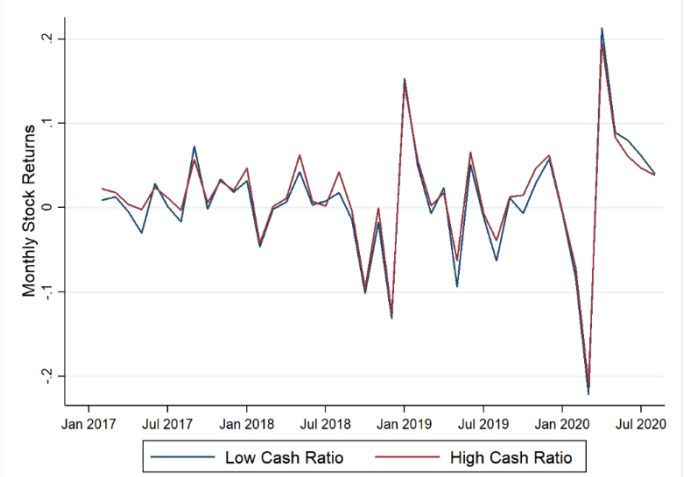
Chapter 5: Conclusion

The contribution of this paper is manifold. Regarding the differences between corporate debt structures, I first uncover evidence in favour of higher bond-to-total debt ratios leading to higher returns during noncrisis periods. I hypothesize that this is connected to the existence of a loan premium and higher volatility in returns and increased risk. Secondly, I find that firms with medium and high bond ratio suffer more heavily in the midst of unexpected disasters, speculating that this is the result of the higher expected bankruptcy costs and risk materializing, and add that low bond ratios may contribute to companies' resilience to unforeseeable shocks due to the higher flexibility syndicated by banking services. Lastly, the outcome of my research suggests that the resilience aspect of bank borrowing is a component which has previously already been factored into the pricing of the loan premium.

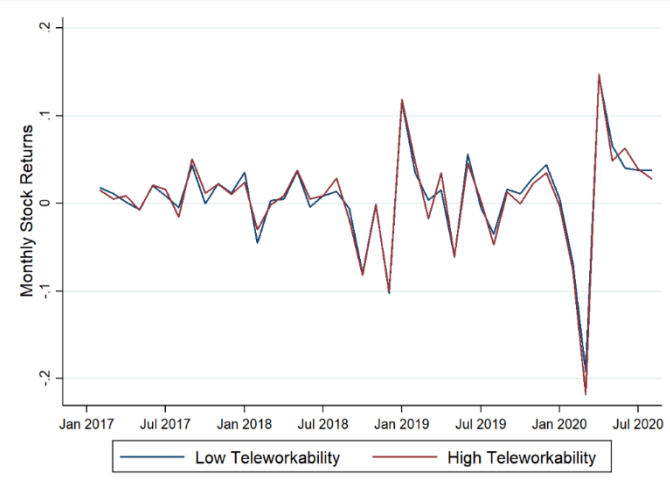
Panel 1: Monthly Stock Returns Across Bond Ratio Terciles



Panel 2: Monthly Returns Across Cash Ratio



Panel 3: Monthly Stock Returns Across Teleworkability



Panel 4: Monthly Returns Across Leverage Ratio

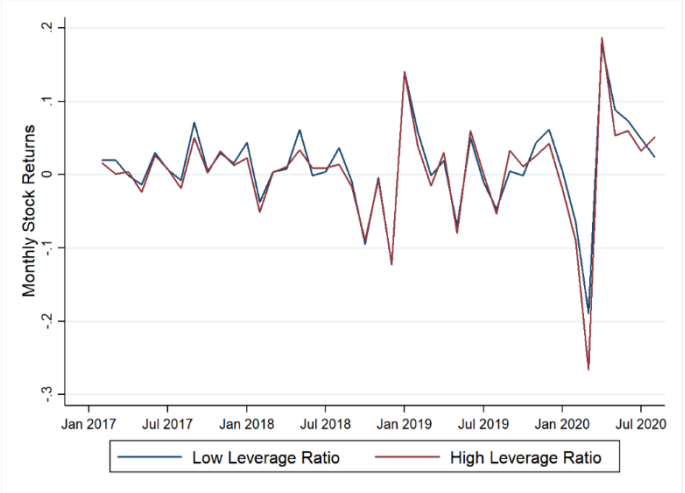


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Table 1: Summary Statistics Across Bond Ratio Terciles

VARIABLES	N	mean	sd	min	max
Monthly Returns					
Low Bond Ratio	16,571	0.00008	0.140	-0.786	3.66
Medium Bond Ratio	16,660	0.00434	0.131	-0.773	4.58
High Bond Ratio	16,351	0.00678	0 .156	-0.787	4.75
Quarterly Returns					
Low Bond Ratio	16,207	0.00090	0.318	-0.867	9.92
Medium Bond Ratio	16,244	0.01449	0.305	-0.894	9.28
High Bond Ratio	15,871	0.02819	0.394	-0.891	9.64
Teleworkability					
Low Bond Ratio	17,392	0.466	0.246	0.0176	0.954
Medium Bond Ratio	17,362	0.436	0.254	0.0176	0.954
High Bond Ratio	17,342	0.456	0.272	0.0176	0.954
Size (Total Assets)					
Low Bond Ratio	17,392	109,830	356,568	71.85	2.862e+06
Medium Bond Ratio	17,389	34,612	80,696	59	925,199
High Bond Ratio	17,390	23,050	54,314	20.08	742,812
Tangible Assets-to-Total Assets					
Low Bond Ratio	17,389	0.830	0.218	0.0817	1
Medium Bond Ratio	17,323	0.784	0.229	0.106	1
High Bond Ratio	17,285	0.790	0.224	0.0999	1
R&D Expenses-to-Assets					
Low Bond Ratio	6,707	0.00845	0.0170	0	0.195
Medium Bond Ratio	9,105	0.0111	0.0176	-0.000132	0.315
High Bond Ratio	9,306	0.0208	0.0295	-3.00e-05	0.476
Leverage Ratio					
Low Bond Ratio	17,392	1.264	32.67	-1,579	487.4
Medium Bond Ratio	17,389	0.818	34.17	-1,141	468.2
High Bond Ratio	17,390	0.395	28.62	-1,452	414.2
Cash Ratio					
Low Bond Ratio	10,326	0.0207	0.441	-3.232	5.850
Medium Bond Ratio	13,468	-0.00624	0.549	-5.624	13.00
High Bond Ratio	14,717	-0.0242	1.010	-36.41	20.85
Profitability					
Low Bond Ratio	14,407	0.0439	0.0400	-0.197	0.572
Medium Bond Ratio	16,886	0.0548	0.0502	-0.551	0.476
High Bond Ratio	17,225	0.0613	0.0829	-0.724	3.297

Table 2: Base Regression on Bond Ratio Tercile Interactions with Covid Months

VARIABLES	Quarterly Returns (q+1)
Medium Bond Ratio	0.0152**
	(0.00677)
High Bond Ratio	0.0306***
	(0.00666)
Covid Months	0.0267***
	(0.0133)
Medium Bond Ratio * Covid Months	-0.0847***
	(0.0172)
High Bond Ratio * Covid Months	-0.0528***
	(0.0172)
Total Assets	-3.84e-07***
	(1.29e-07)
Earnings per Share	0.00227*
	(0.00137)
Dividends per Share	-0.0107**
	(0.00437)
Leverage Ratio	-1.84e-06
	(1.83e-06)
Cash Ratio	0.0132***
	(0.00365)
Profitability	-0.0644
	(0.0488)
CAPEX-to-Assets	-0.445***
	(0.119)
Research & Development	1.65e-06
	(4.04e-06)
Tangible Assets	3.31e-07**
	(1.57e-07)
Teleworkability	0.0378***
	(0.0106)
Constant	0.00435
	(0.00750)
Observations	19,246
R-squared	0.033

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Simple regression on Bond Terciles with and without Teleworkability

VARIABLES	Quarterly Returns (q+1)	Quarterly Returns (q+1)
Medium Bond Ratio	0.00374	0.00487
	(0.00660)	(0.00658)
High Bond Ratio	0.0211***	0.0233***
	(0.00651)	(0.00648)
Total Assets	-3.47e-07***	-3.36e-07**
	(1.31e-07)	(1.31e-07)
Earnings per Share	0.00230*	0.00215
	(0.00139)	(0.00139)
Dividends per Share	-0.00994**	-0.0120***
	(0.00444)	(0.00439)
Leverage Ratio	-1.87e-06	-2.02e-06
	(1.86e-06)	(1.86e-06)
Cash Ratio	0.0149***	0.0153***
	(0.00370)	(0.00370)
Profitability	-0.0866*	-0.0648
	(0.0495)	(0.0490)
CAPEX-to-Assets	-0.204*	-0.249**
	(0.121)	(0.120)
Research & Development	2.05e-06	3.47e-06
	(4.10e-06)	(4.08e-06)
Tangible Assets	2.72e-07*	2.45e-07
	(1.59e-07)	(1.59e-07)
Teleworkability	0.0430***	
	(0.0108)	
Constant	0.0223***	0.0371***
	(0.00754)	(0.00651)
Observations	19,246	19,298
R-squared	0.004	0.003

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Table 4: Further Regressions on Teleworkability

VARIABLES	Quarterly Returns (q+1)	Quarterly Returns (q+1)
Medium Bond Ratio	0.0124	0.0159**
	(0.00806)	(0.00675)
High Bond Ratio	0.0308***	0.0310***
	(0.00809)	(0.00664)
Covid Months	0.0261***	0.0270***
	(0.0154)	(0.0149)
Medium Bond Ratio * Covid Months	-0.0697***	-0.0841***
	(0.0189)	(0.0172)
High Bond Ratio * Covid Months	-0.0415**	-0.0519***
	(0.0194)	(0.0172)
Total Assets	-3.93e-07***	-3.93e-07***
	(1.29e-07)	(1.29e-07)
Earnings per Share	0.00226*	0.00226*
	(0.00137)	(0.00137)
Dividends per Share	-0.0108**	-0.0109**
	(0.00435)	(0.00435)
Leverage Ratio	-1.88e-06	-1.90e-06
	(1.83e-06)	(1.83e-06)
Cash Ratio	0.0134***	0.0134***
	(0.00364)	(0.00364)
Profitability	-0.0628	-0.0645
	(0.0488)	(0.0487)
CAPEX-to-Assets	-0.484***	-0.481***
	(0.119)	(0.119)
Research & Development	1.91e-06	1.96e-06
	(4.04e-06)	(4.04e-06)
Tangible Assets	3.36e-07**	3.35e-07**
	(1.57e-07)	(1.57e-07)
High Teleworkability	0.0103	0.0169***
	(0.0111)	(0.00562)
High Teleworkability * Medium Bond Ratio	0.0141	
	(0.0145)	
High Teleworkability * High Bond Ratio	0.00421	
	(0.0139)	
High Teleworkability * Covid Months	0.0502	-0.00702
	(0.0337)	(0.0196)
High Teleworkability * Medium Bond Ratio * Covid Months	-0.0919**	
	(0.0451)	
High Teleworkability * High Bond Ratio * Covid Months	-0.0698	
	(0.0428)	
Constant	0.0143**	0.0133**
	(0.00723)	(0.00665)
Observations	19,298	19,298
R-squared	0.033	0.033

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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Table 5: Bond Tercile Effects Among Small and Large Firms

VARIABLES	(1) NextQuarterlyReturnss	(2) NextQuarterlyReturnss
Medium Bond Ratio	-0.0160	0.0119*
	(0.0241)	(0.00677)
High Bond Ratio	0.0413*	0.0233***
	(0.0223)	(0.00678)
Covid Months	0.0266***	0.0318***
	(0.0295)	(0.0275)
Medium Bond Ratio * Covid Months	-0.0551**	-0.0844***
	(0.0244)	(0.0171)
High Bond Ratio * Covid Months	0.0133	-0.0591***
	(0.0241)	(0.0174)
Total Assets	-2.74e-07**	-2.77e-07**
	(1.29e-07)	(1.29e-07)
Earnings per Share	0.00367***	0.00354**
	(0.00138)	(0.00138)
Dividends per Share	-0.00923**	-0.00930**
	(0.00434)	(0.00434)
Leverage Ratio	-1.99e-06	-1.92e-06
	(1.82e-06)	(1.83e-06)
Cash Ratio	0.0147***	0.0143***
	(0.00364)	(0.00364)
Profitability	0.00474	-0.0148
	(0.0488)	(0.0485)
CAPEX-to-Assets	-0.475***	-0.453***
	(0.119)	(0.119)
Research & Development	3.64e-06	3.49e-06
	(4.02e-06)	(4.02e-06)
Tangible Assets	2.16e-07	2.27e-07
	(1.57e-07)	(1.57e-07)
Large Firm	-0.0433**	-0.0447***
	(0.0216)	(0.00766)
Large Firm * Medium Bond Ratio	0.0362	
	(0.0250)	
Large Firm * High Bond Ratio	-0.0195	
	(0.0234)	
Large Firm * Covid Months	0.0419	-0.0562**
	(0.0342)	(0.0268)
Large Firm * Medium Bond Ratio * Covid Months	-0.0847**	
	(0.0339)	
Large Firm * High Bond Ratio * Covid Months	-0.160***	
	(0.0346)	
Constant	0.0484**	0.0541***
	(0.0210)	(0.00908)
Observations	19,298	19,298
R-squared	0.037	0.035

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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