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Debt Structure and Corporate Performance During the Covid-19 Crisis

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Summary

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Purpose

The purpose of this paper is to empirically investigate the relation between the debt financing source choices and firm performance before and during the global pandemic. Capital structure decisions is a central issue in corporate finance, but little attention so far was paid to the debt structure composition. Therefore, this paper aims to fill the gap in existing literature and enhance the understanding about the optimal capital structure decisions by deepening the knowledge about the effects of debt source choices on firm performance during the periods of financial distress that would be valuable for corporate decision makers, such as managers and investors, as well as regulatory institutions and government.

Methodology

This paper is utilizing fixed effects panel regressions that include firm-specific and country-specific characteristics as controls for the analysis. The choice of this method is based on the Hausman test. Clustered robust standard errors are used to control for heteroscedasticity. Firm performance is measured by both return on assets and Tobin's Q. Debt structure is proxied by bank debt ratio which is the ratio of total amount of bank loans to total long-term interest-bearing liabilities. The issue of reverse causality is addressed by instrumental variable approach. Furthermore, in order to provide additional support for the findings, propensity-score matching technique is introduced. A "matched" sample is created that is used to run a new regression. Finally, dummy interaction technique and difference-in-differences approach are utilized to compare the effect of bank dependence on firm performance between different groups of companies and time periods.

Theoretical perspectives

We base our analysis on the three main theories explaining the debt financing source choices of firms. First, information-based theories suggest that bank debt may help to reduce the adverse selection and information asymmetry due to the banks' superior ability to obtain and secure private information, as well as their certification function (Leland & Pyle, 1977; Johnson, 1997). Second, moral hazard theories stress the importance of banks' monitoring function that gives them an ability to solve agency problems (Diamond, 1991). Finally, liquidation and renegotiation efficiency theory claims that bank financing might be especially valuable during the period of financial distress (Cantillo & Wright, 2000; Bolton & Freixas, 2000).

Empirical foundation

The empirical findings reported in this paper demonstrate that bank debt in the firm's capital structure has a statistically significant positive effect on operating performance of a firm. Moreover, this effect is more pronounced for financially distressed firms and during the crisis period. Thus, we support the financial flexibility and renegotiation efficiency theory. It is also documented that bank debt has a U-shaped relationship with firms' market valuation. This nonlinear relationship communicates that while in general, market perception of bank financing is negative, firms with high levels of bank debt lose less market value. Finally, there is no statistically significant difference in market valuation of bank dependent and bank independent firms during the crisis as compared to the period before. Main findings remain unchanged after addressing potential endogeneity issues by introducing an instrumental variable approach.

Conclusions

Overall, the results reported in this paper suggest that debt source choice may be an important determinant of firm performance, especially in a financial distress situation. A notable difference in the effect of bank debt on different dimensions of firm performance support the intuition about the presence of costs and benefits of both types of debt that can play out differently with the dissimilar measures of corporate efficiency. This means that these costs and benefits should be weighted in accordance with the firm's strategy, business conditions and prioritized performance measure when making debt financing decisions.

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1. Introduction

1.1. General background

In a vast literature on capital structure decisions discussing the choice of an optimal proportion of debt and equity, corporate debt is traditionally treated as a homogeneous source of capital. As a result, a large strand of literature focuses on the association between the level of financial leverage and firm performance without accounting for the fact that debt financing comes from several considerably different sources (Margaritis & Psillaki, 2010; Vithessonthi & Tongurai, 2015). Such simplification may, however, overlook important implications for the research on capital structure decisions and result in biased conclusions. It might be reasonable to assume that different sources of debt have their unique features that can result in notably different effects on firm performance. Rauh and Sufi (2010), for instance, argue that many firms obtain debt from multiple sources, each of which may have different implications for the effects of financing on investment opportunities and consequently, for firm performance. This heterogeneity in debt composition is particularly important for understanding differences in firm performance with similar leverage ratios. Therefore, in this paper we stress the importance of debt structure composition for investigations on the optimal capital structure through studying the effect of debt source choices on firm performance. Specificity of the difference between the debt financing sources and their effects on firm performance suggests that it is expected to be most pronounced during the period of financial distress (Bolton & Freixas, 2000). Therefore, the period of economic crisis when the average level of distress is higher appears to be the relevant setting for an empirical study on the topic.

1.2. Problematization

There are at least three theories that point out why firms should care about their debt source choices. First, asymmetry of information between lenders and borrowers might limit the firm's choice between financing sources (Leland & Pyle, 1977; Fama, 1985, Nakamura, 1993; Johnson, 1997). Second, the monitoring function of banks may reduce agency problems that arise within a company, which potentially positively affect firm performance (Diamond, 1991; Besanko & Kanatas,1993). Finally, it has been argued that the renegotiation feature of bank debt is of particular importance during periods of financial distress (Chemmanur & Fulghieri, 1994; Cantillo & Wright, 2000; Bolton & Freixas, 2000).

The most part of the prior empirical research on the effects of debt financing source on firm performance is represented by a large number of event studies that concentrate on the impact of a particular debt source on stock market movements. However, there is only scarce evidence on the differences in firm performance between bank dependent firms and firms relying on other sources of debt. A few scholars examining this issue concentrate specifically on the crisis period. Kang and Stulz (2000), for instance, examine this issue around the banking crisis in Japan in the 1990s. They document that bank dependent firms underperform their peers with other sources of debt. Chava and Purnanandam (2011) find that firms that mostly rely on bank debt suffer larger valuation losses than firms with access to public debt during the episode of bank lending contraction in the U.S. in 1998. On the other hand, Davydov and Vähämaa (2013) document a positive effect of reliance on bank debt and stock returns of Russian firms during the Global Financial Crisis. Other researchers do not connect the studied relation to the macroeconomic conditions. Agarwal and Elston (2001) find that the general relation between a particular debt source and firm performance is insignificant. Finally, Davydov (2016) suggests that the level of reliance on bank debt has a positive effect on firm operating performance, whereas the relation between the bank debt and market performance is nonlinear. This paper, in turn, compares the effect of a debt structure composition on firm performance before and during the crisis period of 2020.

1.3. Purpose and methodology

Thus, the purpose of this paper is to empirically investigate whether different sources of debt in the firm's capital structure affect its operating and stock market performance and whether this effect is different during the crisis. Using an unbalanced panel data on 742 publicly traded firms from the largest emerging economies - Brazil, Russia, India, and China (BRIC) - over the period 2011-2020, this paper aims to contribute to the prior literature by examining the effect of different levels of public and bank debt on the firm's operating performance and market valuation before and during the Covid-19 crisis.

In order to empirically analyze this research question, the data from the four largest emerging economies: Brazil, Russia, India, and China, is used. Emerging market economies distinctly differ from developed markets, that are more often studied in the literature, in many aspects, including the capital structure decisions. These differences comprise the more pronounced role of debt financing, and bank financing in particular, due to the less developed financial markets. At the same time, because of the prominent economic growth, largest emerging markets were

found to be very attractive by investors that led to a rapid development of local bond markets. As a result, many firms that had been fully bank-financed, gained an opportunity to choose between private and public debt. In this regard, another important difference discussed in the literature is that firms in emerging markets tend to frequently switch from one source of debt to another. While firms in the developed markets will most likely stick with a particular debt type (Denis & Mihov, 2003), the choice of debt financing source is rather continuous in the emerging economies. Thus, the debt structure decisions are assumed to be a more important issue for corporates in emerging rather than developed markets as it is also likely to have a more pronounced effect on firm performance. This makes emerging market economies an appropriate setting to investigate our research question.

The key empirical approach utilized in this paper is fixed effects panel regressions that help us to empirically analyze the effect of public and bank debt levels on firm performance. Instead of focusing on the immediate reaction of the stock market on debt issuance used in most of the previous studies, a continuous effect of debt source choices on operating and stock market performance of a firm is examined. Gaining an understanding of this long-term effect might be more valuable for firms' debt financing strategy. The paper uses data on firms that have access to both bank debt and bond markets which creates more homogeneous determinants of debt source choices. Hence, the results should not be affected by firm-specific characteristics that restrict the firm to choose one over another type of debt. In line with the previous literature, in our study the operating performance of the firm is represented by return on assets while market valuation is proxied by Tobin's Q. The firms' debt structure is represented by both bank debt ratio and a dummy variable showing if the firm is bank dependent. Moreover, we account for the fact that this setting could potentially cause endogeneity problem for our empirical results due to the reverse causality between debt structure and firm performance that may lead to faulty conclusions. In order to address this issue, we introduce the new instrumental variable, banking sector concentration, that is used to replace the endogenous variable representing the level of bank debt in firm's capital structure. It is showed that the level of banking sector concentration positively correlates with firms' reliance on bank debt. At the same time, banking concentration does not affect individual firm performance. In this approach we are following Davydov (2016). Additionally, a novel for the literature on this topic propensity-score matching technique is used in our research. It would help us to investigate if there is a difference in firm performance of bank dependent and bank independent firms with similar characteristics (controls). Furthermore, the paper utilizes the dummy interaction technique in order to check if the bank

debt is more valuable for financially distressed firms. Finally, difference-in-differences approach is used to examine if the effect of reliance on bank debt and firm performance during the period of economic downturn for the two groups of companies is different from that during the normal times.

1.4. Empirical findings

The empirical findings reported in this paper demonstrate that bank debt in the firm's capital structure may have a positive effect on operating performance of a firm. Moreover, this effect is more pronounced for financially distressed firms and during the crisis period. Thus, we support the financial flexibility and renegotiation efficiency theory. It is also documented that bank debt has a U-shaped relationship with firms' market valuation. This nonlinear relationship communicates that while in general bank loans may have a negative effect on market valuation, firms with higher levels of bank debt are able to diminish this effect. However, the difference in the effect of bank loans and public debt on stock market performance during the crisis is not statistically significant. After controlling for differences in firm- and country-specific characteristics and addressing potential endogeneity problems, there is considerable evidence to suggest that higher levels of bank debt may be particularly valuable for enhancing operating performance during the periods of financial distress.

1.5. Contribution

Thus, this paper contributes to the existing literature by expanding a very small group of studies aiming to fill the gap in scientific knowledge about the relation between debt source choices and firm performance on a continuing basis. To our knowledge, it is the first study that examines the relation between debt structure and firm performance during the period of Covid-19 crisis. It is especially valuable to investigate the issue during this period of economic downturn as it is distinctly different from the previous crises in that it is not accompanied by the severe banking crisis. We introduce econometric techniques, such as propensity score matching, dummy interaction and difference-in-differences approach that were not applied in the previous literature to study this association. Moreover, even though a few studies with contradicting results are present, there is a lack of understanding about the effect of debt source choices on operating performance of a firm in general. Additionally, we are providing the results for the generally less studied emerging market economies that experience a turning point development in their debt markets and therefore are of a special interest.

1.6. Outline

The rest of the paper is organized as follows. Section 2 provides an overview of the macroeconomic setting and debt financing conditions in BRIC. Section 3 presents related theoretical and empirical literature. Section 4 describes the data. Section 5 presents the empirical methodology, while Section 6 reports the findings on whether different levels of public and bank debt affect firm performance. Finally, Section 7 concludes the paper.

2. Macroeconomic overview and financing conditions in BRIC

Before analyzing the previous studies, it is important to assess the features of the macroeconomic setting and financing conditions in BRIC during the studied period as it would help us to apply theories in the right practical context when formulating hypotheses and discussing the results.

The BRIC acronym for the four developing countries originated in 2001. Economists believe these four nations will become dominant suppliers of manufactured goods, services, and raw material by 2050 due to low labor and production costs. These are also the leading countries among emerging market economies in terms of economic development and are amid the fastest growing economies in the world. In 1990, BRIC countries accounted for 11% of global gross domestic product (GDP). By 2014, this figure rose to nearly 30% (Brennan, 2020).

In the beginning of the century, these countries were similar in terms of average economic growth rate, human development and the size of their economies. However, during the last decades, China stood out from this group taking the most part in the common growth of the BRIC countries. Now it is the second world's economy with 17% share in global GDP (2020). At the same time, economic growth of the other members of the group slowed down considerably during the last decade (Brennan, 2020).

Nevertheless, the debt financing conditions in the four countries are similar. Banking systems of BRIC countries are to a large extent state-dependent. Banks have historically been the key providers of funds, and even large firms still rely on bank financing. However, during the last decade these four economies experienced a fast development of financial markets. This resulted in a notable public debt market growth. Moreover, a significant increase in corporate leverage level in emerging market economies was observed, so that in 2013 it overtook that in developed countries (Caruana, 2016). Leverage as percent of GDP in emerging markets increased by almost 60% since 2008 reaching a maximum of 112% in 2016. This increase in leverage was

explained by the low interest rate environment after the Global Financial Crisis as well as rapid economic development, and again, was to a large extent coming from China (Beltran, 2017). In 2020, debt among Chinese nonfinancial corporations was 159.1% of GDP. By contrast, the figure among American companies equates to 78.3% of GDP (Brennan, 2020). Notably, the growth in leverage was almost entirely driven by public debt, whereas bank debt level was stable (Alter & Elekdag, 2017).

Even before the largest hit from the Covid-19 crisis, the economic situation in the four countries was not stable. A slowdown in the growth of the world economy and trade, the decline in commodity prices, the increased volatility of world currency and financial markets after the Global Financial Crisis led to an outflow of capital from emerging markets. In 2015-2016 years, Brazilian economy suffered from the worst recession in the last hundred years (Biller, 2016). In Russia, the 2014-2015 crisis was caused by a sharp decrease in oil prices and national currency rates. Chinese economy experienced 2015-2016 stock market turbulence over which the Shanghai Composite Index fell by 50% (Hsu, 2016). In India, the credit bubble popping in 2018 significantly restricted funding supply.

With different periods of peaks, each of the BRIC countries suffered extremely from the pandemic. However, even during the global health crisis China was able to outperform its fellow BRIC that have had much larger outbreaks. Therefore, China has been able to recover economically quicker than others. According to the IMF (2020), China is likely to be the only country to register positive growth in 2020 (5%). Brazil and India were hit very hard by the pandemic ranking second and third most fatalities. The IMF (2020) projected Brazilian economy to slow down by almost 6%. Indian economy plunged 23.9% in the second quarter 2020, the first quarterly contraction since 1997 (Brennan, 2020). Russia has experienced very difficult periods as well and the country was ranked fourth in the world for total cases. According to the IMF (2020) forecasts, GDP will shrink by 4.1%.

Therefore, governments of the countries had to take a number of measures to support the economies. It includes monetary policy adjustments and, foremost, interest rate regulation that to a large extent affected debt financing conditions. Central banks of the four countries decided to lower their policy rates in response to the pandemic (Figure 1). Thus, the central bank of Brazil lowered the policy rate by 2.25% from February to August 2020, to the historical low of 2%. Bank of Russia cut the key rate by 2% in 2020 bringing it to a historical low of 4.25%. The People's Bank of China lowered the policy rate by 0.2% in April 2020. Since March 2020, the Reserve Bank of India reduced the repo rate by 115 basis points to 4% (IMF, 2021).

Furthermore, a set of monetary policy measures to support the financial system and banks in particular have been implemented. This includes temporary regulatory easing for banks intended to help corporate borrowers. All of the four countries introduced reduction of reserve requirements and capital conservation buffers, and a temporary relaxation of provisioning rules. The Central Bank of Russia implemented measures to ease liquidity regulations for systemically important credit institutions. Parliament approved a law that guarantees the possibility for affected citizens and enterprises to receive deferrals of loan payments for up to six months. The People's Bank of China key measures include: (i) liquidity injection into the banking system, (ii) forbearance for delay in loan payments for affected corporates facing repayment difficulties, (iii) tolerance for higher level of nonperforming loans and reduced provision coverage requirements. Reserve Bank of India introduced a temporary reduction of the liquidity coverage ratio, an extension of the time period for resolution timeline of large accounts under default, a collateral-free lending program with 100 percent guarantee (IMF, 2021).

Thus, due to the pandemic and subsequent regulatory response, debt financing conditions in BRIC countries were affected by the changing macroeconomic environment. Because of the ease in banking regulation and measures that encouraged bank lending, it was possible to avoid the debt supply shortage and bank financing during this period was available and attractive. On the other hand, there was a booming situation on the bond market. This is explained by the low interest rate environment. Specifically, due to the extremely low bank deposits interest, investors massively switched to the bond markets seeking higher coupons. This situation of high demand on the bond market created favorable conditions for the issuers who was able to lock into very advantageous terms (Goel & Serena, 2020). Therefore, during the period in question, both sources of debt financing were attractive and it might be assumed that the choice between them was an important decision for many firms in emerging market economies.

3. Literature review and hypothesis development

This segment of the paper introduces the review of the theoretical and empirical developments related to our research question. The introduced theories provide predictions and explanations for the relation between capital structure, debt source choice and firm performance. Section 3.1 explains the traditional theories of optimal capital structure. Section 3.2. covers the theoretical determinants of debt source choice. Section 3.3. presents the critical views against the introduced theories. It is followed by the review of empirical findings on the association

between debt structure and firm performance in Section 3.4. Section 3.5. presenting the summary of the reviewed theories and hypotheses development concludes this part of the paper.

3.1. Traditional theories of optimal capital structure

The phenomenon of debt financing source choice originated from the general idea of maintaining the optimal capital structure for a firm. The undermentioned theories are related to the firm's financing decisions. This means an ideal or advantageous choice between debt and equity proportions in the firm's capital structure which is a primary concern in corporate finance. It is worth mentioning these theories in our study because they help to understand the general idea of financing source choices and the role of leverage in the firm's capital structure. Some analogies could then be drawn when discussing the debt structure decisions.

3.1.1. Irrelevance theory

In 1958, Modigliani and Miller (MM) were the first to introduce such fundamental work on capital structure decisions of firms. This theory is considered as a base for theoretical and empirical work on capital structure. According to the MM (1958) approach, the choice of financing source is insignificant in the perfect capital markets. Under a few assumptions of an ideal lies the absence of taxes, transaction cost and bankruptcy cost, as well as the equal availability of information about the future prospects of the firm for investors and insiders. Even though MM-theory suggests that capital structure is irrelevant to the value and the cost of capital of the firm, markets do not carry such assumptions in reality. Thus, on that ground the irrelevance theory was criticized. These criticisms led MM to amend the 1958 approach and consider that the corporate tax system provides a tax shield from paying the interest on debt (MM, 1963). Moreover, many modern theories such as the tradeoff theory, the pecking order theory and the market timing theory compile the MM approach. These theories define how breaching some of the MM theory assumptions impacts the capital structure and financing decisions.

3.1.2. The trade-off theory

The trade-off theory is based on the arguments extracted from the work of Modigliani and Miller (1963). According to the MM (1963), the firm value is maximized when the firm is 100% financed by debt capital due to the maximum value of tax shield. However, in reality this supposition is anecdotic which proves the model to be incomplete. The trade-off theory suggests

that the proportion of debt in capital structure depends on both tax shield benefits and bankruptcy costs. This brings forth the optimal debt to equity ratio at the stage where these two factors are equal. This is further investigated by Myers (1984) who states that the optimal proportion of debt and equity is not static. The choice between debt and equity financing is rather a dynamic procedure. This implies that an increase in the level of debt leads the firm to enjoy the benefit from tax deduction but firms should be cautious because increased debt also increases the possibility of financial distress which ultimately increases the likelihood of bankruptcy.

Bradley et al. (1984) states that under the static trade-off theory, enhancement in the bankruptcy costs is linked to decline in the optimal debt proportion. On the contrary, the increase in the value of a tax shield is positively related to the optimal proportion of debt. Logically it seems accurate but empirically the model is complicated as in real scenario firms operate under changing conditions. Under the dynamic trade-off theory, firms' capital structure decisions mainly depend on the firms' expectations for the coming years. It means that the choice of optimal proportion of debt today relies on the expectations of the firm for the near future (Luigi & Sorin, 2009). Brennan and Schwartz (1984) further explain that firms' financing choices are correlated with their cash flows and reflect that investment and financing choices are done collectively.

The implication of trade-off theory concludes that firms should raise the level of debt in capital structure when the tax benefits exceed the bankruptcy costs. Hence, the trade-off theory implies the positive relationship between an "optimal" level of leverage and firm performance which is supported by many studies namely Taub (1975), Margaritis and Psillaki (2010), Fosu (2013) and many more.

3.1.3. The pecking order theory

An alternative theory based on MM approach is advanced by Myers (1984) and is known as the pecking order theory. It states that firms would prefer to finance new investments by utilizing internal sources of finance rather than external funds. This theory deals with the understanding of adverse selection and agency cost issues in the context of capital structure. Thus, this theory proposes that the choice of financing source depends not only on the value of cost and benefits of debt but also market reactions and managerial behavior.

Myers and Majluf (1984) suggest that relying on internal funds to finance the project is perceived as a positive signal to the market. In case if external financing is necessary, debt

would be preferred to new equity issuance since present stakeholders will not be pleased with diluting their stakes and the market price would react accordingly.

Thus, pecking order theory states that during normal or boom market situations firms are found to be more profitable because of lower proportion of debt in their capital structure. But in case of financial crisis firms become less profitable and deal with liquidity crises (Cetorelli & Goldberg, 2011), Therefore, firms choose external financing i.e., rely more on debt financing during the crisis. As a result, pecking order theory exhibits a negative relation between firm leverage and its performance which is also concluded by many empirical studies such as Rajan and Zingales (1995), Fama and French (1998), Abor (2007) etc.

3.1.4. The market timing theory

This theory is novel and propounded by Baker and Wurgler (2002). In this regard, few studies have been conducted on this issue. The theory assumes that managers determine the optimal financing decision based on the situation in the equity market (Huang and Ritter, 2009). Baker and Wurgler (2002) proposed that when a firm believes its stock is overvalued it would prefer issuing new shares, whereas debt financing as well as repurchasing of shares is undertaken when the stock is undervalued. The validity of this theory is tested by Elliott et al. (2007). They find that an overvalued firm has the highest possibility of issuing new equity thus supporting the theory. Therefore, it could be concluded that market fluctuations may affect the choice of firms' capital structure. If to base the explanation of generally found negative relation between leverage and firm performance on this theory, it might be argued that firms with higher proportion of debt in capital structure suffered more periods of undervaluation.

3.2. Theoretical determinants of debt source choice

The above discussion concludes that debt financing as a source of capital concerns the changes in firm performance and firm value. Thus, here arises a question about what is the inference of different debt source choices on firm performance. In this regard, Bolton and Scharfstein (1996) even suggest that, given the economic magnitude of the debt market and the observation that firms tend to utilize debt more often: "it may be more important to understand the structure of debt financing than the choice between debt and equity".

Private and public debt are the two broad categories of debt financing sources of firms. Most of the time, public debt is considered synonymous to corporate bonds and private debt indicates

bank loans[1]. Presented in the following subsections asymmetric information, moral hazard and liquidation and renegotiation theories would help to explain the debt financing source choices of firms.

3.2.1. Information-based theories

Information asymmetry faced by lenders and borrowers is assumed to be able to affect a firm's debt source choice. According to Leland and Pyle (1977) banks have a competitive advantage in information production which helps firms to solve the adverse selection problem. Hence, the firm dealing with severe information asymmetry would borrow from banks whereas firms with less adverse selection prefer public debt. In this regard, small firms are predicted to benefit more from using bank debt since it is more difficult for them to bear the costs of information production that is required for public issuance (Fama, 1985; Nakamura, 1993). Further, Nakamura (1993) argues that the information-related advantage of bank debt is less prominent for larger companies because they usually use the services of many banks and each financial institution does not have access to the complete information about the firm's accounts and transactions. Thus, for big firms the cost advantage in borrowing from a bank is lower. Another notable prediction was proposed in the study by Hadlock and James (2002). They replicate the market timing theory in the context of debt structure decisions and focus on the bank's ability to correctly price the firm's claims and thus reduce the adverse selection the firm suffers when undervalued. Thus, the suggestion is that undervalued firms rely more on bank debt.

Campbell (1979) stresses that firms' proprietary information is precious to competitors. That is why firms with valuable inside information would benefit more from bank loan borrowings than public issuance because banks have the ability of keeping the sensitive information unrevealed. In contrast, the public debt issuance might require the firm to unfold this inside information in order to obtain the desired terms. Therefore, the proprietary information theory predicts that for innovative firms that are more likely to have positive inside information it would be advantageous to borrow from banks. However, Bhattacharya and Chiesa (1995) suggest that the firm should weigh the costs and benefits of keeping proprietary information and getting the advantageous terms, accounting for some possibility of information leakage through banks. The authors show that it might be beneficial for a bank to reveal the positive

[1] Private debt includes both bank and non-bank sources but this paper concentrates on the bank loans vis-à-vis public debt, as they are most often observed in firms' debt structures.

private information about one of their borrowers to another bank's client in order to insure the solvency of both firms.

These information-based theories were tested empirically by numerous studies. Consistent with the arguments in Fama (1985) and Nakamura (1993) that it is less costly in big firms to produce the information required to issue public debt, several papers find a positive relation between firm size and level of public debt in the firm's debt structure (Krishnaswami et al. 1999; Denis & Mihov, 2003). Hackbarth et al. (2007) find that large and old firms (that have a bargaining power) use a mix of bank and public debt while small and young firms are mostly fully bank-financed. In a recent study, Marshall et al. (2016) using a sample of 400 UK firms over the period 2000–2012 show that large firms with higher reputation are more likely to borrow in public debt markets.

Krishnaswami et al. (1999) measure the information asymmetry between the firm and lenders by the residual volatility in the firm's stock returns (computed as the standard deviation of the residuals of the market model regression) and find a positive relation between the level of information asymmetry and the ratio of privately placed long-term debt to total long-term debt. However, Denis and Mihov (2003) use the ratio of research and development (R&D) expenses to sales as a measure of information asymmetry and find no relation between the variable and the firm's preference for bank loans. Finally, Hadlock and James (2002) proxy the level of information asymmetry by the firm's market valuation. Using return volatility and stock price run-ups to measure undervaluation, they show that undervalued firms find bank loans more beneficial than public debt.

Recent studies show that bank debt seems to help firms in dealing with information asymmetry originating from external uncertainty, such as the competitive situation in the sector or political frictions. Boubaker et al. (2018) examine how competitive pressure affects firms' debt financing source choice. Using a sample of 3675 U.S. firms over the period 2001–2013, they find a negative relation between competitive pressure from the product market and firms' reliance on bank debt. Authors also stress a significant decrease in the level of bank debt after large import tariff reductions. Ben-Nasr et al. (2019) find a positive relationship between political uncertainty (proxied as close to election periods) and the level of bank debt. In addition, they show that the association is more significant in opaque and more financially constrained firms as well as firms from countries with weaker shareholder rights, labor protection, creditor rights and national governance.

Supporting the hypothesis about the banks' ability to keep proprietary information unrevealed, Krishnaswami et al. (1999) measure favorable private information with the unexpected future earnings of the firm, which are computed as the difference between actual earnings per share and forecasted earnings per share in the next year scaled by earnings per share in the current year. They show that firms with higher unexpected earnings rely more on private debt than other firms, but only if they have serious information asymmetry problems.

Finally, proprietary information models predict that the issuance of bank debt should be perceived as a positive signal by the market as it means that the firm has positive information. It was supported by a large strand of event study research that found positive abnormal returns following the announcements of bank debt arrangements (Lummer & McConnell, 1989; Szewczyk & Varma, 1991; Preece & Mullineaux, 1994; Billett et al., 1995).

3.2.2. Moral hazard theories

Moral hazard theory provides intuition that shareholders of levered firms need to be monitored because they have incentives to engage in actions that are damaging to debtholders. According to Jensen and Meckling (1976), shareholders have an incentive to invest in risky projects in order to increase the possible outcome because they are protected from downside risk by limited liability. It was further demonstrated by Galai and Masulis (1976) who modelled the equity of a levered firm as a call option on the firm's assets in order to explain why shareholders have an incentive to increase the riskiness of the projects. The issue of 'underinvestment' was explained by Myers (1977). Since debtholders have priority claims on a firm's cash flows, shareholders of a highly leveraged firm may not be willing to invest in positive net present value (NPV) projects when the cash flows from the project would primarily be used to pay down debt.

The work of Besanko and Kanatas (1993) contributes to the literature by explaining the ability of bank debt to reduce the moral hazard problems between shareholders and lenders. In their model, the entrepreneur's incentive to exert additional effort and improve the profitability of the project is reduced when the firm gets more leverage. The reason is that entrepreneur's payoff from the project is reduced since the firm's cash flow is shared with lenders. In this setting, banks have a superior to public lenders ability to monitor and force the entrepreneur to supply more effort. Therefore, these arguments are also related to banks' information production abilities, but this information is produced ex-post, i.e. after the debt financing agreement. However, a logical conclusion that bank loans would be more advantageous than public debt for firms with more leverage was not supported empirically.

Furthermore, Diamond (1991) provides an explanation on how bank monitoring and borrower reputation can influence the choice of public and bank debt. The research discusses three main points: i) start-ups or young firms primarily use bank monitoring in order to generate a good reputation that would help them to issue public debt at accessible terms in the future; ii) firms with average credit rating prefer to borrow from banks; iii) high and very low credit rating firms favor public debt. Thus, this indicates that new borrowers on the market prefer banks since they want to develop a good reputation. Borrowers with good prospects prefer public debt because the fear of losing their strong reputation protects them from indulging in self-serving actions removing the need for close monitoring. Lastly, low credit rating firms have a higher cost of capital and no fear of being caught engaging in self-interested actions when monitored. Hence, bank monitoring is not able to prevent these firms from moral hazard issues because they have fewer to lose.

Another prediction by Hoshi et al. (1993) is that firms with tangible assets that can be used as collateral to borrow cheaper would prefer public debt, while firms without collateral would prefer bank debt. This intuition was supported by Houston and James (1996), Johnson (1997), and Denis and Mihov (2003).

Nevertheless, moral hazard problems concern not only the shareholders-debtholders relationships. In case of separation between ownership and control, another important issue is the agency problems between shareholders and managers. Hoshi et al. (1993) suggest that bank monitoring is also effective in ensuring that managers' decisions are in line with shareholders' interests i.e., banks are able to force managers to choose to invest in the most profitable projects rather than pet projects that provide private benefits. The model predictions state that management of the firm with many attractive investment opportunities does not need to be monitored because the payoff from the profitable project is higher than the private benefits from the pet project. For a firm with intermediate level of profitable projects the bank monitoring is extremely valuable since the chances of management engaging in self-serving activities is high and the forgone payoff from profitable investments is still considerable. Finally, for the case with very limited profitable investment opportunities bank monitoring costs are useless since the difference between the outcomes of optimal projects and pet projects is insignificant. Investigating the predicted relation empirically, Krishnaswami et al. (1999) find a positive and linear association between the profitable investment opportunities and the level of bank debt. This partly contradicts the theory showing that managers of successful firms also need to be monitored. In Denis and Mihov (2003) this relation is insignificant.

Meneghetti (2012) further evaluates on the moral hazard issues from separation between ownership and control and focuses on the management compensation as a determinant of the debt structure decisions. It is expected that managers with high incentive compensation are more prone to choose to be monitored and commit to investing in efficient projects. In contrast, managers receiving low incentive compensation would avoid bank monitoring in order to be able to invest in pet projects as they are not incentivized to do the opposite. Investigating this relation empirically, Meneghetti (2012) suggests that executives whose incentive compensation is tied to firm performance prefer bank loans to public debt. Following the same theoretical implications, an article by Lin et al. (2013) examines the relation between a borrowing firm's ownership structure and its debt source choice using a sample of 9831 firms in 20 countries from 2001 to 2010. They find that the divergence between the control rights and cash-flow rights of a borrowing firm's largest ultimate owner has a negative effect on the level of bank debt in the firm's debt structure.

The above discussion thus concludes that preference is given to bank debt when the more effective bank monitoring leads to an increase in firm value.

3.2.3. Liquidation and renegotiation efficiency

The prior studies argue that banks' ability to deal with the situations of financial distress is superior to that of public debt. It is also assumed that banks are better prepared to make the right decision regarding renegotiation or liquidation when the firm is close to default. The reasons are that banks have an informational advantage over bond holders and need to protect their reputational capital for being able to use the correct instrument to deal with financial distress. Therefore, it is expected that firms that are more likely to face financial difficulties and thus need the lender to make an optimal liquidation/renegotiation decision would prefer bank debt (Berlin & Loeys, 1988; Chemmanur & Fulghieri, 1994). On the contrary, firms with high and stable cash flows and high-profitability are assumed to prefer public debt (Cantillo & Wright, 2000). Cantillo and Wright (2000) and Bolton and Freixas (2000) state that banks are more likely to choose reorganization over liquidation and perform reorganization more effectively than public lenders which makes the bank debt contracts more flexible. Therefore, bank debt should be more beneficial for firms facing high probability of financial distress.

These predictions found almost unanimous empirical support. Johnson's (1997) finding of a positive relation between the earnings growth volatility (used as a measure of credit risk) and the level of bank debt in the firm's balance sheet shows that bank debt is more valuable for

firms with higher levels of financial distress. Denis and Mihov (2003) find that firms with investment grade debt rating and higher Altman Z-Score are more likely to choose public debt.

Moreover, Roberts and Sufi (2009) argue that financial flexibility is also important for financially stable firms. They suggest that renegotiation of debt arrangements following new information about the firm's credit quality, with lower interest rates and additional credit, is more accessible for private than public debt.

A recent empirical study by Chen et al. (2020) supports the hypothesis that the possibility of renegotiation can affect the choice of debt financing source. Authors show that firms with a lower portion of redeployable assets, which are assets that would be less valuable to use outside the business, prefer to borrow from banks than issue public debt. Thus, such firms benefit from the ability to renegotiate bank debt contracts instead of selling assets in the event of default.

3.2.4. Financial intermediation

Financial intermediation theory explains why banks are able to deal with the above-described issues better than the public market (Diamond, 1984). Banks as financial intermediaries perform the task of delegated monitoring in which they have a cost advantage due to the diversification effect. Since financial intermediaries obtain money from many lenders and lend them to many borrowers, they are better positioned to monitor than multiple individual investors that have an incentive to free-ride on other's monitoring efforts. Thus, banks help to avoid this duplication of effort. Therefore, banks have cost advantages in information production ex-ante and are monitoring agents who are better able to produce information ex-post. Moreover, banks have the ability to keep sensitive information confidential (Campbell, 1979). Finally, due to the fact that banks lend funds to multiple firms with projects whose returns are independent, the probability that the bank has enough proceeds to pay back its depositors is higher than it is for individual lenders.

Furthermore, it is argued that banks have a unique position to translate information to financial markets. There are several explanations on how banks gain this ability. First, banks are able to invest in a costly information-gathering procedure that gives them a competitive advantage in evaluating lending opportunities. Another view is that banks gain unique access to private information about their clients because they are dealing with a big number of borrowers over a long period of time, whereas this inside information is unavailable for individual lenders (Black, 1975). Fama (1985) argues that since bank debt, along with other types of privately placed fixed-payoff securities, is classified as inside debt, banks get access to information not available

to holders of the firm's publicly traded securities. This explains why the evaluation of the borrower by a bank resulting in a positive loan decision is perceived by capital-market participants as a signal of the borrower's creditworthiness (Campbell, 1979; Diamond, 1984).

3.3. Theory limitations

Above discussed theories made a large contribution into the literature and have broad acceptance and validity but still are often criticized. Firstly, trade-off theory suggests that every firm can reach the optimal level of debt by maintaining the balance between costs and benefits of debt financing. In this regard, Sheikh and Wang (2011) argue that much research has already been conducted relating to this issue but no certain procedure is set up for managers in order to achieve the optimal capital structure.

Secondly, pecking order theory states that in order to minimize the information asymmetry costs the firm should firstly go for internal funds, then use debt and finally, as a last resort, issue equity. Fama and French (2005) document that equity issues have been increasingly frequent and firms issue equity even when they could have used internally generated funds or issued debt. They interpret this as evidence against the pecking order theory. Other investigations show that there are some other factors present which could force the firms to avoid external financing which are not considered by the pecking order theory (Baskin, 1989; Allen, 1993).

Thirdly, market timing theory is criticized for its over simplicity in defining the right time to attract funding from a particular source for all firms, whereas capital structure choice is more individual and specific (Chang et al., 2006). Further, Mahajan and Tataroglu (2008) criticize the theory because the related studies are mostly based on American firms. So, it is questionable if the theory applies to other countries (Baker & Wurgler, 2002).

Finally, the debt source choice theories' criticism is related to the statement that bank debt has superior ability in dealing with moral hazard issues. On the contrary, Sharpe (1990) and Rajan (1992) argue that relying on bank debt could as well lead to the occurrence of agency problems. The information produced through the bank-firm relationship creates information monopolies or hold-up problems. Rents extracted by banks when a project goes well distort investment decisions by lowering firm incentives. Rajan (1992) adds that banks may extract excessive rents from borrowing firms through their controlling rights to them. Therefore, banks could engage in self-serving activities at the expense of entrepreneurs. James and Smith (2000) argue that

bank monitoring could also be costly since the covenants it contains restrict investment expenditures, the sale of assets and financing activities.

3.4. Empirical findings

Based on the above-discussed theories and related empirical research that investigate the patterns in debt source choices based on firm characteristics, it is possible to conclude that bank debt poses several unique features that provide benefits for firms in terms of dealing with information asymmetry, agency problems and financial distress. In this regard, a further research question related to the association between debt structure and firm performance was posed by the scholars. The finding by Rauh and Sufi (2010) who show that most firms simultaneously use different types of debt, and that the correlation between firm profitability and leverage varies across different debt structures demonstrates the importance of this investigation.

3.4.1. Debt structure and firm performance

Research on the topic is represented mostly by event studies that find positive market reaction to the announcements of the issuance of bank debt (Szewczyk & Varma,1991; Preece & Mullineaux 1994; Billett et al., 1995) A more recent study by Fungácová et al. (2020) investigate market perception of bank debt in Europe. They find that debt announcements tend to generate a positive stock market reaction. It is also shown that loan issuance receives a significantly more prominent reaction than a bond issuance. Correspondingly, the prior literature finds significant negative effect on stock returns after bond issue announcements (Eckbo, 1986; Gilson & Warner, 1998; Spiess & Affleck-Graves, 1999; Godlewski et al., 2011). Some other studies have reported little or no response to issues of public debt (Mikkelson & Partch, 1986; James, 1987; Hadlock & James, 2002). Other scholars show that the market reaction to bank debt is not as straightforward. Marshall et al. (2019) find that stock prices respond positively only to syndicated loans. Notably, the lender characteristics are also found to be able to affect the stock market reaction. Thus, higher abnormal returns are associated with higher lender's credit quality and better reputation (Billet et al., 1995). On the other hand, the announcements of loans made by low-quality banks generate negative stock returns for the borrowing firms (Huang et al., 2012).

Despite much empirical support for the positive stock price reaction to bank loan announcements, the effect of bank debt on operating performance is less studied and significant

results were not obtained so far. Agarwal and Elston (2001) using a sample of large German firms do not find statistically significant influence of bank debt on firm profitability and growth.

From the discussion in this subsection, it could be concluded that various firm characteristics, as well as external factors could influence the debt financing source choices of firms. Furthermore, the relation between the level of bank debt and stock market performance of a firm is generally found to be positive, while the association between bank financing and operating performance is insignificant. However, a special market situation occurring during the crisis periods could change the relation existing in the normal market. The effect of recent financial crises on the relation between bank debt and firm performance found in the literature is discussed in the next subsection.

3.4.2. Debt structure and firm performance during financial crisis

Prior empirical work on the theme of financial crises had become a significant research area investigating this special period of volatility spillover across financial markets (Edwards & Susmel, 2001). The first episode of the financial crisis occurred in the year 1997 with the credit crunch on the U.S. market followed by the Russian crisis of 1998. The Global Financial Crisis took place in 2008 and was described by Chen at al. (2019) as "the most severe shock to hit the global economy in more than 70 years". Finally, the most recent crisis episode caused by the spread of coronavirus has been considered as a "black swan" in the history of the financial markets (Malik et al., 2021). Thus, a financial crisis is defined as "a disruption of financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently supply funds to those who have the most productive investment opportunities" (Mishkin, 1992).

This definition exhibits that the crisis results in deterioration and shrinking of the aggregate economy (Carmassi et al., 2009). So, this has a global effect on financial sectors of different countries that leads to a crumble of the stock market as a whole (Argandoña, 2012). This also evidences the interdependence of the global economy that was significantly affected by the collapse of some big players, such as Lehman Brothers, on the leading U.S. market. This fall of the U.S. financial market was followed by the worldwide financial crisis that resulted in liquidity issues among many businesses globally (Ahn et al., 2011), and the diminishing of credit supply (Cornett et al., 2011). This means that firms' access to bank financing was restricted. Campello et al. (2010) find that 86% of U.S. firms forgo profitable investments due to the challenges relating to external financing during the crisis. Thus, it is apparent that an

increase in uncertainty due to the financial crisis could influence the firms' debt structure (Almeida et al., 2011; Dick et al., 2013). In this regard, research has been conducted to identify how the relation between debt structure and firm performance changes during the crisis periods as compared to a normal market situation.

One part of literature is dedicated to the relation between debt financing source choice and firm valuation during the financial crisis. Chava and Purnanandam (2009) provide evidence that adverse capital shocks to banks affect their borrowers' performance negatively. They show that firms relying primarily on bank debt suffered larger valuation losses during the period of bank lending contraction in the U.S. in 1998. Godlewski (2014) suggests that in general during financial crises firms face negative stock market reactions to bank loan announcements but also adds that larger firms still experience positive stock price reactions. Marshall et al. (2019) based on the sample of 400 UK firms demonstrates that excess returns on the announcement of bank loans have declined during and after the financial crisis. In contrast, Li and Ongena (2015) using the U.S. market data estimate excess returns before and after the onset of the Global Financial Crisis. They find that prior to August 2007 positive abnormal returns were marginal but increased afterwards. This means that bank loans were perceived more valuable by the market after the crisis than in the booming market situation.

Number of studies investigate the effect of bank debt on firms' investing behavior. Giebel and Kraft (2020) analyze the change in firms' innovation behavior in reaction to the credit supply shock during the 2008/2009 financial crisis. They find that the shock to bank financing negatively affected short-term innovation adjustment in 2009. Buca and Vermeulen (2017) show that in response to bank credit tightening, investments fall substantially more in bank-dependent industries. Hiromichi (2019) studying a sample of Japanese firms find that bank-dependent firms faced more underinvestment or uncertainty after the financial crisis of 2008 than firms with access to the public debt market.

3.4.3. Debt structure and firm performance in emerging markets

Research investigating the association between debt structure decisions and firm performance focuses on the developed markets samples. The studies discussed above are also related to the developed economies. This subsection, in turn, would present the research that was conducted based on emerging markets economies data as the comparison of these two strands of literature could provide valuable results.

We start with the articles about the relation between debt source choice and market valuation. Most of the papers using developed markets data find that there is a positive market reaction to bank debt (Szewczyk and Varma,1991; Preece and Mullineaux 1994; Billett et al., 1995; Fungácová et al., 2019). Research that is based on the emerging markets economies data provides the inverse results. Bailey et al. (2010) and Huang et al. (2012) whose findings are based on the sample of large listed Chinese firms report a negative market reaction to the bank debt issuance announcements in the event-study analysis framework. The study by Godlewski et al. (2000) using a sample of Russian firms shows a general negative reaction of stock markets to debt issuance with insignificant difference between announcements of loans and bonds. However, Davydov et al. (2014) also use a sample of Russian firms and find that companies that use public debt underperform relative to fully bank financed firms in terms of stock market valuation over the long-term period. Finally, Davydov (2016) using a sample of firms from emerging markets economies finds a U-shaped relationship between the level of bank debt and long-term market valuation measured by Tobin's Q.

Regarding the relation between bank debt and operating performance of firms, from the limited number of studies we learned that this association in the developed markets is insignificant (Agarwal & Elston, 2001). In contrast, Davydov (2016) analyzing the data on 700 publicly traded firms from emerging markets economies find that higher levels of bank debt may have a positive effect on firm profitability measured by return on assets.

Finally, it is possible to find the difference in observed relation between bank debt and firm performance in developed and emerging markets economies during the crisis periods. Most of the studies that used the developed markets data found a negative stock market reaction to bank debt issuance announcements amidst the crisis. On the contrary, Davydov and Vähämaa (2013) investigating a sample of publicly listed firms from Russia find that fully bank-financed firms significantly outperformed firms with public debt during the crisis. However, they also report that the stock prices of bank dependent firms recovered more slowly in the post-crisis period.

Thus, we observe many inverse results when comparing the relations in question in developed and emerging markets economies. One reason for this could be the difference in the position and functioning of banking institutions in the two groups of countries. Even though there certainly are many state-owned banks in developed countries, emerging markets economies are known for the most amplified role of government in their banking systems (Bertay et al., 2012).

Andrianova et al. (2010) argue that, even though the presence of state ownership in the banking sector is often criticized, they find a positive association between government ownership of banks and long run growth rates. They add that this relation is more prominent during financial crises. Bertay et al. (2012) also find that lending by state banks is less procyclical than lending by private banks. Consistently, Brei & Schclarek (2013) based on a sample of 764 major banks headquartered in 50 countries over the period of 1994–2009 show that government-owned banks increase their lending during crises relative to normal times, while private banks' lending decreases. Government-owned banks thus counteract the lending slowdown of private banks. However, it could not be set aside that state-owned banks are largely affected by political influence. Thus, the studies by Dinc (2005) and Ianotta et al. (2013) suggest that government-owned banks are subject to political influence which is evident from the fact that they increase the lending volumes more than private banks during election years.

3.5. Theoretical summary and hypothesis development

Issuing public debt is in many ways advantageous for firms. First, they are able to borrow large amounts of funds. Moreover, when issuing bonds, a company forms a public credit history, which does not happen when working with one or several banks. When the borrower makes coupon payments on time and fulfills the obligations in full, it builds its reputation. As a result, investors account for a high reliability of the borrower and demand a lower risk premium. Thus, the interest rate on subsequent borrowings is reduced and the issuer bears less debt service costs (Diamond, 1991). In addition, a decrease in the investment risk of the borrower entails the possibility of issuing longer term bonds. Finally, due to the fact that the fixed component of flotation costs is considerably larger for public debt issues than for private issues, public debt could provide greater economies of scale (Krishnaswami et al., 1999).

However, many companies find themselves unwilling or unable to use public debt as a financing source for several reasons. The first issue is explained by costly information production models. This theory states that producing the information required to issue public securities is expensive and involves complicated procedures of preparing documents for the issue including certified financial statements and prospectus, registration with financial markets authorities, as well as bearing marketing and other fixed costs. Secondly, firms might be unwilling to disclose some strategic information, for example, information on a firm's marketing and advertising strategies or R&D activities, that is valuable to the firm's rivals. However, the revelation of such information may be necessary for the issuing firm to prove its

creditworthiness. Moral hazard theory provides intuition that shareholders of levered firms need to be monitored because they have incentives to engage in actions that are damaging to debtholders. Additionally, bank monitoring helps to deal with agency problems between shareholders and managers. Another notable advantage of bank loans over public debt discussed in the literature is the financial flexibility and possibility of renegotiation it provides.

Nevertheless, a strand of literature pays attention to the fact that firms can be negatively affected by bank influence. Banks could exploit their unique position to promote their own interests over the interest of the shareholders. For example, banks could share private information about the firm with its competitors or influence management to undertake less risky projects, or engage in rent-seeking activities and divert income away from the firm to themselves via the costs of financing.

Based on the above-discussed theories, due to the more efficient external monitoring, less severe adverse selection and financial flexibility provided by banks, performance of bank dependent firms may be enhanced.

There are several studies that empirically investigate the association between the debt financing source choice and operating performance of the firm. Agarwal and Elston (2001) motivate their hypothesis about the positive relation between the level of bank debt and firm performance by the intuition based on the information production and moral hazard theories. It states that if banks have access to private information that reduces agency costs, and if firms with close bank relationships benefit from better access to financing, then bank-influenced firms should have better performance than independent firms. However, using a sample of large German firms they do not find statistically significant influence of bank debt on firm profitability and growth. The authors explain it by the presence of rent-seeking activities that are evidenced by the high interest payments of bank dependent firms which translate the possibility of conflicts of interest. Davydov (2016) in his study on the sample of large firms from emerging markets economies finds that degree of reliance on bank debt (computed as the ratio of bank loans to total long-term interest-bearing debt) is positively associated with firm performance measured by return on assets.

Existing studies do not provide unified results for the relation between bank loans and firm performance. However, we would base our Hypothesis 1 on the information asymmetry, moral hazard and financial flexibility theories and examine if the result holds for our sample of firms from BRIC countries:

H1. *The higher level of bank debt in the debt structure has a positive effect on operating performance of the firm.*

However, in this paper we concentrate on testing the financial flexibility and renegotiation efficiency theories. Even though the financial flexibility and opportunity for renegotiation provided by bank debt is assumed to be beneficial for all firms, companies that are more likely to experience financial distress are expected to benefit more from the close bank-firm relationships. Studies that investigate the debt financing source choice in relation to the degree of financial distress of the firm find empirical support for this intuition (Johnson, 1997; Denis and Mihov, 2003).

To our knowledge, there are no empirical studies investigating the variability in operating performance of bank dependent firms in relation to the degree of financial distress. Based on the financial flexibility and renegotiation efficiency arguments we form the following Hypothesis 2:

H2. *Financially distressed firms benefit more in terms of operating performance from being bank-dependent than financially stable companies.*

Our main research question in this paper is related to the comparison of the association between the level of bank loans in debt structure and firm performance before and during the recent economic crisis caused by the pandemic.

The average level of financial distress and adverse selection is inflated during the crisis period. Therefore, based on the renegotiation efficiency and information asymmetry theories, during the period of global financial distress, the average firm that most likely faces financial constraints would benefit in terms of operating performance from the flexibility provided by bank debt.

Addressing the previous empirical research, it is important to note that the current macroeconomic setting is unique due to the different nature of this crisis as compared to the financial crises (1997, 2008) that occurred in the last decades. The key difference between the mentioned economic events is in their formation. Whereas financial crises originated inside the financial sector and banking system in particular, the 2020 economic crisis was caused by an external, natural factor that was almost equally disturbing for all sectors of the economy. In 2008, the fatal position of the world largest banks negatively affected financial sectors of almost all countries which resulted in limited access to bank debt financing for corporate firms. This

issue became a subject of many studies that show a more pronounced negative effect of the Global Financial Crisis on bank dependent firms than companies relying on public debt (Giebel & Kraft, 2020; Buca & Vermeulen, 2017; Hiromichi, 2019).

However, due to the explained difference in the nature of the current Covid-19 crisis compared to the previous financial crises, based on the information asymmetry and renegotiation efficiency theory we assume a different relationship between bank debt and firm performance during the 2020 crisis and formulate the following Hypothesis 3:

H3. *The average increase (decline) in operating performance between the periods before and during the 2020 economic crisis is larger (lesser) for the bank-dependent firms.*

Investigating the relation between the debt financing source choice and market valuation researchers most often appeal to the information production or signaling theory. Theoretical studies stress the unique position of banks that allows them to perform a certification function and to be information transmitters to the financial markets. Therefore, firms receiving bank debt financing are expected to gain in their market valuation.

Consistent with the theoretical predictions, most of empirical research that uses the event study method find positive market reaction to the announcements of the issuance of bank debt (Szewczyk & Varma,1991; Preece & Mullineaux, 1994; Billett et al., 1995; Fungácová et al., 2019). However, these studies are based on the developed markets. Research that is based on the emerging markets economies provides different results. Bailey et al. (2010) and Huang et al. (2012) whose results are based on the sample of large listed Chinese firms report negative effect of bank debt issuance announcements on market performance. The study by Godlewski et al. (2000) using a sample of Russian firms shows a general negative reaction of stock markets to debt issuance with insignificant difference between announcements of loans and bonds. However, Davydov et al. (2014) find that firms that use public debt underperform relative to fully bank financed firms in terms of stock market valuation over the long-term period.

Based on the information production theory that posit certification function of banks, we pose the Hypothesis 4 as follows:

H4. *The higher level of bank debt in the debt structure has a positive effect on market valuation of the firm.*

Research about the relation between the choice of debt financing source and market valuation over the period of crisis made a significant contribution to the literature on the theme and understanding of the phenomenon in question. It was especially relevant to study the difference in this relation before, during and after the Global Financial Crisis since this economic event was characterized by the significantly decreasing trust in the banking system. Based on the large amount of non-performing loans banks were left with in 2008, financial markets realized that banks' evaluation and monitoring of borrowers were not as efficient after all. Despite this depreciation of the certification function of banks, firms relying on bank debt could experience disruption in their access to external financing due to the restricted credit supply. This could also affect the perception of bank dependent firms by financial markets amidst the crisis.

Empirical findings mostly support this intuition. Godlewski (2014) Chava and Purnanandam 2009) Marshall et al. (2019) demonstrates that excess returns on the announcement of bank loans have declined during and after the financial crisis. This supports the theory of deteriorating certification function of banks as a result of financial problems in the sector meaning that loans have become less informative as a signal of the creditworthiness of borrowing firms. Some papers, however, found inverse relation that was explained by the intuition that during the period of restricted credit supply only firms with very high credit quality could receive debt financing (Davydov & Vähämaa, 2013; Li & Ongena, 2015).

As was discussed above, accounting for the different nature of the current crisis compared to previous financial crises, we assume that this time the studied relationship would not be affected in the same way and the theoretical predictions would hold. Since banks did not suffer the same financial problems and, thanks to the new banking regulation, were better prepared in terms of increased capital buffers to suffer losses from non-performing loans, firms with close bank relationships could be perceived better than firms with public debt by financial markets during the recent crisis.

H5. *The average increase (decline) in market valuation between the periods before and during the 2020 economic crisis is larger (lesser) for the bank-dependent firms.*

4. Data and descriptive statistics

The sample used in our empirical analysis is represented by large, publicly listed firms from the largest emerging market economies (EMEs) – Brazil, Russia, India and China (BRIC). It was chosen to base our study on the EMEs for several reasons. First, due to the less developed

financial markets in these countries, companies in emerging markets still to a large extent rely on bank debt. This is in contrast to, for instance, the U.S. economy, where even relatively small firms can reach the bond market. On the other hand, EMEs experienced notable growth of the public debt market which resulted in more firms getting access to bonds. Therefore, the debt source choice decision becomes more prominent for companies in emerging markets. Moreover, the debt of non-financial companies in emerging market economies has grown so rapidly in the last decades that in 2013 it overtook that of advanced economies, as a proportion of GDP (Caruana, 2016). This means that debt is a very important source of financing for firms in emerging markets. This also increases the importance of choosing an optimal debt structure. Additionally, researchers document that, while companies in the developed markets will most likely stick with a particular debt type and debt structure composition, due to the changing environment on the debt markets, the choice of debt structure is rather continuous in EMEs (Denis & Mihov, 2003). Thus, debt source choices are more likely to have a more pronounced effect on firm performance in emerging rather than in developed markets. It also means that we can potentially find more companies with a heterogeneous debt structure which is what we are concentrating on. Finally, due to the less stable economic situation in EMEs, the financial distress issues are expected to be more pronounced which is beneficial for testing our main liquidity and renegotiation efficiency hypothesis. That is why EMEs firms are considered an appropriate sample to investigate such a type of research question.

We collect data on the companies' debt structure to determine bank dependent and bank independent companies and other financial statement variables to control for firm specific characteristics such as firm size, leverage, liquidity, profitability. The data is obtained for fiscal years 2011-2020 from Bureau Van Dijk's ORBIS database.

The analysis is limited to industrial firms as capital structures of financial companies differ significantly and are subject to specific regulations. In order to avoid any selection bias, the sample includes only firms that have access to both bank debt and bond market debt, i.e. had been using both sources of debt during the sample period. Firms that for some reason are not exposed to a debt source choice and are limited to use only one source of debt financing do not satisfy the purpose of this study. Such an approach causes more homogeneous characteristics of firms in terms of debt source choices. Following previous literature (Lin et al., 2013; Davydov, 2016), unleveraged firms are excluded from the sample as they are also less exposed to the debt source choice decision. Firms with insufficient financial information are also removed from the sample.

The final sample used in the empirical analysis consists of an unbalanced panel of 4348 firm-year observations on 742 individual firms. The number of observations varies across variables due to lack of historical financial data.

Table 1 reports summary statistics for the variables used in the empirical analysis. The main variable of interest is the bank debt ratio. This variable represents the ratio of the total amount of bank loans to the total long-term interest-bearing liabilities. To be retained in the sample, a firm should have issued bonds at least once during the sample period. Thus, the bank debt ratio may vary from zero to one, implying that the firm can be fully financed by public debt or bank loans, or the combination of the two. In addition, a bank dependence dummy is also used in the analysis. It helps to divide the sample into two groups of companies. The first group is bank dependent firms. The company is considered bank dependent if the bank debt ratio is higher than 50%. Consequently, a bank independent firm is a company that has a bank debt ratio that is less or equal to 50%. Since the bank debt ratio is changing over time, the company can change the group during the sample period. Bank dependence dummy variable takes the value of 1 if the firm is bank dependent and zero otherwise.

Following previous literature (Anderson et al., 2012; King & Santor, 2008; Lang & Stulz, 1994), there are two primary measures of firm performance: return on assets (ROA) and Tobin's Q. ROA is a traditionally used accounting-based measure of operating performance calculated as earnings before interest and taxes, depreciation, and amortization divided by total book value of assets. Tobin's Q is used as the market-based measure of firm performance and calculated as the ratio of the firm's market value to the replacement value of its assets. Firm's market value is defined as market capitalization plus the book value of preferred stock and the book value of debt.

Panel A of Table 1 shows that the data sample is very heterogeneous in terms of firm performance. ROA varies between -22% and 48% with the mean of 3.3%, while Tobin’s Q differs from 0 to 6.87 with an average of 0.58.

Panel A of Table 1 also shows that the firm size as measured by the total assets (sales) varies from 15.12 (0.18) to 377 000 (472 000), with the mean of 9 135 (5 111) million dollars. Moreover, it can be noted that the average sample firm’s liquidity is rather low. The average liquidity as measured by the current ratio is 1.33. Current ratio is calculated as current assets divided by current liabilities. Sample firms have a moderate level of leverage. The debt-to-assets ratio is 0.36, while debt-to equity is 1.39. Debt-to-assets and debt-to-equity ratios are

calculated as book value of total debt divided by book value of total assets and book value of equity respectively. The sample firms have moderately high profitability which is evident from the average return on equity and return on equity employed values being 7.7% and 9.1% respectively. Average EBITDA margin amounts to 20%. ROE and ROCE are earnings before interest and taxes divided by book value of equity and capital employed respectively, where capital employed is total assets minus current liabilities. It can also be observed that the average Altman's (1968) Z-score is 1.06, while interest coverage ratio is 3.88. These numbers indicate that an average firm is relatively creditworthy and generates sufficient revenues to cover interest expenses. Interest coverage is measured as earnings before interest and taxes divided by the interest expense plus dividends on preferred stock. Following Lin et al. (2013), Z-score is calculated as (1.2 × working capital + 1.4 × retained earnings + 3.3 × earnings before interest and taxes + 0.999 × sales) / total assets + 0.6 × (market value of equity/book value of debt).

Finally, Panel A shows that the average firm from the sample is on 58% financed by banks, while the average concentration of the banking sector is about 59%, varying across countries and across years from 37% to 76%. The level of the banking sector concentration is used as an instrumental variable for bank debt dependence to control for endogeneity. It is obtained from the World Bank database and calculated as the top 5 banks' total assets divided by the sum of total assets of the banking sector.

Panel B of Table 1 presents geographic distribution of the sample. About 15% of observations are from Brazil, 12% from India, 1% from Russia with the majority of observations being represented by Chinese companies (71%). Panel B shows how the dependent and main explanatory variables differ between countries. Russian firms have the highest ROA (5.3%) while Indian firms on average performed worse than the rest of the sample. Return on assets for Indian firms amounted to 2.9%. Firms from Brazil had the highest market valuation as measured by Tobin's Q, while Russian firms had the lowest valuation. The average degree of reliance on bank debt also varies between countries. However, it can be noted that the difference is marginal. Thus, the bank debt ratio is the highest for Indian firms (62%), while the least bank dependent firms are Chinese with the bank debt ratio of 57%. The proportion of bank dependent firms also varies between countries: from 60% of sample firms in China to 70% in India. Country credit rating is the highest for Russia (5.23) and the lowest for Brazil (4.70), implying that 5 corresponds to BB rating on the S&P credit rating grid. Such distribution of sample implies that it is important to control for country-specific factors. Therefore, the country credit rating variable could be included in a regression model.

Panel C of Table 1 reports the performance measures and bank reliance variables values broken down into two periods: pre-crisis period from 2011 to 2019 and crisis period of 2020. It can be observed that average ROA was 0.4% lower during the crisis as compared to the pre-crisis period. Tobin's Q, on the contrary, was higher during the crisis, 0.77 in 2020 as compared to the 0.58 in 2011-2019. Average debt ratio increased by almost 2% in 2020, while the proportion of bank dependent firms increased by 4% and reached 65% in 2020 as compared to the pre-crisis period.

Figure 2 shows the dynamics of the average bank debt ratio during the period 2011-2020 by country. It could be noted that the peaks in debt ratio were observed in years 2011, 2018 and 2020. Breaking down the bank debt ratio by country, it could be seen that Brazilian and Indian companies decreased notably the amount of bank debt in proportion to total debt during the last years.

5. Methodology

5.1. Univariate tests

Our empirical analysis begins with dividing the data into two subsamples: bank dependent firms and firms which are mainly financed by public debt ("bank independent"). Following previous literature (Davydov, 2016) it is assumed that a firm is bank dependent if its major source of debt financing are banks. Therefore, the bank debt ratio of bank dependent firm is set to be higher than 50%. With simple univariate tests, we first compare differences in means in the two groups for the whole period. And we then proceed by comparing the firm characteristics of the best (the top quartile) and the worst (the bottom quartile) performing firms in terms of return on assets.

5.2. Panel regression

Next, the relationship between debt source choice and firm performance is examined with fixed effects panel regressions. We report both pooled ordinary least squares regression with country, industry and year controls, as well as firm fixed effects method regression. The choice is supported by the Hausman test. Following a common in empirical studies approach, the issue of heteroskedasticity is controlled for by directly using clustered robust standard errors as the clustering in variances of variables is expected in panel data.

As the main part of our analysis, we focus on the association between the degree of reliance on bank debt and firm performance in terms of operating efficiency and market valuation in a multivariate setting (Hypotheses 1 and 4). Consistent with prior empirical research on debt financing (Agarwal and Elston, 2001; Campello, 2006; Rahaman, 2011; Davydov, 2016), firm size, financial leverage, profitability measure, liquidity, solvency, county and year specifications are included in the multivariate analysis model.

Therefore, we examine the relationship between bank dependence and firm performance for the period from 2011 to 2020 with the following panel regression specification:

$$Performance_{i,t} = \alpha + \beta_1 Bank\ debt_{i,t} + \beta_2 Size_{i,t} + \beta_3 Leverage_{i,t} + \\ + \beta_4 Profitability_{i,t} + \beta_5 Liquidity_{i,t} + \beta_6 Solvency_{i,t} + \beta_7 Country_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $Performance_{i,t}$ stands for the measure of firm performance for firm *i* at time *t*; $Bank\ debt_{i,t}$ is either a bank debt ratio calculated as bank loans to total long-term interest-bearing debt or a dummy variable that takes the value of one if firm is bank dependent (has a bank debt ratio that is higher than 50%) and zero otherwise; $Size_{i,t}$ denotes firms size; $Profitability_{i,t}$ is a profit margin ratio, $Liquidity_{i,t}$ is a liquidity ratio; $Solvency_{i,t}$ is represented by default risk measure and coverage ratio; $Country_{i,t}$ is a credit risk of the country in which the firm operates.

Performance is measured by either return on assets (ROA) or Tobin's Q. ROA and Tobin's Q are used as a proxy for operating performance and stock market performance respectively. Firm size is measured by the natural logarithm of book value of total assets. The degree of financial leverage is measured by the debt-to-equity ratio. Current ratio is used to control for liquidity and EBITDA margin is used to account for profitability. Solvency of a firm is controlled for by Altman's (1968) Z-score representing default risk and interest coverage ratio accounting for the ability to serve its debt and financial commitments on time and in full. Due to the institutional settings of emerging economies, it is also important to account for country specific-factors. Therefore, we include S&P country credit rating in our regressions.

5.3. Instrumental variable

Furthermore, we acknowledge the potential severity of the endogeneity problem for our analysis. The decision to issue private or public debt may as well be affected by firm performance. For example, banks may prefer to finance more profitable firms. This intuition is

supported by the prior literature on the determinants of debt source choices in a firm's capital structure. Several studies (Altunbas et al., 2010; Faulkender & Petersen, 2006; Hale & Santos, 2008; Hoshi et al., 1993) find that firm performance affects the debt source choice. Therefore, the reverse causality problem between our dependent and main explanatory variable is present. In order to control for endogeneity, the instrumental variable (IV) approach would be introduced. This method implies finding a new exogeneous variable that would replace the initial endogenous explanatory variable in our regression. In order to find a valid instrumental variable to use in the analysis, this exogeneous variable should have two characteristics. First, it should be correlated with the endogenous variable (bank debt ratio). Second, it should not be related to the dependent variable (firm performance).

Existing studies about the banking sector and financial markets suggest that they tend to move in opposite directions in their development. Thus, Rajan and Zingales (2003) show that banks oppose financial development due to potential competition emerging from the public debt market. Demirguc-Kunt and Huizinga (2001) argue that movement towards development of financial systems in emerging markets is associated with a decrease in banks' profitability and interest rate margins. These findings suggest that developments in the banking sector should be negatively associated with expansion of the financial markets. Finally, Dickie and Fan (2005) find that a more concentrated banking sector leads to a corporate bond market being smaller and less developed. Based on these studies, it is proposed that banking concentration ratio representing the proportion of top 5 banks' assets in total assets of the whole banking sector in given country would be a suitable instrumental variable for bank debt ratio and would help to address the endogeneity problem[2]. This instrument for bank debt ratio was also previously used in empirical analysis by Davydov (2016). The validity of the chosen instrumental variable is endorsed due to the facts that it is expected to correlate with endogenous variable bank debt ratio and is not directly related with firm performance. Considering arguments that the higher banking concentration may cause underdevelopment of the public debt market, it is expected that there is a positive correlation between banking sector concentration and firm's reliance on bank debt. At the same time, we assume that banking sector concentration could not affect the firm performance. Even though it could be argued that the presence of banking monopoly may harm businesses and thus be correlated with firm performance, recent empirical evidence shows

[2]Following Davydov (2016), we are using a sector-level variable for IV, as it was not possible for us to observe any suitable firm-level variable. This is mostly due to the fact that firm-level variables correlated with bank debt ratio are at the same time strongly related with firm performance, and therefore do not comply with IV conditions.

that considerable negative affection of banking concentration level on firm performance is applicable only when the banking concentration reaches very high levels, assuming a near-monopolistic situation in the market (Delis et al., 2015). In our data sample, the maximum level of banking concentration amounts to 76% and, following the previous literature (Davydov, 2016), is not considered as a banking monopoly. Therefore, it is still assumed that there is no direct relation between the banking sector concentration and individual firm performance and the proposed instrumental variable is expected to be valid. These arguments would be formally checked by running a first stage IV regression. The results are discussed in the next section of the paper.

5.4. Propensity-score matching

As a next step in the analysis, we will introduce the propensity-score matching technique that is used to match the treatment group (bank dependent firms) with its closest peer from the control group (bank independent firms). Using this approach, we estimate treatment effects from observational data. It would help us to estimate a difference in firm performance of bank dependent and bank independent firms that are very similar in terms of other firm characteristics used as controls. Similarity between subjects is based on estimated treatment probabilities, known as propensity scores. Thus, the average treatment effect (ATE) of bank dependence on the firm performance will be estimated. After that, the matched sample will be used to run a new regression model.

5.5. Dummy interaction

Since we are studying the effect of debt structure on firm performance in emerging market economies. We argue that due to the general economic instability in these countries, financial distress issues are the most severe and are more or less relevant for the majority of local companies. This is also demonstrated by the descriptive statistics that shows that our sample is considerably heterogeneous in terms of the level of default risk. Therefore, we concentrate specifically on testing the liquidation and renegotiation efficiency arguments.

Empirical method used for this is a dummy interaction. This approach would help us to investigate how the relation between the level of reliance on bank debt and firm performance varies for firms experiencing different degrees of default risk as measured by Altman's (1968) Z-score (Hypothesis 2). According to the literature (Cantillo & Wright, 2000; Bolton & Freixas, 2000), the level of reliance on public or private debt may be dictated by the extent of financial constraints of a firm. Therefore, it is reasonable to assume that more financially distressed firms

may benefit more from renegotiation opportunities and flexibility offered by banks than financially stable firms. Therefore, we divide the firms into two groups based on their Z-score being higher or lower than the threshold of 1.8 (Altman, 1968). The group of firms with Z-score below the threshold would be considered financially distressed while the rest of the sample is assumed to be financially stable. The dummy variable created would take the value of one if the firm is financially distressed and zero otherwise. This new dummy variable is interacted with an already existing dummy variable representing bank dependence that takes the value of one if the proportion of bank debt in total long-term interest-bearing debt is more than 50% and zero otherwise. This dummy interaction variable would show how the relation between reliance on bank debt and firm performance is different for financially distressed firms compared to the rest of the sample.

Therefore, after adding the modification to the initial regression the new model would look as follows:

$$Performance_{i,t} = \alpha + \beta_1 Bank\ debt_{i,t} + \beta_2 Size_{i,t} + \beta_3 Leverage_{i,t} + \\ + \beta_4 Profitability_{i,t} + \beta_5 Liquidity_{i,t} + \beta_6 Solvency_{i,t} + \beta_7 Country_{i,t} + \\ \beta_8 Bankdistress_{i,t} + \beta_8 Distress_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $Bankdistress_{i,t}$ represents the dummy interaction between the bank dependence and financial distress dummies, $Distress_{i,t}$ is a financial distress dummy that takes the value of one if Altman's Z-score is lower than 1.8 and zero otherwise, and the rest of the variables are the same as in Equation 1.

5.6. Difference-in-differences

Finally, as a way to make a conclusion about the difference in performance of bank dependent and bank independent firms before and during the Covid-19 crisis (Hypotheses 3 and 5), we use the difference-in-differences approach. This technique aims to study the effect of a treatment (an explanatory variable) on an outcome (dependent variable) for a "treatment group" versus a "control group". Specifically, it estimates the average change over time in the outcome variable for the treatment group, compared to the average change over time for the control group. In our case, the treatment group is bank dependent companies, whereas the control group is bank independent companies. We estimate the average change in performance between the periods before and during the crisis. This method is also performed by adding an interaction

between dummy variables. The first dummy variable is the one representing the presence of bank dependence or treatment. The second dummy variable indicates the presence of an economic crisis or the second period. It is set to one if the year is 2020 and zero otherwise. This dummy interaction variable would communicate the difference in performance between the pre-crisis and crisis periods for bank dependent firms compared to bank independent firms. The model would be modified as follows:

$$Performance_{i,t} = \alpha + \beta_1 Bank\ debt_{i,t} + \beta_2 Size_{i,t} + \beta_3 Leverage_{i,t} + \\ + \beta_4 Profitability_{i,t} + \beta_5 Liquidity_{i,t} + \beta_6 Solvency_{i,t} + \beta_7 Country_{i,t} + \\ \beta_8 Bankcrisis_{i,t} + \beta_8 Crisis_{i,t} + \varepsilon_{i,t} \quad (3)$$

where $Bankcrisis_{i,t}$ represents the dummy interaction between the bank dependence and crisis dummies, $Crisis_{i,t}$ is a dummy that takes value of one if the year is 2020 and zero otherwise, and the rest of the variables are the same as in Equation 1.

5.7. Robustness tests

Robustness of the results is ensured with several additional test that are not tabulated. Given the data sample distribution with the most observations coming from China, it is important to control for results not to be driven by observations from any single country. This issue is addressed by including the interaction variable of the country dummies and the main explanatory variable. Moreover, we are using one- and two- year lags in all regression specifications as a robustness check.

6. Empirical analysis

6.1. Univariate tests

We start our empirical analysis with simple univariate tests. Table 2 compares firm performance and characteristics between companies that relied on bank debt and those that have mostly used public debt. The differences in means are tested with a t-test. A firm is defined as bank dependent if its bank debt ratio is more than 50%. There are 660 firms that were defined as bank dependent and 480 firms that are bank independent. As the bank debt ratio is time variant across companies, the same firm may be included in a different subsample in different years. Therefore, the sum of cross-sectional observations is greater than the total sample's size of 742. As can be noted from the table, two subsamples are significantly different in terms of firm

characteristics. The results reported in Table 2 indicate that bank dependent firms tend to be larger in terms of total assets. Bank dependent firms have on average 1 0500 million dollars in assets, while the average for bank independent companies is 6 916 million dollars. Furthermore, bank dependent firms have less cash in proportion to assets and lower liquidity as measured by current ratio as well as liquidity ratio. The average current ratio is equal to 0.85 for bank dependent firms and is amounted to 1.04 for the rest of the sample. Bank dependent firms have more leverage as measured by debt-to-equity ratio. The ratio for bank dependent companies is 1.58, whereas an average value for bank independent companies is 1.09. Consequently, the solvency ratio is slightly lower for firms that rely mostly on bank debt. Bank dependent firms have an average solvency ratio of 0.35, while the value for bank independent firms is 0.41. Moreover, Table 2 shows that bank dependent firms are more profitable than the opposite group as shown by EBITDA margin and return on capital employed (ROCE) ratios. EBITDA margin amounts to 21% for bank dependent firms, while the average ratio for firms relying on public debt is 18%. ROCE is slightly higher for bank dependent firms: 9.3% compared to 8.7%. Even though obtained mean values suggest that return on equity (ROE) is higher for bank dependent firms, the difference is not statistically significant. Notably, the same applies to the main explanatory variable, return on assets (ROA). Even though the average ROA is slightly higher for bank dependent firms, the difference is not statistically significant. However, it is possible that we obtain significant results for this relation in the multivariate setting after adding other firm-characteristics as controls. Finally, average market valuation as measured by Tobin's Q is lower for firms relying on bank debt as opposed to bank independent firms.

Thus, our findings of bank dependent firms being on average less liquid and solvent and having higher default risk are consistent with the theoretical predictions and previous empirical results which state that more financially constrained firms prefer bank debt. On the other hand, our results contradict the previous findings about small firms being bank dependent. In our sample bank dependent firms are larger. However, this might be due to the fact that our sample is more homogeneous and does not include a classical group of start-ups and young firms as they usually do not have an access to public debt in emerging markets.

As the next step of our analysis, we compare firm characteristics in two sub-samples that are created based on return on assets values. In particular, we focus on characteristics of the firms in the top and bottom quartiles of return distributions. Table 3 reports summary statistics and t-tests for differences in means between the two subsamples. As can be noted from the table, the best and the worst performing firms are different with respect to the degree of reliance on bank

debt. The best performing firms had an average bank debt ratio of 60%, whereas the ratio for the worst performing firms was 53%. Furthermore, about 54% of worst performing firms were relying on bank debt, while the proportion of bank dependent firms among the best performing companies amounted to 65%. Consistent with Table 2, return on assets values do not demonstrate substantial difference between the bank dependent and bank independent firms in terms of its magnitude. However, the difference in means of bank debt ratio between the best and the worst performing firms is now statistically significant. It can be noted from the table that the return on assets values for the best and the worst performing firms are significantly different. The firms in the bottom quartile of return distribution had an average ROA of -2.3%, while the best performing firms reached the value of 9.1%. Considering the fact that the average bank debt ratio is higher among the best performing firms, we are able to conclude that bank dependent firms performed better than the group of companies relying on public debt. The difference in average return between the subsamples was about 11.4%.

Table 3 further demonstrates that there are statistically significant differences in other firm characteristics between the two sub-samples. As expected, we observe that the worst performing firms are slightly smaller based on total assets and revenues, and have a higher degree of financial leverage based on debt-to-equity ratio. Furthermore, these firms are less profitable, have substantially lower liquidity and lower market valuation. The worst performing firms are less solvent as shown by solvency ratio and interest coverage ratio. Finally, these firms have a higher default risk as measured by Altman's (1968) Z-score.

Overall, the results reported in Tables 2 and 3 imply that bank dependent firms outperformed the firms that use mostly public debt. At the same time, bank dependent firms are on average larger, less solvent, have lower liquidity and higher default risk.

6.2. Debt structure and operating performance

Next, the association between operating performance measured by return on assets and debt source choice is examined in a multivariate setting with panel data regressions.

Table 4 reports the results of pooled ordinary least squares (POLS) model with year, country and industry effects (Model A), as well as firm fixed effects method regression (Model B). The fixed effects method was chosen based on the Hausman test. The results suggested that the fixed effect model would be more suitable than the random effects method for our data as the null hypothesis was rejected at the 1% confidence level. In both POLS and fixed effects models

the main explanatory variable has the same magnitude and is highly statistically significant. However, the pooled cross-sections setting might not be the optimal for our model to estimate the relationship between the reliance on bank debt and operating performance since the panel dimension is ignored. The fixed effects method would be rather preferred to use for further modifications.

A serious problem that should be considered in regression analysis is heteroskedasticity. If this issue is present, standard errors and statistical significance estimations are no longer valid. In order to control for heteroskedasticity we use clustered robust standard errors. If comparing Model B for which conventional standard errors were used to model C with clustered robust standard errors, it can be observed that the estimated coefficient did not change. This indicates that our estimations are valid.

Thus, the results of our basic model used to examine the effect of reliance on either bank debt or public debt on firm performance suggest that 1% increase in bank debt ratio is associated with 0.006% increase in ROA. This also implies that fully-bank financed firms experience on average 0.6% higher ROA than firms that rely only on public debt. The coefficient is statistically significant at 1% confidence level. This is in line with the results obtained in the previous studies. Davydov (2016) found that 1% increase in bank debt ratio was followed by about 0.01% increase in ROA.

As a next step of our analysis, we control for the issue of potential endogeneity in the relationship between the prevailing debt financing source and firm performance. Several studies (Altunbas et al., 2010; Faulkender & Petersen, 2006; Hale & Santos, 2008; Hoshi et al., 1993) found that firm performance may affect the debt source choice. This reverse causality problem is addressed by applying two-stage instrumental variable regressions. As was discussed in the methodology section, the literature on the topic (Demirguc-Kunt & Huizinga, 2001; Dickie & Fan, 2005; Rajan & Zingales, 2003) suggest that banking sector and financial markets development tend to move in the opposite directions. We argue that the relative strength of either debt market may affect the choice of firms to issue one or the other type of debt. One indicator of banking sector strength could be the degree of concentration in the market. Therefore, it is proposed to use the banking sector concentration variable that is correlated with bank debt ratio and unrelated with performance as an exogenous instrumental variable. Taking into account the findings that the higher banking concentration may cause underdevelopment of the public debt market, it is expected that there is a positive correlation between banking

sector concentration and firm's reliance on bank debt. At the same time, we assume that banking sector concentration could not affect the firm performance.

The validity of the proposed instrumental variable is verified in Model D in Table 4 that represents the first stage regression where the bank debt ratio is the dependent variable and the banking concentration is an explanatory variable. It can be observed that the estimated coefficient for the banking concentration is positive and highly statistically significant. This result implies that there is a strong positive relationship between firm's reliance on bank debt and overall banking sector concentration and therefore the instrument is valid.

Model E in Table 4 presents the second stage IV regression. The results demonstrate that the estimated coefficient for the instrumented bank debt ratio is still positive and statistically significant at 5% confidence level. Thus, the model indicates that higher levels of bank debt in the firm's debt structure may enhance operating performance of the firm, which is consistent with our initial estimates of the relation between bank debt ratio and return on assets in Models A-C (Table 4).

Next, in order to provide an additional argument to the validity of our estimations indicating the association between debt source choice and operating performance, the propensity-score matching approach is introduced. This method allows us to ensure that if we compare the operating performance of two very similar companies that are different only in terms of debt structure, the result will be the same as estimated in our model. This approach is based on matching the treatment group (bank dependent firms) with its closest peer from the control group (bank independent firms). Column F in Table 5 presents the estimation of the average treatment effect of being a bank dependent firm that communicates that companies relying on bank debt experienced on average 0.4% higher ROA and the estimation is statistically significant at 1% level.

It is also possible to use a "matched" sample to run a regression with the same parameters as in previous models. Model G in Table 5 presents the regression that is based on the "matched" sample. It can be observed that the estimated coefficient is still positive, statistically significant and very similar in magnitude to the one estimated in previous Models A-C in Table 4. Hence, this result supports the validity of our findings of the positive association between the degree of reliance on bank debt and operating performance.

Thus, with the help of above-discussed techniques we ensure the validity of results provided by our base model showing the positive effect of bank debt on firm performance. This finding

supports our Hypothesis 1 that is based on the information asymmetry, moral hazard and financial flexibility arguments. However, it is difficult to find a legible explanation for the mechanism of the observed effects of bank debt on firm performance based solely on our base model.

In order to deepen our analysis, we propose adding dummy interactions that would help to compare the effect of bank dependence on firm performance between different groups of companies and time periods. Given the previous empirical evidence that bank debt may be more valuable for firms facing financial constraints (Cantillo & Wright, 2000; Bolton & Freixas, 2000), it may be important to treat financially distressed firms as a separate subgroup. Therefore, we would like to compare the impact of the bank debt on operating performance between financially distressed and stable companies. One way to do that is to create a new dummy variable that would take the value of one if the firm is experiencing financial distress and zero otherwise. The degree of financial distress is measured by Altman's (1968) Z-score that estimates the company's risk of default. The threshold level of this indicator that allows us to identify financially distressed firms is equal to 1.8 (Altman, 1968). Hence, the group of companies that have a Z-score lower than the threshold level of 1.8 is considered financially distressed and the rest of the sample is assumed to be stable. Then we interact the new dummy variable with the bank dependence dummy.

Before analyzing the model with dummy interaction, it is worth estimating the relation between bank dependence dummy variable and return on assets for the whole sample. Model H in Table 6 communicates that the bank dependent firm on average has 0.54% higher ROA. Model J presents the estimated coefficient for the interaction between bank dependence and financial distress dummies denoted as "Bankdistress" variable. Estimated coefficient for this variable communicates that distressed firms benefit more from being bank dependent with respect to operating performance than financially sound firms. This bank dependence premium for distressed firms is equal to 0.9% higher return on assets, while the positive effect of bank dependence for financially stable firms amounts to only 0.3% higher ROA. This result is consistent with the Hypothesis 2 that is based on liquidation and renegotiation efficiency theory.

As a last step in estimating the relationship between the degree of reliance on bank debt and operating performance, we intended to compare how the bank dependent and bank independent companies performed during the economic downturn in 2020 caused by the pandemic as compared to the period before. In order to test for that, the difference-in-differences approach is used. Therefore, we use dummy variables. The first dummy variable shows if the firm is bank

dependent. The second dummy variable indicates the presence of an economic crisis. It is set to 1 if the year is 2020 and 0 otherwise. Model K in Table 7 presents the estimated coefficient for the interaction between bank dependence and crisis period dummies denoted as "Bankcrisis" variable. Based on this variable coefficient, it can be concluded that bank dependent firms' operating performance suffered less from the pandemic crisis than that of the rest of the sample. Specifically, the downturn in performance caused by the pandemic as measured by ROA was about 2% worse for firms using mostly public debt. This estimation is statistically significant at 10% level. This coincides with the prediction of Hypothesis 3. We support the intuition that, in contrast to the previous financial crises, during the current period of distress banks were able to effectively perform their functions that are advantageous for firms facing information asymmetry and financial distress issues that were inflated during the crisis periods. As a result, firms relying on bank debt were able to cope with these problems better than firms relying on public debt.

Moreover, since we are studying the debt structure decisions among large companies with access to public debt, we argue that these firms most likely did not suffer severe adverse selection issues, whereas the ability to better deal with financial distress could be more important in emerging markets. Therefore, we stress the financial flexibility and renegotiation efficiency arguments in explaining our results. Thus, we can conclude that, due to their close relationships with banks and accessibility of renegotiation, bank dependent firms are less constrained in their investment decisions, can invest more aggressively, maintain lesser liquidity buffers and worry less about their credit risk in distress times. Additionally, bank monitoring might be able to prevent underinvestment in a close to default situation. In contrast, firms relying on public debt worry more about getting into default and therefore would rather prefer to cut investments and defer their funds into safety buffers or pay out through dividends than invest in projects. This, in turn, may positively affect the ability of bank dependent firms to use their assets more effectively and earn more returns than the opposite group of firms (Rauh and Sufi, 2010).

6.3. Debt structure and market valuation

As a second part of our analysis, the association between firm valuation and bank debt ratio is examined. Table 8 reports the estimation results. Model L suggests that lower degree of financial leverage and default risk, as well as higher interest coverage and liquidity ratio are positively associated with firm valuation. Table 8 shows that the estimated coefficient for the

bank debt ratio is negative and statistically significant at the 1% level. The magnitude of the coefficient indicates that Tobin's Q decreases by about 0.48 units for fully bank financed firms. These results are somewhat inconsistent with the findings obtained in the previous section. Since increasing bank financing is associated with improvement in operating performance the market assessment of it is expected to be positive. It is also inconsistent with most of the previous empirical findings that show the positive market reaction to bank debt issuance due to the banks' certification function and their role of information transmitters (James, 1987; Kang & Liu, 2008; Fungácová et al, 2019). However, studies that find contradicting results exist. Marshall et al (2019) finds that stock prices respond positively only to syndicated loans, while bilateral loans do not receive any significant market reaction. They also document that bank loans have become less informative as a signal of the creditworthiness of borrowing firms after the global financial crisis. Lummer and McConnell show that only loan renewals generate significant excess returns, while new loans do not communicate information to the market. Others show that the positive impact of bank announcements concerns primarily small firms (Slovin et al, 1992) and firms that lack sufficient evaluation and monitoring by parties other than banks (Best & Zhang, 1993). We did not distinguish between the syndicated and bilateral loans, as well as new loans and loan renewals. However, we can ensure that we concentrate on big firms that have access to the public market and therefore lack of monitoring should not be a severe problem in our sample. It is also important to take into account the studies that are based on emerging markets data. Research based on a sample of Chinese companies showed a negative market reaction to bank loan announcements (Bailey et al, 2010; Huang et al, 2012). This is explained by the fact that Chinese economy and banking sector in particular are state dependent. The ultimate controlling shareholders of most Chinese firms (69.6%) are the central government, local governments, or state-owned enterprises. The four biggest banks in China are state-owned as well. In this regard, it is possible that banks may follow political rather than purely commercial goals. This leads to banks prioritizing state-owned firms and offering funds to troubled firms to keep them afloat which is considered as inefficient lending that market accounts for. It is also a common practice for the government to subsidize such kinds of loans to financially weak companies following an intention to boost the economic growth. Therefore, banks lose their certification role in state-controlled emerging markets economies and are not trusted by the market. The fact that the Big Four state-owned banks in China have historically been plagued by large ratios of non-performing loans (NPLs) to total loans supports these arguments (China's State-controlled Economy, 2010). Furthermore, Bailey et al. (2010) emphasize that these negative effects are heightened for borrowers with frequent related-party transactions, poor subsequent

performance, high state ownership, no foreign class shares, loans from local bank branches, or loans intended to repay existing debt (Bailey et al, 2010). Huang et al. (2012), in turn, sees the problem in state-owned firms stressing their poor governance practices and expropriation of minority shareholders by state controlling owners following their political goals. In this situation increasing the amount of funds available to a firm may increase expropriation of minority shareholders' interest by majority shareholders, notably through related-party transactions, defaults, and payout policies and lead to a value destruction. These arguments are supported by Godlewski et al's (2000) study on a sample of Russian firms that finds a negative reaction of stock markets to debt arrangements that can be explained by moral hazard behavior of shareholders at the expense of debtholders. Therefore, ineffective lending and poor governance of firms in emerging markets to a large extent due to the significant government control over the economy explain a negative market perception of bank loans.

However, we should account for the potential nonlinearity of the relationship between bank debt ratio and firm valuation[3]. In order to test for this, the new variable representing bank debt ratio squared was added to the regression. Positive and statistically significant coefficient estimates in Model L in Table 8 communicate that the U-shaped relationship is present. These results indicate that fully bank-financed firms may experience higher market valuation. However, the negative magnitude of the coefficient for the raw bank debt ratio is larger, indicating that high levels of bank debt are only diminishing the negative effect of bank debt on firm valuation. This relationship is illustrated in Figure 3. The figure shows the average Tobin's Q for different levels of bank debt in the firm's total debt. As can be seen from the figure, once the firm increases bank loans in the debt structure, its market value decreases. The negative relationship is observed up to the point when the firm is financed by bank loans by about 60%. After that the relationship becomes positive and it can be noted that fully bank-financed firms lose only a marginal amount of market value compared to fully bond-financed firms.

Further, Model M in Table 8 reports estimation results from the IV regressions. First stage regressions are the same as in Table 4 and therefore are not reported in Table 8. As can be noted from the table, IV estimations support the validity of results from Model L, capturing the U-shaped relationship between the level of bank debt and market valuation.

[3] Nonlinearity in the relationship between bank debt ratio and operating performance had also been tested. It did not provide any evidence of nonlinear relationship.

Therefore, it is possible to conclude that in emerging economies, markets value firms with public debt slightly higher than bank-financed firms. It is in line with previous studies that found a negative impact of bank debt on market valuation which is explained by the frictions of a state-controlled economy and banking system making banks less trusted institutions. Moreover, due to the presence of the nonlinear relationship, we can conclude that a firm financed partly with public debt that receives more bank loans is perceived as the most unattractive for the market and loses the largest amount of value. In other words, adding more loans to a structure with less than 60% of bank debt is considered a warning signal for the market. Whereas expanding the amount of public debt is perceived as a good sign by market participants. However, the firms that chose to be mostly (more than 60%) or fully bank-financed are perceived differently. In this case, continuation of bank debt issuance leads to an increase in market valuation.

As a final step, we intended to investigate if significant changes in the relation between the level of bank debt and market valuation of bank dependent and bank independent companies occurred during the Covid-19 health crisis. We report that, comparing the periods before and during the economic downturn, the average change in operating performance of bank dependent firms was not statistically different from that of bank independent firms. Thus, we did not find support for our Hypothesis 5. Based on the results obtained in Model L in Table 8 that showed a general negative perception of fully bank financed firms compared to fully bond-financed firms, it is logical to assume that there was no reason for market participants to build trust for the state-controlled banks in 2020. At the same time, due to the fact that the effect of the recent economic crisis on the banking sector was not as severe as during previous financial crises, markets had no motivation to perceive bank financing more negatively during 2020 than before. Notably, the fact that firms financed mostly with public debt have generally higher market valuation did not translate into the significantly higher performance during the crisis.

The empirical results reported in both subsections above tolerate the robustness tests. The inclusion of interaction between country dummy and bank dependence dummy does not affect the results. Moreover, the interaction variables are not statistically significant. The inclusion of one- and two-years lags also provide virtually the same results for regressions with ROA as the dependent variable. Regressions with Tobin's Q sustain only a one-year lag test.

6.4. Model limitations

Even though we introduced a number of improvements to our base model in order to check the validity and robustness of our results, there still might be some flaws in our regression analysis. First of all, return on assets might not be the best indicator of firm performance as it may be affected by the non-recurring noise in the profits. In the same way, Tobin's Q chosen as a measure of market valuation might be criticized for being less precise as an indicator of market perception of bank debt than abnormal returns around the time of debt issuance. Overall, our research method is different from the traditional event study approach. We did not differentiate between the new issuance, existing debt or loan renewals as our research question implies investigating the relation between debt source choice and firm performance on a continuing basis. Therefore, the data used in the analysis is annual and not organized in terms of timing of the debt issuance, i.e. if a firm issues first bank debt and then bonds or vice versa. However, in case of more accessible data we could control for the order of debt issuances which could potentially provide more precise estimations.

More controls could be added to the model, such as the quality of governance and the attitude to risk, that are more difficult to observe. According to the literature, bank dependent firms tend to have more agency problems and to be less risk averse (Hoshi et al., 1993; Denis & Mihov, 2003). Quality of governance and risk aversion could be expected to positively affect performance. Therefore, the effect of bank debt on firm performance could be underestimated in our model.

Despite inclusion of the variable for country credit rating in estimation models, other omitted country-level factors may still affect the results. Creditors' protection features and renegotiation frictions indeed may significantly affect firm's preferences for debt sources. Nevertheless, the data sample used in the analysis feasibly reduces the impact of creditors protection features and renegotiation frictions on firms' preferences for debt as it contains large-cap firms that have access to both private and public debt markets. Hence, it is argued that these firms are comparable in terms of factors affecting the choice between debt sources.
Finally, there is still an opportunity to find a firm-level instrumental variable that would result in a more argumentative approach for resolving the endogeneity issue.

7. Conclusion

The prior literature suggests that different debt sources provide different features that may be more or less valuable for firms (Diamond, 1991; Rajan, 1992). Monitoring and certification functions of banks, for example, may enhance managerial incentives and resolve moral hazard and adverse selection problems, as well as provide better support during the periods of financial distress but may also cause hold-up problem by employing information monopoly. Bond financing usually allows borrowing larger amounts of funds at more advantageous terms but may as well increase the severity of above-mentioned problems. Yet, little is known about whether different levels of various debt sources in a firm's capital structure affect firm performance. The purpose of this paper is to contribute to the prior literature by examining the effect of different levels of public and bank debt on operating and stock market performance of a firm.

We are using an unbalanced panel of 742 publicly traded firms from Brazil, Russia, India, and China over the period 2011-2020. The sample includes firms that have access to both bank loans and bonds. This freedom to choose either debt financing source means that the debt structure decisions are relevant and important for these firms and may have either positive or negative effect on firm performance.

The empirical findings of this study suggest that bank debt in the firm's capital structure has a statistically significant positive effect on operating performance of a firm, as measured by ROA. Moreover, this effect is more pronounced for financially distressed firms and during the crisis period. This provides support for the financial flexibility and renegotiation efficiency theory. It is also documented that market valuation, measured by Tobin's Q, is significantly lower for firms financed with bank debt than for firms relying on public debt which is explained by the market's mistrust to the state-controlled banks in emerging economies. Moreover, this relationship is nonlinear. As the bank debt ratio approaches 70% of the firm's long-term debt, its relationship with market valuations turns to positive. These results suggest that fully bank-financed firms are able to diminish the negative effects of loan issuances on market valuations. Finally, we report that the difference in stock market performance between bank dependent and bank independent firms during the crisis compared to the period before is not statistically significant. The main findings remain virtually the same after addressing potential endogeneity problems.

Overall, the results reported in this paper suggest that debt source choice may be an important determinant of firm performance, especially in a financial distress situation. A notable difference in the effect of bank debt on different dimensions of firm performance support the intuition about the presence of costs and benefits of both types of debt that can play out differently with the dissimilar measures of corporate efficiency. This means that this costs and benefits should be weighted in accordance with the firm's strategy, business conditions and the prioritized targeted performance measure when making debt financing decisions.

One of the main limitations of our analysis is that we used annual data and did not control for the order of debt issuances, whereas in fact, firms' debt structure could undergo significant changes during the one-year period and the order of debt issuance could affect the results. Furthermore, despite inclusion of the country credit rating variable in estimation models, omitted variables may still affect the results. Especially, variables that could control for the quality of governance, attitude to risk and other country-level factors.

As a next step of the analysis, it would be valuable to investigate how the studied relationship changes in the period after the Covid-19 crisis when relevant data is available and compare it with the period before. It might also be interesting to split the data into more precise periods capturing the peak of the lockdown or the worst market plunge during which the change in the association in question might be the most pronounced. Besides, further studies could obtain more precise estimations by using more firm- and country-level controls and account for the order of debt issuance. Finally, even though observed nonlinearity in the relationship between bank debt ratio and Tobin's Q was empirically found before, a legible theoretical explanation for this association has not been provided yet. Therefore, it would be interesting to investigate the reasons for the uncovered U-shaped link between bank debt ratio and Tobin's Q as the next step of the analysis.

Table 1. Summary statistics

The table reports descriptive statistics on 4348 firm-year observations representing 742 individual firms from BRIC countries over the period 2011-2020. ROA is return on assets calculated as earnings before interest, taxes, depreciation, and amortization divided by the book value of total assets. Tobin's Q is the ratio of the firm's market value to its replacement costs of assets. Market value is calculated as market capitalization plus the book value of preferred stock and the book value of debt. Bank debt ratio is the ratio of bank loans to total long-term interest-bearing debt. Bank dependent is a dummy variable which takes value of 1 if the proportion of bank debt in total debt is more than 50% and 0 otherwise. Liquidity is presented by the current ratio and calculated as current assets divided by current liabilities. Debt-to-assets is measured as total debt to total assets ratio. Debt-to-equity is measured as total debt divided by the book value of equity. Interest coverage defined as earnings before interest and taxes to total interest expenses ratio. ROE and ROCE are net income divided by book value of equity and capital employed respectively. Z-score is Altman's (1968) Z-score and calculated as (1.2 × working capital + 1.4 × retained earnings + 3.3 × earnings before interest and taxes + 0.999 × sales) / total assets + 0.6 × (market value of equity/book value of debt). Banking sector concentration is the ratio of the top 5 banks' total assets to the sum of total assets of all banks in the sector.

Panel A: Full sample

Variable	Mean	Median	Standard deviation	Minimum	Maximum
Dependent:					
ROA	0.033	0.031	0.055	-0.916	0.483
Tobin's Q	0.584	0.397	0.622	0.000	6.867
Main explanatory:					
Bank debt ratio	0.577	0.604	0.296	0.000	1.000
Bank dependent	0.618	1.000	0.486	0.000	1.000
Firm characteristics:					
Sales	5111.188	1198.423	20800.000	0.176	472000.000
Assets	9135.780	3126.384	23100.000	15.116	377000.000
Total debt	1901.958	552.626	4257.471	0.074	59000.000
EBITDA	645.836	192.532	1979.383	-661.649	35500.000
Cash/Assets	0.118	0.105	0.080	0.000	0.793
Financial ratios:					
EBITDA margin (%)	19.957	15.541	18.437	-87.139	95.942
ROE	0.077	0.091	0.307	-7.522	6.363
ROCE	0.091	0.087	0.109	-3.314	2.029
Interest coverage	3.882	2.298	9.178	-61.340	339.213
Current ratio	0.924	0.755	0.775	0.021	26.082
Debt/Assets	0.368	0.364	0.161	-0.933	0.881
Debt/Equity	1.394	1.044	1.176	0.045	9.913
Z-score	1.061	0.965	0.962	-14.854	24.206
Instrumental variable:					
Bank concentration	0.586	0.568	0.053	0.366	0.755

Panel B: Geographic distribution

	Brazil		China		India		Russia	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Number of ID	113		530		90		9	
ROA	0.037	0.042	0.032	0.030	0.029	0.025	0.053	0.058
Tobin's Q	0.641	0.418	0.586	0.402	0.516	0.323	0.422	0.364
Bank debt ratio	0.595	0.602	0.567	0.595	0.617	0.675	0.596	0.692
Bank dependence	0.645	1.000	0.602	1.000	0.695	1.000	0.667	1.000
Country rating	4.699	5.000	4.743	5.000	5.000	5.000	5.230	5.000

Panel C: Time period distribution

	2011 - 2019		2020	
	Mean	Median	Mean	Median
ROA	0.033	0.031	0.029	0.028
Tobin's Q	0.581	0.395	0.774	0.588
Bank debt ratio	0.575	0.602	0.594	0.632
Bank dependent	0.615	1.000	0.654	1.000

Table 2. Comparison of operating performance and firm characteristics

The table reports comparisons of means of firm characteristics of two sub-samples. Bank dependent firms are the firms with the proportion of bank debt in total debt of more than 50% and bank independent firms are the rest of the sample. Firm characteristics are calculated across the period 2011-2020 and defined as in Table 1. The difference in means is tested with t-test. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	Bank independent		Bank dependent		Difference in means
	Mean	Median	Mean	Median	
Number of ID	480		660		
ROA	0.032	0.029	0.033	0.035	-0.001
Tobin's Q	0.720	0.512	0.498	0.344	0.222***
Bank debt ratio	0.257	0.272	0.774	0.777	-0.517***
Sales	5635.113	1033.173	4781.882	1321.161	853.231
Assets	6916.235	2407.956	10500.000	3627.128	-3588.911***
Total debt	1069.924	361.628	2415.287	754.964	-1345.363***
EBITDA	615.995	149.226	664.592	227.964	-48.596
Cash/Assets	0.131	0.119	0.110	0.097	0.021***
EBITDA margin (%)	18.149	14.574	21.084	16.386	-2.906***
ROE	0.073	0.088	0.080	0.093	-0.633
ROCE	0.087	0.090	0.093	0.084	-0.583*
Interest coverage	3.791	2.398	3.937	2.260	-0.146
Current ratio	1.040	0.878	0.852	0.685	0.189***
Solvency ratio	0.405	0.413	0.345	0.335	0.060***
Debt/Equity	1.090	0.829	1.581	1.248	-0.491***
Z-score	1.136	1.017	1.021	0.929	0.115***

Table 3. Comparison of firms in the top and bottom quartiles of ROA distribution

The table presents comparison of means of firm characteristics in the bottom quartile of return on assets distribution relative to those in the top quartile of return distribution. Bank debt ratio is the ratio of bank loans to total long-term interest-bearing debt. Bank dependent is a dummy variable which takes value of 1 if the proportion of bank debt in total debt is more than 50% and 0 otherwise. Firm characteristics are calculated across the period 2011-2020 and defined as in Table 1. The difference in means is tested with t-test. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	Mean of firms in the bottom quartile of ROA distribution	Mean of firms in the top quartile of ROA distribution	Difference in means
ROA	-0.023	0.091	-0.114***
Tobin's Q	0.438	0.924	-0.486***
Bank debt ratio	0.528	0.604	-0.076***
Bank dependent	0.541	0.645	-0.104***
Sales	2461.616	5690.782	-3243.293***
Assets	5205.608	7800.992	-2613.371***
Total debt	1277.204	1341.835	-65.530
EBITDA	241.271	908.260	-669.336***
Cash/Assets	0.106	0.129	-0.023***
EBITDA margin (%)	11.030	28.410	-17.380***
ROE	-0.125	0.222	-34.643***
ROCE	0.016	0.164	-14.765***
Interest coverage	0.172	8.442	-8.370***
Current ratio	0.782	1.181	-0.402***
Debt/Assets	0.292	0.463	-0.171***
Debt/Equity	1.956	0.894	1.062***
Z-score	0.734	1.429	-0.695***

Table 4. Bank debt and operating performance

The table reports the estimates of different versions of Equation 1 using unbalanced panel data on 742 large publicly traded firms from the BRIC countries for the period 2011-2020. The dependent variable in columns A, B, C, and E is ROA, calculated as earnings before interest, taxes, depreciation, and amortization divided by total assets. Model A is pooled ordinary least squares (POLS) model with year, industry and country controls. Models B and C are based on fixed effects method. Column D report first stage estimation results of the IV regressions where the dependent variable is the bank debt ratio - the ratio of bank loans to total long-term interest-bearing debt. Bank concentration is the instrument in the IV estimations. Model E is the second stage IV regression. In models A and B conventional standard errors are used. In models C-E clustered robust standard errors are used. Standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	A	B	C	D	E
Method	POLS	FE	FE	FE with IV (first stage)	FE with IV
Variable	ROA	ROA	ROA	Bank debt ratio	ROA
Bank debt ratio	0.006***	0.006***	0.006***		0.045**
	(0.002)	(0.002)	(0.003)		(0.021)
Bank concentration				1.034***	
				(0.165)	
Log assets	0.003***	0.004**	0.004	-0.013	0.004**
	(0.000)	(0.002)	(0.004)	(0.017)	(0.002)
EBITDA margin	0.001***	0.001***	0.001***	-0.001	0.001***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Interest coverage	0.001***	0.001***	0.001***	0.002***	0.001***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Current ratio	0.006***	0.005***	0.005**	-0.042***	0.002*
	(0.001)	(0.001)	(0.002)	(0.008)	(0.001)
Debt/Equity	-0.000***	-0.000***	-0.000***	0.000	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Z-score	0.037***	0.068***	0.068***	-0.065***	0.065***
	(0.001)	(0.002)	(0.008)	(0.019)	(0.003)
Country rating	-0.001	-0.000	-0.000	-0.011	-0.006*
	(0.002)	(0.002)	(0.004)	(0.025)	(0.003)
Constant	-0.072***	-0.140***	-0.140*	0.414	-0.074
	(0.023)	(0.037)	(0.082)	(0.341)	(0.048)
Year controls	Yes	Yes	Yes	Yes	Yes
Industry controls	Yes	No	No	No	No
Country controls	Yes	No	No	No	No
Firm fixed effects	No	Yes	Yes	Yes	Yes
SE type	Conventional	Conventional	Clustered robust	Clustered robust	Clustered robust
Observations	3,412	3,412	3,412	3,412	3,412
R-squared	0.499	0.424	0.424	0.072	0.420
Number of ID		679	679	679	679

Table 5. Matched sample regressions

The table presents the average treatment effect on the treated estimation (F) as well as POLS model G based on the matched sample. The sample is matched based on the propensity score. The dependent variable for all models is return on assets (ROA). Bank dependent firms are the treatment group. Clustered robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	F	G
Metod	ATE	POLS
Variable	ROA	ROA
ATE Bank dependent vs Bank independent	0.004***	
	(0.001)	
Bankratio		0.006***
		(0.002)
Log assets		0.002
		(0.002)
EBITDA margin		0.001***
		(0.000)
Interest coverage		0.001***
		(0.000)
Current ratio		0.011***
		(0.002)
Debt/Equity		-0.000***
		(0.000)
Z-score		0.072***
		(0.002)
Country rating		-0.002
		(0.002)
Constant		-0.121***
		(0.047)
Year controls		Yes
Firm fixed effects		Yes
SE type		Clustered robust
Observations		4,176
R-squared		0.787

Table 6. Bank debt and operating performance of financially distressed firms

The table represents fixed effect models H and J. The dependent variable is return on assets (ROA). Distressed is a dummy variable that takes value of 1 if Altman's Z-score is lower than 1.8 and 0 otherwise. Bankdistressed variable is an interaction between Bank dependence and Distressed dummies. Clustered robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	H	J
Method	FE	FE
Variable	ROA	ROA
Bank dependent	0.540***	0.278*
	(0.161)	(0.130)
Distressed		-0.747**
		(0.344)
Bankdistressed		0.621**
		(0.286)
Log assets	0.403	0.420
	(0.431)	(0.421)
EBITDA margin	0.070***	0.072***
	(0.012)	(0.011)
Interest coverage	0.114***	0.114***
	(0.042)	(0.042)
Current ratio	0.456**	0.467**
	(0.209)	(0.213)
Debt/Equity	-0.006***	-0.006***
	(0.002)	(0.002)
Z-score	6.841***	6.608***
	(0.794)	(0.889)
Country rating	-0.045	-0.037
	(0.387)	(0.382)
Constant	-13.620*	-13.554*
	(8.180)	(7.988)
Year controls	Yes	Yes
SE type	Clustered robust	Clustered robust
Observations	3,412	3,412
R-squared	0.425	0.427
Number of ID	679	679

Table 7. Bank debt and operating performance during the crisis period

The table represents fixed effects Model K where difference-in-difference method is utilized. The dependent variable is return on assets (ROA). Bank dependent firms are the treatment group. 2020 is the period after. Bankcrisis variable is an interaction between bank dependence and crisis period dummies. It shows the difference in average changes over time for the treatment and control groups. Clustered robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	K
Method	FE
Variable	ROA
Bank dependent	0.516***
	(0.138)
Bankcrisis	1.832*
	(0.979)
Crisis	-2.086**
	(0.838)
Log assets	0.395**
	(0.198)
EBITDA margin	0.071***
	(0.007)
Interest coverage	0.114***
	(0.009)
Current ratio	0.459***
	(0.094)
Debt/Equity	-0.006***
	(0.001)
Z-score	6.843***
	(0.224)
Country rating	-0.010
	(0.242)
Constant	-12.920***
	(3.565)
Year controls	Yes
SE type	Clustered robust
Observations	3,412
R-squared	0.426
Number of ID	679

Table 8. Bank debt and firm valuation

The table reports the estimates of different versions of Equation 1 using unbalanced panel data on 742 large publicly traded firms from the BRIC countries for the period 2011-2020. The dependent variable is Tobin's Q, calculated as the ratio of the firm's market value to its replacement costs of assets. Market value is calculated as market capitalization plus the book value of preferred stock and the book value of debt. Bank debt ratio is the ratio of bank loans to total long-term interest-bearing debt. Bank debt ratio (squared) is the quadratic term for variable bank debt ratio. Models L is fixed effects method regression. Model E is the second stage IV regression. Bank concentration is the instrument for bank debt ratio in the IV estimations. Clustered robust standard errors are in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	L	M
Method	FE	FE with IV
Variable	Tobin's Q	Tobin's Q
Bank debt ratio	-0.476***	-12.370*
	(0.128)	(7.466)
Bank debt ratio (squared)	0.392***	10.507*
	(0.112)	(6.356)
Log assets	0.006	0.008
	(0.005)	(0.011)
EBITDA margin	0.001	0.005
	(0.001)	(0.003)
Interest coverage	0.009***	0.009***
	(0.002)	(0.003)
Current ratio	0.080***	0.091***
	(0.019)	(0.030)
Debt/Equity	-0.000**	0.000
	(0.000)	(0.000)
Z-score	0.133***	0.125***
	(0.019)	(0.031)
Country rating	-0.787*	-0.118*
	(0.366)	(0.047)
Constant	0.183*	2.769*
	(0.108)	(1.651)
Year controls	Yes	Yes
SE type	Clustered robust	Clustered robust
Observations	2,865	2,865
R-squared	0.352	0.094
Number of ID	671	671

Figure 1. BRIC policy rates around the Covid-19 crisis period

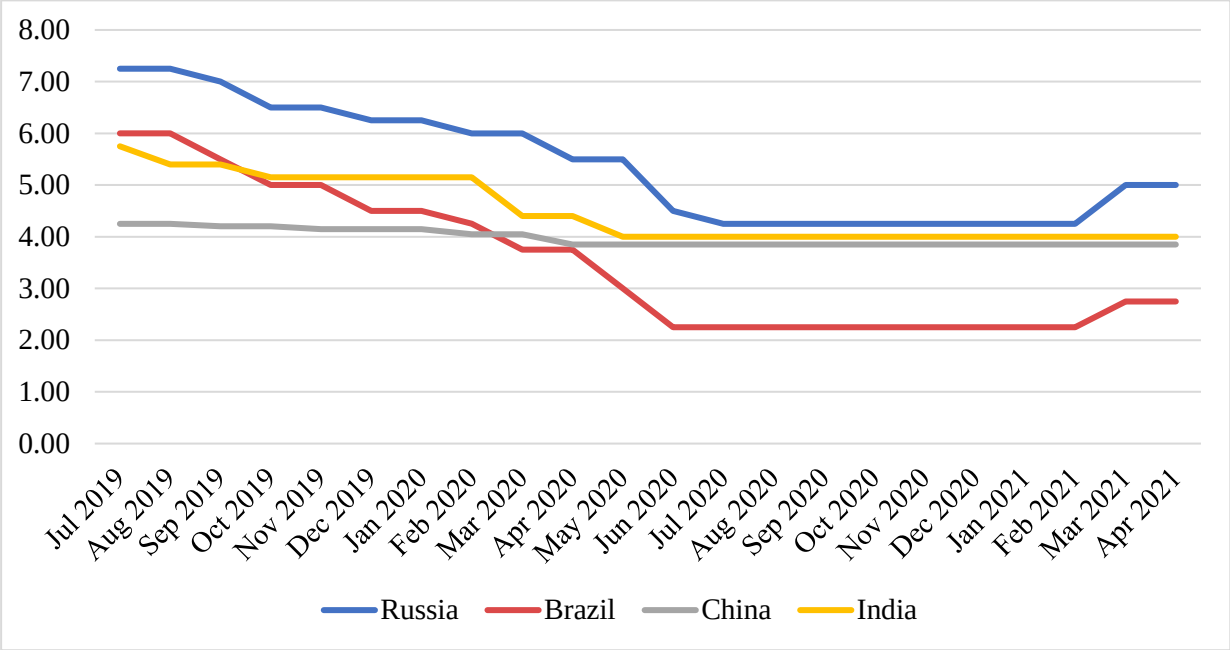


Figure 2. Average bank debt ratio dynamics during 2011-2020 by country

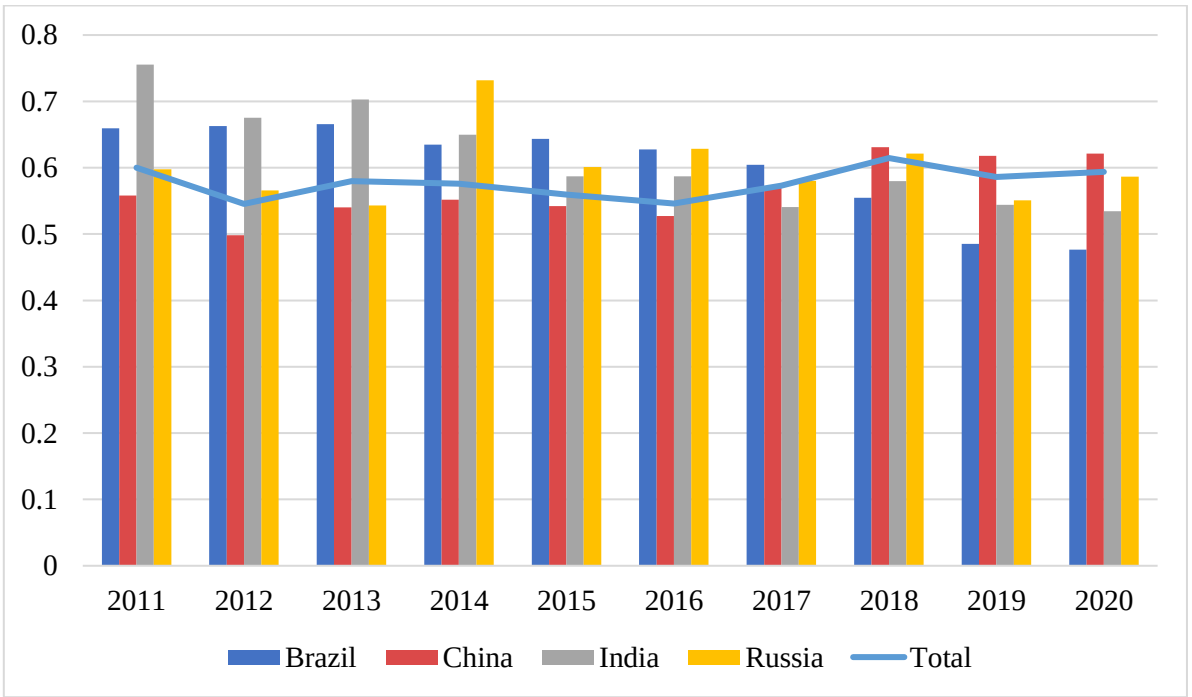
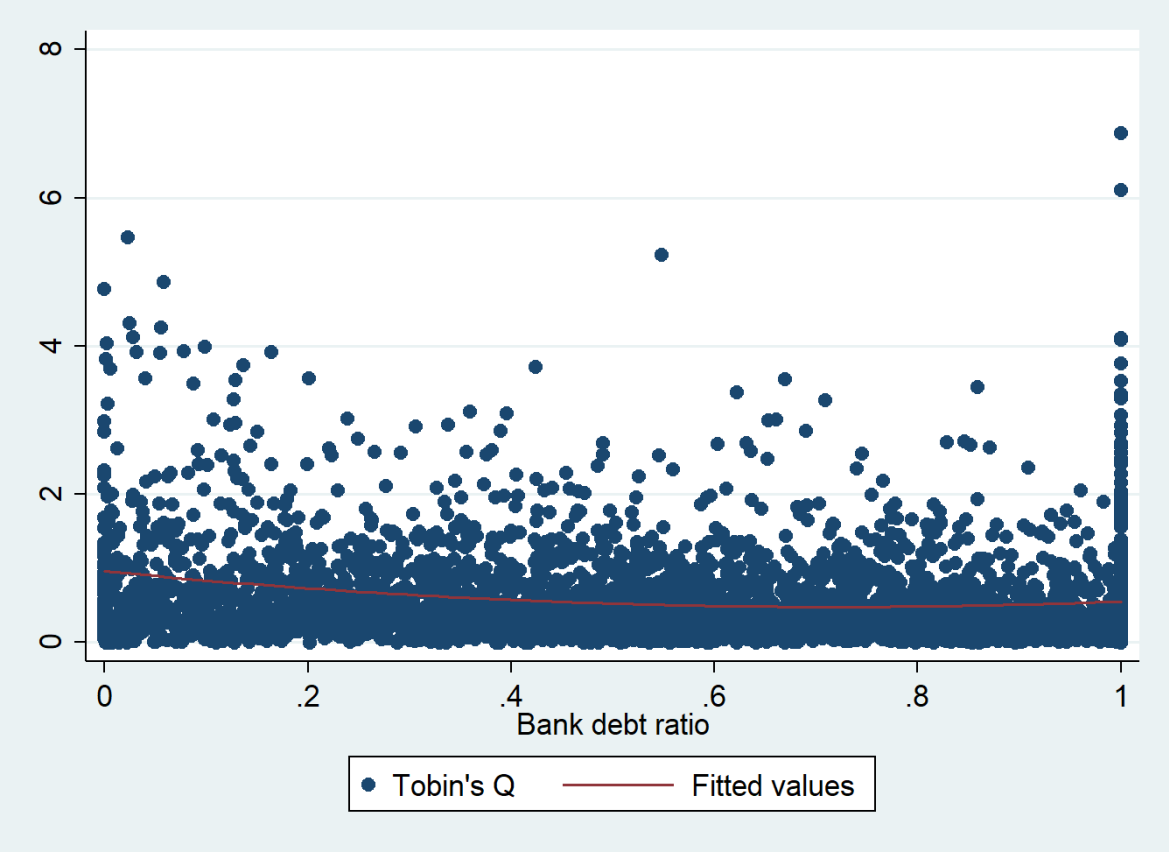


Figure 3. Tobin's Q and bank debt ratio



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