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Essays on Debt Financing, Firm Performance, and Banking in Emerging Markets

Julkaisun nimike

Esseitä yritysten velkarahoituksesta, suorituskyvystä sekä pankkitoiminnasta kehittyvillä markkinoilla

Tiivistelmä

Tässä väitöskirjassa tutkitaan yritysten velkarahoituksen eri muotoja ja niiden vaikutuksia yritysten suorituskykyyn kehittyvillä markkinoilla. Aihetta tutkitaan neljässä eri esseessä. Ensimmäisissä kahdessa esseessä tutkitaan venäläisten yritysten markkina-arvojen ja velkarahoitusvalintojen välistä yhteyttä. Tulokset osoittavat, että joukkolainamarkkinoilta hankitulla velkarahoituksella voi olla negatiivinen vaikutus yritysten markkina-arvoon. Yritykset, jotka ovat riippuvaisia markkinalähtöisestä velkarahoituksesta, pystyvät kasvattamaan markkina-arvoaan vähemmän kuin yritykset, joiden velkarahoitus koostuu pääasiallisesti pankkilainoista. Lisäksi tulokset osoittavat, että markkinalähtöisestä velkarahoituksesta riippuvaiset yritykset menestyivät huomattavasti heikommin vuonna 2008 alkaneen finanssikriisin aikana kuin yritykset, joiden vieras pääoma koostui pankkilainoista.

Kolmannessa esseessä tutkitaan laajemmin velkarahoituksen eri muotojen vaikutusta yritysten suorituskyvyn mittareihin kehittyvillä markkinoilla. Tulokset osoittavat, että markkinalähtöisellä velkarahoituksella voi olla negatiivinen vaikutus yrityksen kannattavuuteen. Tulokset viittaavat myös siihen, että yrityksen korkea pankkirahoitusaste vähentää korkean velkaisuuden aiheuttamaa negatiivista vaikutusta yrityksen markkina-arvoon.

Neljännessä esseessä tutkitaan valtio-omistuksen vaikutuksia pankkien lainanantokäyttäytymiseen ja pääomitukseen. Tulokset osoittavat, että valtion kokonaan omistamat pankit kiihdyttivät lainanantoaan ja veloittivat pienempiä lainakorkoja finanssikriisin 2008–2010 aikana yksityisiin pankkeihin verrattuna. Lisäksi valtio-omisteiset pankit olivat paremmin pääomitettuja mahdollisten kriisitilanteiden varalta. Saadut tulokset viittaavat siihen, että valtion omistajuus voi olla hyödyllistä pankeille erityisesti kriisien aikana.

Asiasanat

Velkarahoitus, yrityksen suorituskyky, rahoituskriisi, pankkitoiminta, valtio-omistus, kehittyvät markkinat

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Essays on Debt Financing, Firm Performance, and Banking in Emerging Markets

Abstract

This thesis examines corporate debt financing sources and their implications for firm performance in emerging markets. The topic is examined in four individual essays. The first two essays focus on the association between the sources of corporate debt financing and stock market performance of Russian firms. The results indicate that public debt financing may have a negative effect on firm's market valuation. Firms that rely on public debt underperform relative to firms with other sources of debt financing in terms of stock market valuation. Moreover, the results show that the firms which rely entirely on bank debt significantly outperformed the firms with public debt amidst the financial crisis of 2008.

The third essay considers the effect of debt sources on a wider set of firm performance measures in several emerging markets. The results show that bank debt may have a positive effect on accounting returns. The findings also suggest that higher levels of bank financing reduce the negative effect of debt on market valuation.

The fourth essay of the thesis examines the effects of the state ownership of banks on their lending behavior and capitalization. The results show that fully state-owned banks boosted their lending and charged lower interest rates during the financial crisis of 2008-2010 in comparison to privately held banks. Moreover, state-owned banks were better protected against asset default. These findings suggest that state ownership of banks may be particularly valuable during the periods of financial turmoil.

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Denis Davydov

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1 INTRODUCTION

Debt financing is a key element in a firm's choice of its capital structure. By generating revenues that would not have been reached without additional funding, external financing in the form of debt or equity capital allows firms to increase firm value, which is traditionally considered an ultimate goal of any business. Stepping aside from perfect market assumptions, it becomes obvious that different taxation regimes, access to capital, transaction costs, different levels of agency costs, and other factors do not make financing choices irrelevant in the firm's approach to this goal. Therefore, the problem of capital structure choices has been a central question in the corporate finance literature of the last 50 years. While determinants of the choice between debt and equity are well documented and, to a large extent long established, the effects of various debt sources on firm value and performance still remain somewhat unclear.

For this reason, this doctoral dissertation examines corporate debt financing sources and their implications for firm performance in four individual essays. In particular, the first, second, and third essays focus on the effects of different debt sources on firm profitability, market valuation and stock returns. The fourth essay examines characteristics of bank debt in more detail, assessing loan growth and interest rates structure by investigating the importance of ownership type of financial intermediaries. The dissertation focuses on the emerging markets, the importance of which is highlighted by the rapidly growing body of scientific literature. Due to rapid economic expansion, higher returns, diversification opportunities, and differences in corporate governance and legal norms, emerging economies have become a center of attention for international investors and economists. While the first, second, and fourth essays in this thesis focus on the Russian market, the third essay examines the four largest emerging economies, known as the "BRIC" (Brazil, Russia, India, and China) countries. Hence, this dissertation aims to contribute to the existing literature on the peculiarities of emerging markets and their importance in understanding modern financial theories.

In general, the empirical findings reported in this dissertation provide strong evidence to suggest that the origin of debt financing may have an impact on firm performance in emerging markets. It is documented that while public debt may have a negative effect on firm market valuation, bank debt, in turn, may cause positive effects on firm profitability and market value. Moreover, as shown in the second essay of this dissertation, which focuses explicitly on the financial crisis of 2008-2010, bank debt may be particularly valuable in times of financial turmoil. Furthermore, the results of the fourth essay imply that fully state-owned banks increase their lending and charge lower interest rates, when compared to private and foreign banks in crises episodes.

This doctoral dissertation consists of the introductory chapter and four empirical

essays. The remainder of the introductory chapter is organized as follows: Chapter 2 introduces the existing capital structure theories. Chapter 3 reviews the theoretical fundamentals of debt financing. Chapter 4 briefly introduces emerging markets finance and includes a discussion about the differences in institutional settings. Finally, summaries of all four essays are provided in Chapter 5.

2   CONCEPTUAL CAPITAL STRUCTURE FRAMEWORK

2.1   Traditional theories and optimal capital structure

A firm's financial decisions start from the choice between debt and equity. This chapter briefly outlines the theoretical motives of this choice that are closely related to debt financing decisions, which are discussed in the following chapter.

The classic theories of capital structure focus primarily on the costs of capital. It is generally accepted that the market value of a company is defined by discounted future cash flows. The conventional capital structure theory proposes that the discount factor can be affected by the firm's financing decisions. By taking the weighted average cost of capital (WACC) as the discount factor, the optimal capital structure can be characterized by such combination of debt and equity where the WACC is minimized. Given that cost of equity is usually higher than cost of debt, an increase in debt financing can reduce the total cost of capital. However, high levels of financial leverage may be considered as additional risk for shareholders, as the increased interest payments destroy part of the income, consequently affecting dividend payments and potentially causing financial distress. As a compensation for increased risk, equity holders would require a higher level of return, so pushing WACC upwards. Hence, the relationship between the amount of debt and WACC is nonlinear, making the universal optimum capital structure virtually nonexistent.

The evolution of the optimal capital structure theory started with Modigliani & Miller (1958) and was continued in the seminal works of Hirshleifer (1966), and Stiglitz (1969) that focus on the optimal composition of debt and equity. They argue that the benefits of cheaper debt are offset exactly by the increase in the cost of equity, making the financing choices of a firm irrelevant to its value under the perfect market assumption. Modigliani & Miller (1963) provide another argument by relaxing the assumption of no taxes and introducing a new model which significantly altered their previous conclusions. Due to the tax relief from interest payments, Modigliani & Miller (1963) argue that the decrease in WACC is significantly larger than the associated increase due to the increased financial risk of the equity financing. Therefore, according to this model, a firm's value is maximized with 100% of debt financing, implying that the firm should borrow as much as possible.

In practice, such a kind of capital structure is unrealistic. Various agency costs, asymmetry of information, bankruptcy risk and other market imperfections which Modigliani and Miller did not take into account, make it problematic, if not impossible, to reach the recommended level of debt. In the real world, lenders often impose different covenants on the debt holders, trying to reduce agency costs. One such covenant may be a certain limit on the amount of additional debt in a firm's

capital structure, creating a ceiling on the debt to equity ratio. Another source of imperfection is bankruptcy risk that occurs in highly leveraged firms. Anticipating possible failure on interest payments, an increase in the rate of return would be required not only by equity holders but also by lenders, leading to a significantly higher WACC and consequently lower firm value. Finally, the tax shield proposed by Modigliani & Miller (1963) is not everlasting. It is obvious that increased interest payments at a certain point may overwhelm the benefits of a reduced taxation base. At this point it is inexpedient to increase the level of debt as additional interest payments would not receive any tax deductions, so causing an increase in the cost of debt.

Miller (1977) continued relaxing these assumptions by introducing another model of optimal capital structure, augmented with personal income taxes. He hypothesizes that personal income taxation may also affect a firm's financing decisions. In particular, differences in dividend and interest taxes may affect the investor's choice between debt and equity instruments. If dividend taxes, for instance, are higher than the taxes on interest, then the degree of financial leverage is positively associated with firm value.

The traditional capital structure theories allow us to make three conclusions: Firstly, given market imperfections, capital sources are not irrelevant for firm value. Secondly, corporate taxes provide a shield that allows an increase in firm value if it is 100% debt financed. In practice though, such a degree of financial leverage is difficult, if not impossible to achieve. Finally, personal income taxes may also affect firm value, implying that the optimal capital structure may be affected by different factors that need to be taken into account. All three conclusions suggest however, that the optimal capital structure problem is unique for each firm and may contain multiple equilibria. Further research has shown that the classical Modigliani and Miller theorems fail to explain the empirical composition of debt and equity. Hence, other theoretical explanations are required to reach an empirical consensus. Sections 2.2 and 2.3 provide a description of the modern capital structure theories.

2.2   The trade-off theory

The trade-off theory is to a large extent based on the Modigliani & Miller (1963) proposition. This proposition suggests that firm value is maximized with 100% of debt-financed capital. However, such an extreme prediction is often unachievable, making the model incomplete in its predictions. Obviously, there are other factors that limit the amount of debt in a firm's capital structure. One such factor is bankruptcy costs. Using these offsetting costs, Kraus & Litzenberger (1973) propose a model where the optimal level of debt is defined by the trade-off between the tax shield from debt financing and the costs associated with riskier activity due

to increased financial leverage. According to this model, the value of a firm increases as long as the marginal tax benefits are higher than marginal bankruptcy costs, yielding the optimal debt to equity ratio at the point where these two factors are equal. Myers (1984) further investigates this issue and proposes the existence of a target debt to value ratio, which is gradually pursued by a firm. Hence, Myers (1984) hypothesizes that the choice between debt and equity is not only a static process, but can rather have dynamic characteristics where firms adjust their capital structures over several periods.

Under the static trade-off theory, any increase in the bankruptcy costs is associated with a reduction in the optimal level of debt, while an increase in the personal tax rate on equity, positively relates to the optimal debt level (Bradley et al., 1984). Although these propositions sound logically correct, the empirical test of this model is problematic. In the real market environment, firms operate over several periods, making the model hold only under specific assumptions. One such assumption is the absence of retained earnings that play a crucial role in capital structure decision making.

In the dynamic environment on the other hand, these assumptions can be relaxed. Brennan & Schwartz (1984) and Kane et al. (1984) introduce continuous time models, where a firm is deciding on its financing across several periods. Assuming no transaction costs but accounting for taxes, bankruptcy costs and uncertainty, such a firm would react to increased (decreased) profitability or any other adverse shock immediately and readjust its capital structure. Fischer et al. (1989) propose a more realistic theory that accounts for transaction costs, making capital structure adjustment costly. According to this model, the recapitalization process follows adrift based on the financial performance of a firm. Fischer et al. (1989) show that even a small transaction cost detains capital structure rebalancing, which explains empirical variations in the debt ratios.

Different versions of the trade-off theory employ different assumptions. While one version considers the firm's cash flow to be exogenous (see e.g. Kane et al., 1984; Fischer et al., 1989; Goldstein et al., 2001; Strebulaev, 2007), others assume that the firm's financing choices are related to its cash flows, and thereby consider investment and financing choices simultaneously (see e.g. Brennan & Schwartz, 1984; Mello & Parsons, 1992; Mauer & Triantis, 1994; Titman & Tsyplakov, 2007; Hennessy & Whited, 2005; Tserlukevich, 2008). Dividend payout policy, as well as taxation regimes, on the other hand, may also be crucial assumptions in financing decisions (see e.g. Stiglitz, 1973; Hennessy & Whited, 2005). Nevertheless, Hackbarth et al. (2007) show that the trade-off theory is quite sufficient in explaining corporate capital structures.

The fact that the dynamic trade-off theory has been modified and revised for the past 30 years raises the discussion of its reliability for modern financial markets. By relaxing different assumptions on taxes, transaction costs, payout policy, etc.,

different dynamic trade-off models yield somewhat different conclusions. However, while a consensus on the optimal capital structure is not reached, much of the work is still in progress, which indicates the on-going importance of the issue for modern financial theory.

2.3   The pecking order theory

An alternative explanation of the empirical capital structure distribution is suggested by Myers (1984), who argues over the hierarchical distribution of capital sources. In particular, he claims that firms would often prefer to utilize internal sources of financing rather than external. Debt financing, in turn, is also superior to equity, as equity issuance is least preferable for a profitable firm. Such a pecking order of funding is able to explain empirical variation in the capital structures. Profitable firms that do not issue debt as recommended by the trade-off theory, simply generate sufficient internal resources to finance their investments. Moreover, the theory of a pecking order is rather simple for understanding signaling hypotheses based on adverse selection and agency cost issues. These models suggest that a firm's decision to issue debt or equity is dependent not only on internal costs and tax advantages, but also on the investors' reaction and managerial incentives. Myers & Majluf (1984) suggest that asymmetric information between managers and investors would require a firm to follow the pecking order of capital structure if it wants to signal its attractiveness to the market. Any positive net present value (NPV) project that would result in increased firm growth and improved profitability would rarely be financed by new equity issues, as the current stakeholders would not like to split future profits with new ones. In contrast, if the project that requires financing may cause an increase in riskiness and higher costs, then existing shareholders would rather reallocate this risk among new stakeholders.

However, the pecking order is not as simple as it seems due to certain limitations. For example, Myers (1984) argues that in case of risk free debt, it is similar to internal sources of financing, while with introduction of risk, the debt falls somewhere in between internal and equity financing. This same proposition is described by Viswanath (1993) and Ravid & Spiegel (1997). At the same time, as suggested by Noe (1988), there are actually multiple equilibria in the case of risky debt and the choice between them is not that obvious. A similar case with multiple equilibria arises when the information asymmetry is two-sided (see e.g. Eckbo et al., 1990). Dybvig & Zender (1991) in turn argue that a well-designed managerial contract, which is tied to the firm value, could resolve the adverse selection problem but then the question of optimal contract arises. Another possible solution for the adverse selection problem is to allow present equity holders to participate in the new equity issues, as suggested in the model of Eckbo & Masulis (1992). However, this solution is also more complicated, given market imperfections.

One reasonable explanation for the pecking order is presented by Halov & Heider (2011), who suggest a model of the choice between debt and equity based on the type of asymmetric information. They postulate that if there is an uncertainty about the real value of a firm, it would rather issue debt than equity. However, if the asymmetry of information comes from the riskiness of a firm, it would prefer to issue equity over debt. An agency problem may be another reason for the pecking order of capital. As any external debt requires monitoring and creates additional obligations for managers, retained earnings would be more preferable. Jensen & Meckling (1976) suggest a model where the pecking order of capital is based on agency conflicts. In general, the model confirms the pecking order theory and argues that an optimal capital structure is reached at the point where the benefits of debt financing are higher than the agency costs that it causes.

Many other models based on asymmetry of information, agency costs, and adverse selection have since been developed. A comprehensive review of capital structure theories and correspondent early empirical evidence is provided by Harris & Raviv (1991). More recently, Parsons & Titman (2008) provide an extensive synthesis of the empirical capital structure evidence, while Fama & French (2012) have run the most recent tests of existing capital structure theories. Although existing theories provide a good background for understanding the capital structure puzzle, the empirical evidence shows that there is no unifying model that would satisfy all real market conditions and explain actual debt to equity ratios. Nevertheless, recent dynamic models, for example by Morellec (2004), Atkeson & Cole (2005) and those discussed in Section 2.2 are able to significantly diminish the gap between theory and practice.[1]

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[1] An extensive review of the last two decades of research on dynamic models of capital structure is available in Strebulaev & Whited (2011).

3   THEORETICAL FUNDAMENTALS OF DEBT FINANCING

One general conclusion that can be drawn from the previous chapter is that debt financing matters for a firm's performance and value. The important question that remains in this field of research is: what are the implications of different debt sources for firm performance and market valuation? Primarily, there are three sources of corporate debt: non-bank private debt, bank debt, and public debt. As the most common way of financing their investments, firms approach financial intermediaries and obtain a loan under specified contractual terms. It is argued that large corporations prefer to borrow from the market directly by issuing public debt in form of bonds. Nevertheless, the empirical observations show that smaller, less profitable firms also tend to tap the bond market, while larger, highly profitable corporations customarily have close firm-bank relationships and do not hesitate to rely on bank debt even if the public debt market is easily accessible for them. Hence, theoretical research also focuses on the questions like why firms issue different debt instruments and what are the differences between them. The existing models examine these questions in the context of the theory of banking. In particular, these models focus on the monitoring function of banks and asymmetry of information, efficiency of liquidation and renegotiation, and managerial incentives and agency costs. This chapter describes all three hypotheses and briefly reviews the existing empirical evidence.[2]

3.1   Monitoring and asymmetry of information

Information asymmetry between lenders and borrowers is considered as one of the determinants of a firm's choice between debt sources. Leland & Pyle (1977) for example, suggest that banks perform more efficiently in information transmission, and therefore the degree of information asymmetry is the underlying reason for the choice of bank debt. In particular, firms with a higher degree of asymmetry would borrow from banks, while firms with a lower information asymmetry would chose public debt. Diamond (1984), Fama (1985), and Boyd & Prescott (1986) further examine the monitoring function of banks and conclude that bank financing may be more preferable than public debt as banks are able to mitigate potential moral hazards and adverse selection problems.

Furthermore, Diamond (1991) and Rajan (1992) suggest that the choice between debt sources may also be determined by firm size, reputation, and quality. The higher the quality of a firm, the more likely it will be financed through the pub-

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[2]A more comprehensive theoretical literature review, as well as a survey of the prior empirical evidence is available in Kale & Meneghetti (2011).

lic debt market. However, the relationship between firm quality and debt source choices may be nonlinear. According to these models, large and high quality firms would borrow from the public debt market, while average quality firms would prefer banks. Low quality firms, in turn, would also tap the bond market as general information on their quality is already known to the market. In addition, relying on private debt for such companies is more costly due to potentially stricter monitoring from banks.

On the other hand, Sharpe (1990) examines the asymmetry of information that could arise from relying solely on bank debt. By acquiring private information from a firm, banks may exert their monopoly on this information. As a result, this information monopoly could create offsetting costs that may prevent efficient capital allocation. The issue of offsetting costs is especially relevant in case of short-term bank debt when banks would rather liquidate the borrower in case of poor short run performance (Diamond, 1993). Nevertheless, other things equal, private debt is considered to be a much safer source of financing as it is usually collateralized, more senior, and more informed because of the monitoring function of financial intermediaries (Rajan & Winton, 1995; Welch, 1997).

A somewhat controversial approach to the information asymmetry problem is suggested by Yosha (1995). He hypothesizes that information disclosure to the market may be damaging for high quality firms, and hence, they would rather issue private debt. This model proposes that the direction of the relationship between firm quality and debt source choices is rather opposite, where the capital markets are not rejecting low quality firms, but instead are being rejected by high quality firms due to valuable private information. Nevertheless, recent empirical evidence on new debt contracts from developed markets suggests that the primary determinant of the public debt issuance is the credit quality of a borrower (Denis & Mihov, 2003).

As can be inferred from the above, information asymmetry and the monitoring function of banks may exert different effects on a firm's decision making. While bank debt tends to be more flexible but more expensive (Bolton & Freixas, 2000), public debt may be able to resolve the problem of the information monopoly of banks and so decrease offsetting costs.

3.2   Efficiency of liquidation and renegotiation

Efficiency of liquidation and renegotiation in cases of financial distress is another source of difference between debt sources. Berlin & Loeys (1988) and Chemmanur & Fulghieri (1994) argue that the choice between private and bank debt is the function of the borrower's distance to default. Due to better monitoring by banks, private debt is more efficient in liquidation as lenders obtain more detailed information about the borrower. Consequently, it is suggested that bank debt is more

flexible in renegotiation than public debt. While banks are willing to develop long term relationships with their borrowers, bond holders are less interested in the future perspectives of a firm, and hence would be more likely to initiate immediate liquidation in case of financial distress. These models argue that the choice of debt financing is dependent on the firm's probability to default where firms that are more likely to experience financial difficulties tend to borrow from the banks, whilst more reliable companies are financed by the public debt market.

The issue of the efficiency of renegotiation can also be solved in case of public debt by allowing the exchange of previously issued bonds for new ones. However, Gertner & Scharfstein (1991) argue that implementing such a process on the public debt market may lead to significant under or over investment, thus yielding inefficient investment strategies. Gilson et al. (1990) support this view and suggest that banks are better providers of private restructuring in case of financial distress.

There are many other models on renegotiation and liquidation efficiency (see e.g. Anderson & Sundaresan, 1996; Mella-Barral & Perraudin, 1997) that in general argue that firms which rely on bank debt manage to avoid bankruptcy because banks always agree to renegotiate. However, these models quite often fail to explain those liquidations that occur in the real market environment. Hence, recent research focuses more on strategic firm-bank relationships that are able to explain early liquidations of the firms with low liquidation value (Bourgeon & Dionne, 2013).

3.3   Managerial incentives and agency costs

Debt financing sources may also exert different effects on managerial incentives and resolve moral hazard issues. In addition, when ownership and control over a firm is diluted, managerial optimality rather than shareholders optimality should be considered (Zwiebel, 1996). Stiglitz (1985) and Besanko & Kanatas (1993) suggest that bank debt may decrease managerial incentives to underperform, resolving the moral hazard issue by a greater monitoring ability of banks. As final payoff is, *a priori*, decreased by interest payments, overall managerial incentives decrease with any additional external finance. Bank debt, in turn, may enhance managerial performance and improve a project's probability of success by exerting greater influence on its management.

Furthermore, Bolton & Scharfstein (1996) show that optimal debt contracts are able to mitigate potential strategic defaults by management, and reduce costs in case of liquidity default. The model predicts that low credit quality firms would rely on private debt, while higher quality firms would prefer public debt. At the same time, managers with lower equity ownership are anticipated to avoid extra control caused by bank monitoring. Firms with such kinds of management will most likely issue public debt. On the other hand, firms that are mostly owned by managers

are expected to issue private debt as their control rights decrease the pressure from the monitoring institute. More recently, Meneghetti (2012) argues that the choice between public and bank debt may also be dependent on managerial compensation. He suggests that managers whose compensation is tied to firm performance are more likely to issue bank debt.

Another issue of management incentives that relates to investment strategies seems to have a solution in debt financing as well. Myers (1977) hypothesizes that close and flexible relationships between the lender and the borrower may yield more efficient investments. Such kinds of relationships are more feasible with banks rather than with public debt holders, implying that reliance on bank debt leads to increased firm value. Thus, the choice between private and public debt may also be dependent on the future growth opportunities of a firm. The lower the growth opportunities, the lower is the likelihood that the firm issues public debt.

4   EMERGING MARKETS FINANCE

Financial research is traditionally focused on the developed markets. Soundly, financial markets like the U.S. are the most efficient in terms of information transmission, legal regulations, and economic freedoms. Hence, because of these market conditions and long historic records, most of the empirical tests of existing theoretical models had been carried out using developed markets data. However, in the past few decades, economists and investors observed substantial growth and expansion in lesser developed countries, referring to some of these processes as an "economic miracle". These countries tend to be called "emerging", which describes the process of emerging from less to more developed economies.

Because of higher volatility and returns, and as the result better investment diversification opportunities, fast economic growth and extensive interdependencies with more advanced countries, increasing influence in global economic and political aspects, emerging markets have gained a lot of attention in the academic literature over the past three decades. The research on emerging economies like China, India, Russia, Brazil and others has revealed important differences in institutional, legal, cultural and other settings, and led to a reassessment of standard theoretical models (Bekaert & Harvey, 2002, 2003; Kearney, 2012). This chapter briefly reviews the most important differences between emerging and developed markets and summarizes recent trends and issues in emerging markets finance.

4.1   Emerging market "BRICs"

Although according to the International Monetary Fund there are about 25 countries from around the world that fall under the definition of "emerging economies", most of them remain relatively small and underdeveloped in terms of financial markets. Thus, economists tend to highlight several particular countries that are associated with the driving force of the economic growth in emerging markets.

In 2001, the Global Economic Research Group of Goldman Sachs suggested four countries that comprised the most promising emerging markets (O'Neill, 2001). They called them the BRIC, which refers to the countries of Brazil, Russia, India, and China. At that time, the cumulative GDP of these four economies was about 23% of the world's leading economies (G7) GDP. That was more than both the European Union and Japan combined. Since then, these countries have experienced such a remarkable level of growth that the economists of Goldman Sachs went further and predicted that the aggregate GDP of BRIC countries will be larger than the cumulative value of the G7 countries by 2035. Given the effects of the global financial crisis of 2008-2010, this forecast is, perhaps, too optimistic. However, the crisis actually reemphasized the importance of these countries in the global economy as

most of the BRIC countries have handled the crisis quite well in contrast to most of their developed counterparts. Although capital market frictions were severe for all of them and made them struggle along with the rest of the world, it appeared that BRIC countries were better prepared and recovered faster from the crisis. Hence, in their follow-up work, Goldman Sachs economists O'Neill & Stupnytska (2009) even increased their expectations and suggested that the Russian economy for example, will become larger than the Japanese.

Recently, economists of the World Bank noticed that in the aftermath of the 2008-2010 crisis, BRIC countries showed accelerated growth rates and began to challenge more developed economies in terms of leading roles (Lim & Adams-Kane, 2011). In the global economic downturn, countries like China and India played the key role of the global economic recovery. With the increased volatility in the major financial markets in the U.S. and the U.K., international investors turned back towards the BRIC economies as a good source of diversification and positive rates of return.

This dissertation therefore focuses on the major emerging countries - Brazil, Russia, India and China. While the third essay of this dissertation examines the BRIC countries together, the first two and the last essays focus explicitly on the Russian market. However, the findings of these papers may be generalized for other emerging markets with similar institutional settings.

4.2   Institutional settings

Although there are distinct differences between all emerging countries, certain characteristics are intrinsic to all of them. Most of the emerging countries are characterized by the process of transition from their centralized systems, to free or partially free market economies. Consequently, legal environments and state interventions in the economic mechanisms are important separating features of developing countries. These features significantly affect the market microstructure and create additional risk factors that are priced in the emerging markets. For example, Bekaert et al. (1997) and Perotti & van Oijen (2001) find that political risk is an important factor in some developing countries, which is determined by high levels of political influence in the economy. Some prior literature refers to this institutional factor as the government quality (see e.g. Fan et al., 2011; La Porta et al., 1999b; Shleifer & Vishny, 1994). These studies suggest that the quality of governmental policies as well as the quality of politicians themselves has a crucial role in emerging markets.

China is a good example of such an influence. Being the second largest economy in the world and despite recent reforms and other steps towards market liberalization, the Chinese government controls over 50% of the country's industrial sector and holds over 95% of the banking sector assets. Recent literature on market integration

(see e.g. Tai, 2007) implies that any shift in the Chinese political regime may cause a significant increase in global volatility. Moreover, political connections may be the determining factor of a firm's performance in emerging economies (Fisman, 2001). Recent studies show that certain political connections and the level of corruption in the country may enhance access to finance and improve terms of borrowing from state-owned banks for affiliated companies (see e.g. Claessens et al., 2008; Dinç, 2005; Fan et al., 2008; Khwaja & Mian, 2005; Sapienza, 2004).

The ownership structure itself in emerging markets is something that can be considered as peculiar. In spite of privatization processes, state-owned enterprises are still the driving powers of these countries' economies. While the effects of privatization are well documented (see e.g. Megginson & Netter, 2001, for a comprehensive survey, and Megginson (2005)), some emerging countries, like Russia for example, do not hurry to privatize their major industries. The Russian government still controls over 50% of the banking sector's assets. Although it is generally agreed that state ownership is ineffective (see e.g. Barth et al., 2004; La Porta et al., 2002; Gur, 2012), the emerging markets environment does not make such an ownership structure necessarily harmful. Recent studies show that state ownership of banks may even be more desirable in times of financial crises (Cull & Martinez Peria, 2013; Fungáčová et al., 2013).

The nature of the ownership structure in emerging markets tends to be more concentrated than in developed countries. Aside from state ownership, emerging market firms are mostly held by family or industry group agents. Quite often ownership structures take the form of pyramids and cross-shareholdings (Claessens et al., 2000; La Porta et al., 1999a). Such structures of ownership allow us to take a look at the issue of shareholder-manager conflicts from a new perspective. In contrast to developed countries where ownership is more diffused, information asymmetries between owners and managers in emerging markets may be shifted away due to a more concentrated ownership (Claessens & Yurtoglu, 2013).

Another example of the institutional peculiarities of emerging markets is the regulatory environment. Different accounting standards and levels of transparency for instance, may affect the price discovery and liquidity of the market (see e.g. Nowak et al., 2011; Patel et al., 2002; Zhou, 2007). Moreover, Bekaert et al. (2007) examine the cross-section of market liquidity in emerging markets and show that measures of the local market liquidity have significant explanatory power in stock returns. This relationship implies that the current processes of liberalization and integration with the developing countries that affect market liquidity, make emerging markets special in terms of market microstructure and asset pricing techniques. Although recent trends indicate that developing economies seem to move towards harmonization with the international financial reporting standards, there are still substantial differences in some of the countries.

In general, many corporate decisions in emerging markets are affected by several

features that are unique to the institutional settings of developing countries. In comparison to most developed economies, the financial systems in emerging markets are characterized by a highly concentrated banking sector with strong state influence, concentrated ownership structures, a lack of transparency regarding ownership and control rights, gaps in legislation, political influence, and weak corporate governance practices (see e.g. Chernykh, 2008; Denis & McConnel, 2003; Guriev et al., 2004; Judge & Naoumova, 2004; Klapper & Love, 2002). Given the recent expansion of the financial markets of these countries and the recent developments in legal and corporate governance norms, these emerging markets provide an ideal testing ground for some of the fundamental questions in corporate finance.

4.3   Debt financing in emerging markets

Historically, emerging market firms were able to obtain debt financing only as bank loans, due to the small size and high volatility of the public market of debt. Merely a decade ago in Russia for example, there were almost no issues of corporate bonds, whilst the amount of commercial banks exceeded 2,300. However, the ease of getting a bank loan in Russia was questionable due to high interest rates and high levels of bank risk aversion, especially amidst the Russian debt crisis in 1998. In contrast, there were only about 250 banks in Brazil in the 1990's, during which time the market for corporate public debt was also quite volatile and chaotic. Due to such an oligopolistic environment, Brazilian banks used to exert even more market power in the form of interest rate spreads and credit availability (Belaisch, 2003). Hence, while the largest banks (often state-owned) were reluctant to finance the private sector (Allen et al., 2005), firms in many of the emerging markets faced severe financial constraints (Demirgüç-Kunt & Maksimovic, 2002).

However, emerging economies have experienced substantial development in financial markets over the last two decades. With several important legal and infrastructural improvements, the emerging capital markets rocketed in size and volume. The Russian bond market, for instance, grew from being virtually nonexistent in 1999, to more than 100 billion USD in 2010, which is about 15% of its GDP. The Chinese bond market, in turn, was able to satisfy only 1.4% of the country's corporate financing needs in 2006 (Hale, 2007). While reforming its banking system, the issue of debt financing is also both timely and relevant in China (Berger et al., 2009; Pessarossi & Weill, 2013).

Given the large cross-sectional variation in debt financing choices and recent financial market developments, the emerging markets (and BRIC countries in particular) provide an ideal testing ground for corporate financing theories. The research on debt markets is also particularly valuable as the majority of the previous studies is focused on the emerging equities market. Hence, this dissertation provides new

insights into the field of corporate debt financing in emerging markets. While some findings of this dissertation confirm the tests of existing theories, other results reveal several relationships that have not been previously observed. For example, the nonlinear relationship between the level of bank debt and firm market performance, documented in the third essay, lends potential for future research on the optimal corporate debt structure. Because they are unable to clearly define the optimal debt structure of a firm, existing theories fail to map out a corporate financing plan. Emerging markets research in turn, may be able to advance these theories as the existing evidence suggests that emerging market data allows to conduct powerful empirical tests.

5   SUMMARY OF THE ESSAYS

The main purpose of this dissertation is to examine differences between corporate debt financing sources and their implications for firm performance. In addition, bank debt is examined in more detail, assessing loan growth rates and interest rates structure based on the ownership structure of financial intermediaries. These issues are addressed in four individual empirical essays that constitute this dissertation. The first two essays are part of joint research projects and are co-authored. The last two essays are individual studies and are single-authored. The contribution of each co-author is described below.

Essay 1 *"Does the decision to issue public debt affect firm valuation? Russian evidence"* is co-authored with professors Jussi Nikkinen and Sami Vähämaa. Denis Davydov, as the initiator of the research idea was responsible for data collection, methodological design, initial tests and interpretations of the results. Professor Jussi Nikkinen contributed by giving comments and advice throughout the research process and with refereeing the estimation results. Professor Sami Vähämaa contributed by providing detailed comments on each version of the paper, as well as with numerous suggestions on the improvement of the study and writing some parts of the text.

Essay 2 *"Debt source choices and stock market performance of Russian firms during the financial crisis"* is co-authored with professor Sami Vähämaa. The idea of this research article evolved from the first essay in numerous discussions between the two authors. Research design, methodological issues and the empirical setup are the result of the joint effort of both authors. Denis Davydov was responsible for data collection and empirical tests, while professor Sami Vähämaa was responsible for detailed technical and editorial comments on the paper.

Essay 3 *"Debt structure and corporate performance in emerging markets"* is single-authored by Denis Davydov.

Essay 4 *"Does state ownership of banks matter? Russian evidence from the financial crisis"* is single-authored by Denis Davydov.

Brief summaries of the four essays are presented below.

5.1   Does the decision to issue public debt affect firm valuation? Russian evidence

This essay focuses on the association between firm performance and the decision to issue public debt. In particular, it examines whether the decision to issue bonds affects the firm's stock market valuation. As suggested by existing theories, there are

both costs and benefits stemming from a reliance on any source of debt financing. As discussed earlier in this introductory chapter, bank debt provides more efficient monitoring than other sources of debt. While it is also capable of resolving potential adverse selection and moral hazard issues (Diamond, 1984, 1991), it may also cause hold-up problems because of the bank's monopoly on information (Rajan, 1992). The prior empirical evidence shows that different debt financing sources may indeed be unequally valuable for a firm. However, this evidence is mixed. While some suggests that bank loans enhance firm performance (Easterwood & Kadapakkam, 1991; Gilson et al., 1990), others argue that banks create offsetting costs (Houston & James, 1996), and public debt provides increased financial flexibility and more preferential conditions for a firm's growth rates (Arikawa, 2008; Gilson & Warner, 1998; Weinstein & Yafeh, 1998).

The prior literature examines the association between firm performance and the sources of debt financing, mostly with event studies. In general, these studies find a positive short-term stock price reaction to bank debt arrangements (see e.g. Aintablian & Roberts, 2000; Kang & Liu, 2008). But the evidence available on the corresponding effects of bond issuances is unclear. While one strand of literature suggests that the effect of bond issuance announcements on stock prices is negative (see e.g. Spiess & Affleck-Graves, 1999; Godlewski et al., 2011), other studies argue that these announcements are associated with insignificant or even positive changes in stock market valuation (Miller & Puthenpurackal, 2005).

This essay aims to fill the gap in the existing literature on the relationship between the choice of debt source and firm performance. In addition, it examines the primary determinants of the issuance of public debt in emerging markets. To the best of our knowledge, this study is the first attempt to address the implications of public debt issuances on firm valuation. In contrast to prior literature, this essay uses cross-sectional panel regressions instead of event study methodology. Such an approach allows us to capture the exact long-term association between the firm valuation and the decision to issue bonds, disregarding any market over or under-reactions.

The sample used in the analysis covers the period 2003-2012 and represents a set of large, publicly traded Russian firms. During this period, the Russian debt market experienced substantial growth, and hence, serves as an interesting setting to examine whether the decision to issue public debt affects firm performance. The final sample consists of 353 individual firms from sectors other than the financial and insurance.

The empirical findings reported in this paper indicate that the determinants of debt issuance in the emerging Russian markets seem to follow a pecking order theory. In particular, market valuations of firms that have issued bonds are significantly lower than for firms with other sources of debt financing. However, this relationship may be driven by the endogeneity issue, which is addressed by the two-stage instrumental variable technique. We assume that firm age is a valid instrument for

the presence of public debt in the Russian market. Our validity tests prove this assumption. After addressing endogeneity concerns, the results provide considerable evidence to suggest that the presence of public debt is negatively associated with the firm's market valuation. These results are broadly consistent with the prior event studies on the negative stock market reactions to bond issue announcements (see e.g. Spiess & Affleck-Graves, 1999; Godlewski et al., 2011).

The main finding of the essay is on the deterioration of firm valuation after bond issuance. This reaction can be related to the debt overhang hypothesis. Given that public debt is usually more risky, the announcement of bond issuance could trigger a decrease in stock market valuation as investors anticipate an increase in firm riskiness with increased levels of financial leverage. Alternatively, lower market valuations of firms with public debt may be due to the inefficient monitoring functions of the market. While banks closely monitor their borrowers and potentially decrease manager's incentives to undertake value-diminishing actions, market-based governance mechanisms do not provide sufficient monitoring tools. Given the weak credit ratings system and high information asymmetries in Russia, financial intermediaries may be more advantageous for firm valuation in terms of bank-based governance mechanisms in emerging markets.

5.2 Debt source choices and stock market performance of Russian firms during the financial crisis

This essay examines the relationship between stock returns and the sources of corporate debt financing during the financial crisis of 2008. The subject is particularly interesting in the emerging markets setup as it has been argued that the financial crisis of 2008 spread to emerging economies through the debt markets. Hence, it is examined whether the reliance on bank debt or bonds helped to diminish the effects of the crisis in the emerging Russian market.

Besides several event studies that focus on the immediate stock market reactions to debt placement announcements, there is relatively little empirical evidence that focuses on the relationship between the borrower's stock market performance and reliance on different debt sources in the cross-sectional setup. This relationship may be particularly important if firms are able to quickly readjust their debt financing in response to macroeconomic shocks. The Russian market in particular, serves as an interesting setting in which to examine this issue for several reasons: First, the financial crisis of 2008 was completely exogenous to the Russian economy as it originated from the U.S. sub-prime mortgage sector. Nevertheless, the crisis reached Russia due to its high reliance on natural resources and high levels of integration with more developed economies. Second, the increased risk aversion of investors and tightened terms of foreign borrowing during the crisis caused signifi-

cant liquidity shock in the Russian capital market, and hereby, debt sources played a major role in firms' survival ability.

Instead of examining the difference between debt sources, the prior empirical literature primarily focuses on only one side of the debt market - banks. It is documented that there is a close relationship between the performance of banks and the borrowing firms, especially during credit crunches and liquidity shocks (see e.g. Khwaja & Mian, 2008; Kroszner et al., 2007; Ongena et al., 2003; Paravisini, 2008). Limited evidence on the implications of debt source choices and firm performance during periods of market stress is provided by Kang & Stulz (2000) and Chava & Purnanandam (2011). However, Kang & Stulz (2000) examine the period of banking crisis in Japan in 1990-1993 and find that bank dependent firms performed worse than similar companies with other sources of debt financing. However, the examined shock was not exogenous to Japan and therefore provides very specific evidence in the field. Chava & Purnanandam (2011) in turn, examine the period of bank loan contraction in the U.S. in 1998, which also was not completely exogenous. Similar to Kang & Stulz (2000), they find that firms that relied mostly on bank debt experienced larger valuation losses. This essay aims to contribute to the above literature by focusing on the association between debt source choices and firm stock market performance during the financial crisis of 2008 using Russian data.

The empirical findings reported in this essay demonstrate that there was significant variation in the cross-section of stock returns of large Russian firms during the financial crisis of 2008. By exploiting this variation across 102 individual firms that relied either on bank debt or bonds, it is documented that firms that relied mostly on bank debt significantly outperformed those firms with public debt during the crisis episode. It is also noted that the difference in stock returns of these two sub-samples was insignificant in the pre-crisis period. On the other hand, it can be seen that stock prices of the bank dependent firms recovered more slowly in the post-crisis period. However, the relationship between debt source choices and stock market returns in the post-crisis period appeared to be insignificant.

Observed relationships indicate that bank debt may be particularly valuable in periods of market stress and liquidity shocks in emerging markets. In two hypothetical portfolios of bank dependent and bank independent firms, the drop in the market valuation of the independent firms was much sharper during the crisis episode. However, the recovery of bank dependent firms appeared to be more slow, which in turn, supports the argument for a higher financial flexibility of public debt (Arikawa, 2008; Weinstein & Yafeh, 1998). Nevertheless, the positive effects of bank-based debt financing on firm valuation during the crisis may be related to the bank's ability to spread the loan into the credit line. Drawdowns on these lines can be stretched along multiple periods, allowing firms to rely on debt more during periods of liquidity shock. This argument is consistent with the statistical growth numbers of

commercial loans in Russia. These numbers show that the amount of commercial lending actually increased during the financial crisis of 2008. This argument is also supported by developed markets data, where the corporate borrowers' usage of bank credit lines during the financial crisis also increased (Ivashina & Scharfstein, 2010).

5.3 Debt structure and corporate performance in emerging markets

This essay investigates the association between different debt source composition and firm performance. In particular, using a panel of 700 publicly traded firms from the largest emerging economies of Brazil, Russia, India, and China (BRIC), it is examined whether the reliance on public or bank debt or a certain combination of the two has any implications for firm financial and market performance.

While existing theoretical models suggest that firm value is affected by the particular composition of debt sources (see e.g. Bolton & Scharfstein, 1996; Bolton & Freixas, 2000; Park, 2000), it remains unanswered as to what are the optimal levels of public and bank debt in a firm's capital structure. Despite the vast body of event studies on the stock market reaction on different debt financing announcements, there are only a few studies that examine the issue of debt source choices and firm performance in the cross-sectional setting. One of these studies examines the episode of the banking crisis in Japan in the 1990's and finds that bank dependent firms perform worse than peers with other sources of debt financing. Another study focuses on the period of bank lending contraction in the U.S. in 1998 and finds similar patterns (Kang & Stulz, 2000; Chava & Purnanandam, 2011). As can be noted, the prior evidence focuses on the specific periods of financial distress in the banking sector. Hence, the findings on the underperformance of bank dependent firms may be biased and related to the general distress of financial markets, rather than as a direct effect of debt financing on firm performance.

This essay aims to contribute to the existing literature in several aspects. First, instead of focusing on a specific period of financial turmoil, it examines a larger time span which also includes crisis periods. This approach allows us to examine the effects of debt source composition on firm performance in both normal and crisis times. Second, unlike prior event studies, it uses cross-sectional regressions that enable the elimination of potential market over and under reaction on debt placements. Third, the analysis utilizes the exact debt ratios that allow us to determine the potential optimal composition of different debt sources and account for potential non-linearity in the relationship between the levels of the debt source and firm performance. The essay also deals with endogeneity issues, which arise due to reverse causality, by introducing a novel instrument for the instrumental variable

estimations.

It is proposed that country-level banking sector concentration is a valid instrument for the bank debt ratio for the following reason: As suggested by previous literature, the developments of the banking sector and financial markets do not necessarily correlate. It is argued that banks may oppose financial development because of potential competition emerging from the public debt market (Rajan & Zingales, 2003). Moreover, it is documented that any further development of financial systems is associated with a decrease in the banks' profitability and interest rate margins, especially in emerging markets (Demirgüç-Kunt & Huizinga, 2001). In addition, it is also found that banking sector concentration is negatively related with the size of the corporate bond market (Dickie & Fan, 2005). Given this evidence, and while there is no direct relationship between banking sector concentration and firm performance, it is argued that there is a positive correlation between banking sector concentration and a firm's reliance on bank debt. Hence, the conditions for its use as a valid instrument in the IV estimation techniques are fully satisfied.

Finally, the essay contributes to the prior literature by focusing on the largest emerging markets. Emerging markets provide an especially interesting setting to examine the issue of debt source choices and firm performance. Besides recent expansion and prominent growth rates, emerging markets are specifically different from developed economies in terms of the firm behavior on the debt market. This behavior differs in the length of reliance on a particular source of debt. In contrast to the developed markets where firms are likely to stick with the particular type of debt, the choice of financing source in the emerging markets is more continuous. The firm may switch from bank loan to bonds and back continuously, and hence, there is significant variation in the choices of debt source. Given that this variation is rather small in developed countries, it is expected to have a more pronounced effect on firm performance in emerging markets.

The empirical findings reported in this essay indicate that there is a significant variation in debt source choices. With the sample divided into bank dependent and independent firms, it is observed that a sample firm may be related to both sub-samples in different years during the examined period. Results also indicate that the different composition of debt sources in a firm's capital structure may affect its financial performance, as well as its market valuation. In particular, it is found that higher levels of bank debt may enhance firm profitability. However, bank debt seems to be negatively correlated with the firm's market valuation. This finding is not necessarily inconsistent with findings on the positive relation of bank debt and firm profitability, as the market may react negatively to any additional debt issuances, anticipating debt overhang problems. While the data sample used in this analysis does not distinguish between new and continuous debt arrangements, the observed negative effect of bank debt on market valuation may be due to these expectations.

Moreover, the estimation results suggest that the Tobin's Q ratio has a diminishing vector as the firm increases its use of bank debt, but this vector is nonlinear. As the bank debt ratio approaches roughly 70% of the firm's long-term debt, the vector changes to positive. These results suggest that fully bank-financed firms are able to diminish the negative effects of loan announcements on market valuations. Furthermore, the results also suggest that this relationship may be completely opposite for financially distressed firms.

5.4 Does state ownership of banks matter? Russian evidence from the financial crisis

This essay focuses on bank debt financing. While the previous essay establishes a strong connection between bank debt and firm performance and documents that bank loans may be able to enhance firm profitability and market valuation, a further question is to examine whether there is a difference across banks and are they all equally beneficial for a firm's performance. This essay examines the effects of the state ownership of banks on their lending behavior and capitalization.

While it is generally accepted that government participation in the ownership stakes of commercial enterprises is ineffective and leads to significant underperformance (La Porta et al., 2002; Barth et al., 2004; Bonin et al., 2005; Boubakri et al., 2009; Cornett et al., 2010), economic literature has mainly focused on the process of privatization and its effects on firm performance. However, the global financial crisis of 2008-2010 turned the direction of ownership transfer upside down. Instead of privatization, many countries experienced large scale nationalizations and bailouts, especially in the financial sector (Brunnermeier, 2009; Erkens et al., 2012). Despite the vast literature on the inefficiency of the state ownership of banks (see e.g. Berger et al., 2005, 2009; Lin & Zhang, 2009; Cornett et al., 2010), recent empirical evidence indicates that state ownership of banks is not necessarily harmful and may in fact be particularly valuable in times of financial turmoil (Brei & Schclarek, 2013; Cull & Martinez Peria, 2013; Fungáčová et al., 2013).

This essay investigates whether state ownership has any implications for banks' lending behavior and capitalization, specifically around the time of the global financial crisis of 2008-2010. Using a sample of 348 large Russian banks, the essay aims to contribute to the existing literature by examining the direct effects of state ownership on banks' activity in Russia. An in-country analysis may be expected to provide more robust estimates because of the lower incidence of endogeneity concerns that exist in large cross-country studies. Additionally, the Russian banking sector has all the necessary features to examine this issue as it can be characterized as highly state-influenced with a dense concentration. The essay also contributes to the literature by accounting for potential non-linearity in the relationship of state

ownership and bank lending behavior.

The empirical findings of the essay indicate that a government's participation in the ownership stakes of commercial banks affects their lending behavior and capitalization. In particular, it is found that despite the overall decrease in commercial lending during the crisis of 2008-2010, the drop in lending of state-owned banks was less pronounced. Moreover, the results show that the relationship between lending growth and state ownership is nonlinear and fully state-owned banks, in fact, increased their lending during the crisis. Whilst charging lower interest rates. Finally, the results also suggest that state-owned banks had higher capital ratios during the crisis. This finding suggests that state-owned banks were better protected against financial distress and asset default.

These results yield several important policy implications. Firstly, they suggest that the state ownership of banks may serve as a stabilizing power in the financial sector. While private banks shut down lending programs and charge higher interest rates in response to increased riskiness, state-owned banks relying on governmental support, enhance their lending and decrease interest rates as a method of overcoming financial crisis. Secondly, despite the existence of deposit insurance programs, depositors are more likely to run rather than monitor the bank in periods of financial crisis. The government as a shareholder may serve as an additional guarantee to depositors and thus prevent panic and a funds runoff. Finally, the results suggest that the governments of emerging countries should not hurry to completely privatize their banking sectors. This argument is supported by several recent studies that provide strong evidence that bank privatization may in fact have harmful effects on financial stability and development (see e.g. Andrianova et al., 2008; Andrianova, 2012; Karas et al., 2010; Körner & Schnabel, 2011).

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Does the Decision to Issue Public Debt Affect Firm Valuation? Russian Evidence[*]

Abstract

This paper examines the association between firm valuation and the sources of debt financing. In particular, using a sample of 353 firms, we test whether the decision to issue bonds affects the firm's stock market performance in the emerging Russian markets. Our results indicate that public debt financing may have a negative effect on the firm's market valuation. After controlling for the differences in firm-specific characteristics and addressing potential endogeneity issues, we document that the firms which rely on public debt underperform relative to firms with other sources of debt financing in terms of stock market valuation.

JEL classification: G10; G15; G30; G32

Keywords: debt financing, bonds, firm valuation, firm performance, emerging markets

1   Introduction

In this paper, we focus on the association between firm performance and the decision to issue public debt. In particular, we use data on large, publicly traded Russian firms to examine whether the decision to issue bonds affects the firm's stock market valuation. To the best of our knowledge, this paper is the first attempt to address the implications of public debt issuances on firm performance in emerging markets.

There are both costs and benefits stemming from a reliance on either public or bank debt. Existing theories suggest that bank debt may provide more efficient monitoring features than public debt financing by resolving potential adverse selection and moral hazard problems (Diamond, 1984, 1991), while it may also cause hold-up problems due to the information monopoly of banks (Rajan, 1992). Bank debt can also be considered beneficial in terms of easiness of renegotiation in case of financial distress (Chemmanur & Fulghieri, 1994; Rajan & Winton, 1995). Public debt in form of bonds, on the other hand, seems to be able to resolve the hold-up problem but may not be as favorable as bank debt in terms of renegotiations (Gertner & Scharfstein, 1991) and in resolving information asymmetries (Leland & Pyle, 1977; Johnson, 1997).

The prior empirical literature suggests that different sources of external debt financing may be unequally valuable for a firm. Risk-averse banks may require higher interest on debt financing, and may maintain stricter monitoring conditions and thereby reduce managerial flexibility, while the high costs of bond issuances may create a considerable barrier for even entering the public debt market. Previous studies indicate that different debt source choices may exert a significant influence on firm performance. Lummer & McConnell (1989), Gilson, John & Lang (1990) and Easterwood & Kadapakkam (1991), for instance, argue that private debt in form of bank loans increases firm value. Several recent studies provide support for this argument (see e.g. Haan & Hinloopen, 2003; Shirasu & Xu, 2007). On the other hand, Houston & James (1996) suggest that banks can create offsetting costs and cause hold-up problems, while Gilson & Warner (1998) and Arikawa (2008) document that public debt provides more financial flexibility and helps to increase growth rates, and consequently firm performance. Moreover, Weinstein & Yafeh (1998) find that bank debt may mitigate firms' growth rates by patronizing more conservative investment policies. Cantillo & Wright (2000) suggest that the main advantage of private debt is the possibility of less damaging interventions by banks in case of financial distress. Public debt, in turn, is more advantageous for firms that are less likely to default, have high and stable cash flows and profitability, and low level of real interest rates.

The existing literature also suggests that there are several primary determinants of the firm's choices between different sources of debt financing. Krishnaswami et al. (1999), Denis & Mihov (2003), Faulkender & Petersen (2006), Hale & San-

tos (2008), and Altunbaş et al. (2010) document that the main determinants of the choice between public and private debt are firm-specific characteristics such as size, profitability, leverage, age, and credit quality. Their findings indicate that firms with higher credit quality and greater levels of financial leverage are relying more on public debt, while larger, more profitable firms with higher liquidation values tend to rely on syndicated bank loans. Hadlock & James (2002), in turn, argue that the level of asymmetric information is the decisive factor in firm's decision to choose between bank and public debt. Zhang & Hou (2013) show that the firm's financing choice may also be affected by productivity levels, the riskiness of investment projects, and the relative costs of public and bank debt. Finally, Hoshi et al. (1993) postulate that firms with good performance, valuable investment opportunities or valuable assets are more likely to rely on public debt. Using data from post-deregulated Japan, they document that reliance on bank debt financing is decreasing stock market valuations of keiretsu firms and increasing valuations of non-keiretsu firms.

In prior literature, the association between firm performance and the sources of debt financing has mostly been examined with event studies. In general, these studies provide considerable evidence of a positive short-term stock price reactions to bank debt arrangements (see e.g. Lummer & McConnell, 1989; Mosebach, 1999; Aintablian & Roberts, 2000; Kang & Liu, 2008). However, the evidence on the corresponding effects of bond issuances on stock prices is more mixed. While one strand of literature suggests that the effect of bond issues announcements on stock prices is negative (see e.g. Spiess & Affleck-Graves, 1999; Godlewski et al., 2011), other studies have documented that bond issuances are associated with insignificant or even positive changes in stock market valuation (Miller & Puthenpurackal, 2005).

In this paper, we aim to extend the existing literature by examining whether the decision to issue public debt affects firm valuation. In contrast to the prior literature, we utilize cross-sectional panel regressions to empirically analyze the association between firm performance and the decision to issue bonds. Furthermore, this paper contributes to the literature by focusing on emerging debt markets. Besides other differences, there are distinct differences in corporate governance norms and practices between emerging and developed markets. For instance, strong corporate governance practices make it easier for even relatively small U.S. firms to reach the bond market. As a result of legally regulated corporate governance norms and requirements, the variation in the U.S. firms' behavior on the debt market is relatively narrow. In contrast, being more bank-oriented with weak corporate legal systems, emerging markets traditionally have been significantly different in governance quality across firms (see e.g. Black, 2001; Black et al., 2006), and have exerted stronger effects from bank-based and market-based governance mechanisms. Given these differences, the decision to issue bonds is more likely to have more notable implications on firm performance in less developed markets. Russia, in turn,

exhibits large differences in corporate governance quality between firms as well as high firm-level variation over time due to the recent rapid expansion of the debt market, and therefore, the Russian market creates a unique environment to examine the implications of different debt source choices on firm valuation in emerging markets.

Historically, Russian firms were able to obtain debt financing only as bank loans due to the small size and high volatility of the public market of debt. Merely a decade ago in 1999, there were almost no issues of corporate bonds in Russia and there were more than 2,300 registered commercial banks. Nevertheless, even with such a high number of banks in the economy, the easiness of bank loan availability was questionable due to high interest rates and the adverse effect of risk aversion of banks after the Russian debt crisis in 1998. Thus, in 1999, loans issued to corporations corresponded to only a small fraction of total assets of the Russian banking system. However, the monopoly of commercial banks on the market for debt financing has been continuously declining with development of the capital markets. The number of corporate bond issues excluding financial and public sectors was 1,321 during the last decade, while the number of registered commercial banks went down to 1,100 by 2009, with about 50% of total assets invested in corporate loans. During the last ten years, the Russian market experienced substantial growth and is now one of the largest emerging markets. Along with these developments, market-based corporate governance mechanisms have become more important over recent years. Our data set captures a unique period of expansion of the debt market, and thereby serves as an interesting setting to examine the potential implications of bond issuances on firm performance.

Using a sample of 353 large, publicly traded Russian firms over the period 2003-2012, we find that the debt source choices may affect firm performance in emerging markets. In particular, our results indicate that public debt financing may have a negative impact on the firm's stock market valuation. We also document that firms which have issued public debt are significantly larger and have a higher degree of financial leverage. After controlling for the differences in firm-specific characteristics and addressing potential endogeneity issues, we find considerable evidence to suggest that the firms which rely on public debt financing may underperform relative to firms with other sources of debt. These results are broadly consistent with the prior event studies on the negative stock market reactions to bond issue announcements (see e.g. Spiess & Affleck-Graves, 1999; Godlewski et al., 2011).

The remainder of this paper is organized as follows. Section 2 describes the Russian institutional setting and discusses the implications for debt financing. Section 3 presents the data, while Section 4 introduces the empirical setup. In Section 5, we report our empirical findings on the association between firm performance and the decision to issue public debt. Finally, Section 6 concludes the paper.

2 Institutional setting

The formation of the Russian financial system was initiated by the process of privatization and legal liberalization in the beginning of 1990's after the collapse of the Soviet Union. The period of transition from the closed centralized system to market economy ended with the Russian government's default on domestic debt and significant ruble devaluation in 1998. The crisis period was followed by important institutional reforms that resulted in fast development of the capital markets and the banking sector.

Despite the large number of commercial banks, the Russian banking sector is highly concentrated. In 2010, the top 200 banks were holding almost 93% of total assets, while the top 5 banks accounted for more than 50%. These top 5 biggest banks are either fully or partially government owned.[1] Herfindahl-Hirschman index on household deposits concentration by the end of 2009 was 0.251, which remains quite high for emerging economy like Russia.[2] The credit function of banks is constantly increasing in Russia. Thus, the amount of total loans to corporate sector increased by almost 50% during the global financial crisis. It is noteworthy that corporate loans are becoming longer in maturity since during the same period of time, the amount of loans with maturity of more than 3 years has doubled. By the end of 2010 long-term loans (above 3 years) accounted for 38% of total loans to businesses. However, bank credit in Russia is used more to finance working capital or trading operations rather than real investments into fixed assets. Hence, bank loans financed only about 10% of real investments in 2009.[3]

Russian bond markets have grown rapidly over the last 10 years, with the amount of corporate bonds outstanding growing from 0 in 1999 to more than USD 100 billion in 2010. Equity capital is the other way for obtaining external financing but because of high volatility and exposure of stock prices to the influence of external macroeconomic and political factors, Russian firms have traditionally preferred to issue debt rather than equity. The amount of equity financing attracted by Russian corporations through IPOs peaked in 2007 at USD 45 billion.

In general, corporate financing decisions in Russia are affected by several features that are unique to the Russian institutional setting. In comparison to most developed economies, the financial system in Russia is characterized by more constrained availability of external equity and debt capital, highly concentrated banking sector with strong state influence, concentrated ownership structures, a lack of transparency regarding ownership and control arrangements, gaps in legislation, polit-

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[1] Anzoategui, Peria & Melecky (2012) and Berglof & Lehmann (2009) provide a more detailed discussion on bank concentration and competition in Russia as well as the development of the Russian financial sector.

[2] These statistics were obtained from the Central Bank of Russia (www.cbr.ru).

[3] The statistics on real investments are obtained from the Federal State Statistics Service (www.gks.ru).

ical risks, and weak corporate governance practices (see e.g. McCarthy & Puffer, 2003; Guriev et al., 2004; Judge & Naoumova, 2004; Chernykh, 2008; Liljeblom & Maury, 2010). Despite the rapid expansion of capital markets and the implementation of several laws and rules related to corporate governance during the last decade, Russia is still ranked below most other emerging markets in terms of corporate governance practices.[4]

Given the peculiarities of the banking sector and the weaknesses in corporate governance both at firm and country levels, it has been relatively difficult for Russian firms to obtain debt financing. Public debt markets were small and underdeveloped merely a decade ago, and bank loans were effectively the only form of debt financing available. In this environment, firms in need of external financing have been reliant on the banking sector and banks have thereby obtained a central role as an oversight and control mechanism of firms. In the process of supplying short-term credit and longer-term debt financing for firms, banks receive private information and are able to monitor the client firm's business strategies and management (Lummer & McConnell, 1989).

In addition to governance through banks, market-based corporate governance mechanisms have improved significantly in Russia during the last ten years with the rapid expansion of capital markets, implementation of several new laws and corporate governance codes, and an increase in the amount of foreign investors. These developments have facilitated the access of Russian firms to debt financing through bond issuances. Nevertheless, given the problems with weak corporate governance within country level and the general lack of transparency regarding ownership and control arrangements, it is difficult for Russian firms to obtain debt financing from capital markets without demonstrating a sufficient degree of corporate transparency. Hence, Russian firms that have issued bonds are likely to be associated with good governance mechanisms and above average corporate transparency.

Table 1 presents summary statistics of the main features of Russian corporate bond market. As can be seen from the table, Russian bond market was growing rapidly during the last decade in terms of both number of issuers and size of issues. With only 20 corporate issuers in 2000, the nominal value of corporate issues outstanding was slightly over 1 bill. USD, resulting in an average issue size equal to about 53 mill. USD per each issuer. By the end of 2010, the total amount of corporate issuers was 342 with 194 bill. USD in the nominal value of bonds outstanding. The average issue size rose by more than 10 times since 2000 and was over 568 mill. USD per issuer. The vast majority of Russian banks are not able to provide such large loans due to requirements of the Central Bank that limit the loan size for one borrower (and affiliated structures) to 25% of total equity. Thus, it is possible to expect that

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[4]Detailed discussions of corporate governance in Russia are provided in Buck (2003), McCarthy & Puffer (2003), Guriev, Lazareva, Rachinsky & Tsukhlo (2004), Judge & Naoumova (2004), Liljeblom & Maury (2010). A strong positive association between corporate governance and firm performance in Russia is documented e.g. in Black (2001), Judge et al. (2003), Black et al. (2006).

issue size may be an important determinant of the firm's decision to access public debt market.

Table 1. Characteristics of the Russian corporate bond market.

The table reports summary statistics of the main features of the Russian bond market. The data are obtained from ATON Investment Group.

	2000	2006	2010
Total number of corp. issuers	20	389	342
Nominal value of corp. issues outstanding, $ mill.	1,067	88,798	194,382
Duration of new corp. bonds placements, %*			
$\prec 1.5 years$	19.1	2.30	7.00
$1.5 - 3 years$	52.4	58.7	46.2
$\succ 3 years$	28.5	39.0	46.8
Percentage of nominal value of new corp. bonds			
placements denominated in foreign currencies	0.00	38.1	38.9
Outstanding issues ratings, %			
non rated	29.4	55.3	30.1
low grade ($\prec BB-$)	70.6	15.9	18.7
mid grade ($BB-; BB+$)	0.00	12.5	24.1
high grade ($\succ BB+$)	0.00	16.4	27.0

* excl. sovereigns, municipals, utilities, and financial

The duration of corporate bonds has also been growing throughout 2000-2010. About 47% of corporate bonds were longer than 3 years in duration in 2010. Furthermore, issuing debt in foreign currencies was increasingly popular in Russia during the formation period of the market. In 2006, about 38% of the nominal value of new corporate bonds was denominated in other currency (mainly in USD) than the Russian rubles. This number did not change significantly over time and was about 39% by 2010. Finally, it can be noted from Table 1 that the majority of corporate bonds issues (55.3%) were not rated even by the local rating agencies in 2006. The absence of credit ratings does not necessarily imply riskier securities but rather indicates that Russian firms are using other means for signaling their creditworthiness to the market.

3 Data

We use data on publicly traded Russian firms for the period 2003-2012. The financial data are obtained from Thomson Reuters Datastream. We exclude banks, insurance companies and other financial institutions due to dissimilarities in capital structure and potential regulations that may affect firm performance in these indus-

tries. We also exclude firms with insufficient financial information and firms that have financial information available for less than 2 years.

In contrast to previous studies on debt source choices that quite often used public debt ratings as a proxy for reliance on public debt (see e.g. Chava & Purnanandam, 2011), we choose a different approach that provides a more accurate distinction between firms with public debt and those with other sources of debt financing. We construct a dummy variable that takes a value of one if a firm has outstanding bonds in a given fiscal year and zero otherwise. To obtain the information on firm's debt source reliance, we manually gather the data on corporate bond issuances from the Moscow Exchange MICEX-RTS, the main Russian stock exchange. Finally, following previous literature (see e.g. Hoshi et al., 1993; Lin et al., 2013), in order to avoid any potential bias, we exclude firms that were unleveraged for at least three consequent years. Hence, with the public debt dummy, we are able to assess valuation differences between firms that have decided to issue bonds and firms that are relying on bank debt or other sources of private debt financing.[5]

Our final sample consists of 353 individual firms for the fiscal years 2003 - 2012. The amount of observations varies between variables and decreases to 1,757 firm-year observations when we use market information on firm valuations due to the fact that not all firms were traded on the stock exchanges during the sample period even though they were listed on either of the two main exchanges.[6]

Panel A of Table 2 reports summary statistics for the variables used in our empirical analysis. Following prior literature, our market-based measure of firm performance is Tobin's Q (see e.g. Lang & Stulz, 1994; Anderson et al., 2012), which is measured as the ratio of the firm's market value to the replacement value of its assets. Firm's market value is defined as the market value of equity (market capitalization) plus the book value of preferred stock and the book value of debt. In contrast to accounting-based measures of firm performance or plain stock returns, Tobin's Q allows to avoid problems with comparing performance across firms since no risk adjustment is required (Lang & Stulz, 1994). Furthermore, given that Tobin's Q is forward looking, we are able to capture long-run effects of debt source choices on firm valuations as anticipated by the market participants. As can be noted from Table 2, our sample of Russian firms is very diverse in terms of market-based performance, with the Tobin's Q varying between 0.32 and 8.63.

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[5]We acknowledge that some firms may use several sources of debt simultaneously as noted by Rauh & Sufi (2010). Unfortunately, we are not able to control for the exact fractions of each type of debt in capital structures of our sample firms due to data unavailability. Nevertheless, given that each source of debt has different properties, we assume that the decision to issue bonds may affect firm performance irrespective of its debt structure.

[6]This is due to the Russian market peculiarities and is mostly related to the period of the early 2000's when the capital market was in stage of formation and rapid development. As a result, we were unable to obtain the data on market capitalization for some firms in the yearly 2000's.

Table 2. Summary statistics.

The sample consists of 353 individual firms for the fiscal years 2003-2012. Panel A presents variables descriptive statistics, while Panel B reports the number of firms as well as firm-year observations with public debt issuances for each industry. The amount of observations varies across variables due to data availability. Tobin's Q is the ratio of the firm's market value to its replacement costs of assets. Market value is calculated as the market value of equity (market capitalization) plus the book value of preferred stock and the book value of debt. Public debt is a dummy variable that equals one for firms that have outstanding bonds in a given year. Sales growth is the annual growth rate of sales. Foreign capital access is a dummy variable that equals one for firms that have securities traded on other than domestic market. Current ratio is calculated as current assets divided by current liabilities. Debt to assets ratio is measured as total debt divided by total assets. Interest coverage defined as earnings before interest and taxes divided by interest expenses. Average interest rate is calculated as interest expenses on debt divided by total debt. Free cash flow is scaled by total assets.

Panel A: Variables descriptive statistics

Variable	No. of observations	Mean	Median	Std. deviation	Min	Max
Tobin's Q	1,757	1.28	1.07	0.82	0.32	8.63
Log (Tobin's Q)	1,757	0.11	0.07	0.50	-1.13	2.16
Public debt	3,530	0.21	0.00	0.41	0.00	1.00
Log (Assets)	2,536	15.97	15.75	2.02	4.61	23.21
Log (MarkCap)	1,995	15.55	15.27	2.22	9.54	22.82
Sales growth	2,172	2.39	1.16	22.99	0.00	871.0
Log (Age)	3,320	2.97	2.83	1.15	0.00	5.68
Foreign capital access	3,530	0.13	0.00	0.34	0.00	1.00
Liquidity (current ratio)	2,475	1.99	1.37	2.06	0.25	22.98
Leverage (debt-to-assets)	2,114	27.07	24.75	18.91	0.01	84.57
Interest coverage	2,192	62.59	4.20	295.6	-46.9	3,764.9
Average interest rate	2,052	10.27	7.97	15.71	0.03	255.7
Profitability (EBIT/Assets)	2,382	9.58	7.85	10.68	-27.21	51.43
Free cash flow	2,026	4.42	4.66	11.08	-34.54	39.70

Panel B: Industry breakdown

#	Industry description	Firms in industry	Firm-years with public debt issuances
1	Automobiles & Parts	15	29
2	Basic Resources	57	136
3	Chemicals	21	57
4	Construct. & Material	26	31
5	Food & Beverage	11	55
6	Healthcare	6	6
7	Ind. Goods & Services	69	106
8	Oil & Gas	35	68
9	Retail	10	35
10	Technology	6	13
11	Telecommunications	9	56
12	Travel & Leisure	7	26
13	Utilities	81	127
	Total	353	745

The variable of interest in our empirical analysis is the public debt dummy. Table 2 shows that about 21 percent of the firms in our sample have issued bonds. Regarding the control variables, it can be noted that the average sample firm is rather liquid and moderately leveraged. The average debt-to-assets ratio in our sample is about 27%. The sample is very heterogeneous in term of firm size and profitability. The logarithm of total assets varies from 4.61 to 23.21, with the mean of about 16. The average profitability in our sample, measured as EBIT to total assets, is about 9.6%, with a median of 7.8%.

Panel B of Table 2 describes the number of firms and firm-year observations with public debt issuances by industry. The sample represents 13 industries, classified by the Thomson Reuters Datastream. As can be noted from the table, sample firms are quite spread out among the industries. Similar structure can be observed in the firm-year observations with public debt issuances. For example, 81 utility companies (23% of total firms) account for 127 observations with bond issuances that constitute only 18% of total firm-years with public debt issuances.

4   Methodology

We start our analysis with a simple univariate tests of differences in means and medians between two subsamples: *(i)* firms with public debt and *(ii)* firms without public debt. Our measure of firm performance is Tobin's Q - the ratio of the firm's market value to its replacement costs of assets. After the univariate tests, we estimate the following probit model to identify the potential determinants of bond issuances in Russia:

$$Prob.(PDEBT_{i,t} = 1) = \Phi(\alpha_0 + \beta_n X_{i,t-1} + \sum_{x=1}^{n-1} \delta_x IND_i^x + \sum_{y=2004}^{2012} \omega_y YEAR_i^y)$$

(1)

where $PDEBT_{i,t}$ is a binary variable for the presence of public debt in the firm's capital structure. $\Phi(\cdot)$ denotes the cumulative standard normal distribution function and $X_{i,t-1}$ is a matrix of lagged firm-specific control variables, including size, leverage, liquidity, interest coverage, profitability, access to foreign capital markets, growth, and free cash flow. IND is a matrix for industry dummy variables and $YEAR$ is a dummy variable that indicates fiscal years.

We examine the relationship between debt source choices and firm valuation with fixed effects panel regressions. Previous studies show that firm performance is affected by several firm-specific characteristics. Thus, we include firm size, financial leverage, profitability, liquidity, and default risk as control variables in our multivariate analysis. Firm size is measured as the logarithm of book value of total assets

and the degree of financial leverage is captured by the debt-to-assets ratio, calculated as the book value of total debt divided by total assets. Profitability is measured by earnings before interest and taxes (EBIT) to total assets ratio, while liquidity is measured by the current ratio which is calculated as current assets divided by current liabilities. Default risk is proxied by the interest coverage ratio, calculated as earnings before interest and taxes divided by interest expenses. We also control for firm growth and accessibility to foreign capital markets in our regressions but due to the lack of historical data, these tests are conducted on a smaller sample. Our proxy for growth is the annual growth rate of sales, while access to foreign capital is proxied by a dummy variable that takes the value of one if the firm has securities traded on other than domestic market in form of depositary receipts.

Although we include a large set of firm-specific control variables in the panel regressions, there could still be unobserved heterogeneity due to some omitted firm characteristics. Omitted variables that could affect firm performance and debt choice simultaneously may cause false correlation direction and lead to biased OLS estimates. We acknowledge that some firms may, for instance, have a better access to the public markets or to the private lending due to their ownership structure (Lin et al., 2013) or more effective corporate governance practices. Unfortunately, we do not possess data on the ownership structure or governance mechanisms of our sample firms. Therefore, we add firm-fixed effects in our estimations to reduce potential endogeneity problems related to omitted unobservable variables.[7] We also include year fixed effects to control for the possible changes in firm performance across years. Hence, we examine the association between firm valuation and public debt issuances with the following two-way fixed effects regression specification:

$$
\begin{aligned}
Q_{i,t} = \alpha_0 &+ \beta_1 PDEBT_{i,t-1} + \beta_2 SIZE_{i,t-1} + \beta_3 LEV_{i,t-1} \\
&+ \beta_4 LIQ_{i,t-1} + \beta_5 INTCOV_{i,t-1} + \beta_6 PROF_{i,t-1} + \beta_7 DR_{i,t-1} \\
&+ \beta_8 GROWTH_{i,t-1} + \sum_{k=1}^{n-1} \alpha_k FIRM_i^k + \sum_{y=2004}^{2012} \omega_y YEAR_i^y + \varepsilon_{i,t} \quad (2)
\end{aligned}
$$

where $Q_{i,t}$ denotes the Tobin's Q of firm i at time t, $PDEBT_{i,t-1}$ is a dummy variable for the presence of public debt in the firm's capital structure, $SIZE_{i,t-1}$ is the logarithm of total assets, $LEV_{i,t-1}$ denotes financial leverage and is measured by debt-to-assets ratio, $LIQ_{i,t-1}$ is the current ratio, $INTCOV_{i,t}$ is the interest coverage ratio, $PROF_{i,t-1}$ denotes profitability, measured by EBIT to total assets ratio, $DR_{i,t-1}$ is a dummy variable for firm's access to foreign capital markets, $GROWTH_{i,t-1}$ is the annual growth rate of sales, $FIRM$ denotes a dummy variable for firm i, and $YEAR$ is a dummy variable that indicates fiscal years. It should be noted that a firm's decision to issue bonds, given that it is a relatively long process, is revealed to the market well in advance before the actual issuance.

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[7]Nevertheless, in some specifications, we use industry dummies instead of firm fixed effects.

Therefore, we use lagged $PDEBT$ dummy variable in our estimations. We also lag all other explanatory variables by one year.

Another potential endogeneity concern is related to the reverse causality problem. Although there is no evidence that firm performance affects the choice to issue public debt, the dummy variable that indicates the presence of public debt in the performance regressions may be endogenous. We address this problem by applying instrumental variables (IV) technique. We assume that firm age is a valid instrument for the presence of public debt in the Russian market.[8] This instrument is strongly positively correlated with the presence of public debt, while its correlation with firm performance is negligibly small. Therefore, we utilize a two-stage instrumental variable regression, where we first regress the debt source dummy ($PDEBT$) on the exogenous firm-specific variables and our instrumental variable ($FIRM\ AGE$), and then utilize the instrumented values for ($PDEBT$) in the second stage regressions.

5   Empirical results

5.1   Univariate tests

Table 3 reports the results of our univariate tests. We compare the means and medians of the market-based performance measure as well as other firm characteristics between two subsamples of leveraged Russian firms: *(i)* firms with public debt and *(ii)* firms without public debt. We test the differences in means with a simple two-tailed *t*-test, while the differences in medians are tested with the Wilcoxon/Mann-Whitney test. As can be noted from the table, firms with public debt are significantly larger than firms without issued bonds based both on total assets and market capitalization. The observed differences in means and medians are statistically significant at the 1% level. The table also shows that firms with public debt have a higher degree of leverage, as the difference in debt-to-assets ratios is statistically highly significant. Furthermore, based on the current ratio and the interest coverage ratio, firms without public debt are more liquid and are less likely to default on their debt obligations. However, average interest rate that a firm pays on its debt is significantly lower for firms with public debt. The difference in means of the interest expenses to total debt ratio is more than 2.6%, implying that firms are able to attract cheaper funding from the public debt market. Finally, it can be noted from the table that firms with public debt are more active in attracting capital from abroad and have higher cash flows scaled to total assets.

Regarding the variable of interest, the univariate tests reported in Table 3 do not pro-

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[8]We discuss the economic motivation of this proposition in more detail in the next section.

vide strong evidence of any performance differences between the two subsamples. The market valuations of firms with and without public debt are almost identical. The mean (median) Tobin's Q for the firm-years with public debt is 1.28 (1.04), and 1.28 (1.09) for the firm-year observations without public debt. *t*-test and the Wilcoxon test suggest that the differences in market valuation between the two subsamples are statistically insignificant. Given that univariate tests indicate that the choice between public and other sources of debt financing may be affected by firm-specific characteristics, it is important to control for these characteristics in a multivariate setting.

Table 3. Univariate tests.

The table reports comparisons of means and medians of firm characteristics between two subsamples. Firm-years with public debt correspond to years when a firm had outstanding bonds, while firm-years without public debt correspond to years when a firm relied on other source of debt and did not have outstanding public debt. The sample consists of 353 individual firms for the fiscal years 2003-2012. Tobin's Q is the ratio of the firm's market value to its replacement costs of assets. Market value is calculated as the market value of equity (market capitalization) plus the book value of preferred stock and the book value of debt. Sales growth is the annual growth rate of sales. Foreign capital access is a dummy variable that equals one for firms that have securities traded on other than domestic market. Current ratio is calculated as current assets divided by current liabilities. Debt to assets ratio is measured as total debt divided by total assets. Interest coverage is a ratio calculated as earnings before interest and taxes divided by interest expenses. Average interest rate is calculated as interest expenses on debt divided by total debt. Free cash flow is scaled by total assets. The difference in means is tested with a two-tailed t-test. The difference in medians is tested with the Wilcoxon test. *, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Variable	Firm-years with public debt		Firm-years without public debt		Difference in means	Difference in medians
Number of firms	120		233			
	Mean	Median	Mean	Median		
Tobin's Q	1.28	1.04	1.28	1.09	0.00	-0.05
Log (Assets)	17.80	17.62	15.37	15.26	2.42***	2.36***
Log (Market capitalization)	17.16	17.03	14.92	14.67	2.23***	2.36***
Sales growth	1.23	1.19	1.21	1.14	0.02	0.05***
Foreign capital access	0.37	0.00	0.07	0.00	0.31***	0.00***
Liquidity (current ratio)	1.63	1.30	2.10	1.40	-0.47***	-0.10***
Leverage (debt-to-assets)	31.52	29.68	25.27	22.47	6.25***	7.21***
Interest coverage	19.91	3.85	79.09	4.51	-59.2***	-0.66**
Average interest rate	8.40	7.82	11.04	8.08	-2.64***	-0.26*
Profitability (EBIT/Assets)	9.90	8.59	9.46	7.55	0.44	1.04**
Free cash flow	0.05	0.06	0.04	0.04	0.01**	0.02***

5.2 Determinants of bond issuances

While it is obvious that the public debt market is mainly open for large and credit-worthy firms, the exact determinants of bond issues in Russia remain rather uncer-

tain. Hence, we continue our empirical analysis by using panel probit regressions to examine the determinants of bonds issuances. To address potential economic ef-

Table 4. Determinants of bonds issuances.

The table reports the estimates of a probit model given by Equation (1). The dependent variable is $PDEBT$, a binary variable that takes the value of one if a firm has issued bonds. Size is measured by the logarithm of total assets. Debt-to-assets ratio is calculated as total debt divided by total assets. Current ratio is a proxy for liquidity and estimated as current assets divided by current liabilities. Interest coverage is calculated as earnings before interest and taxes divided by interest expenses. Profitability is measured by the EBIT divided by the book value of total assets. Foreign capital access is a dummy variable that equals one for firms that have securities traded on other than domestic market. Sales growth is the annual growth rate of sales. Free cash flow is scaled by total assets. All the independent variables are lagged by one year. Column 1 report results for the full sample period (2003-2012), while Column 2 reports estimates for the period of global financial crisis (2008-2010). Standard errors are based on robust covariances. Absolute z-statistics are reported in brackets. All models include year and industry dummy variables. The reported pseudo R-squared is the McFadden's R-squared. ***, ** and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Full sample (2003-2012)	Crisis period (2008-2010)
Size	0.64***	0.64***
	[16.7]	[11.8]
Leverage	0.02***	0.02***
	[5.28]	[3.75]
Liquidity	-0.02	-0.01
	[0.27]	[0.05]
Interest coverage	-0.001**	0.00
	[2.04]	[0.08]
Profitability	0.78	0.04
	[1.52]	[0.05]
Foreign capital access	0.15	0.05
	[1.22]	[0.27]
Sales growth	-0.23**	-0.26
	[2.13]	[1.36]
Free cash flow	-1.07**	-1.29*
	[2.13]	[1.78]
Constant	-10.9***	-11.2***
	[15.6]	[11.9]
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
Obs. with PDEBT=0	1,010	493
Obs. with PDEBT=1	486	221
Pseudo R-squared	0.41	0.40
Log likelihood	-557.7	-266.4

fects on firm's decision to issue bonds, we also run the probit model separately for the full sample period (2003-2012) and for the period of global financial crisis (2008-2010).

Table 4 reports the estimates of the probit models. As can be noted from the table, firm size and leverage have positive and highly significant coefficients, implying that larger and more leveraged firms are more likely to issue public debt. The firm's interest coverage ratio and growth, on the other hand, are negatively related to the probability of entrance to the public debt markets in the full sample estimations. Somewhat surprisingly, this suggests that firms with lower growth rates and inability to repay the interest on existing debt from operating earnings are more likely to issue public debt. The statistical significance of these coefficients is, however, vanished during the financial crisis. Finally, it can be noted from the table that the determinants of public debt issuances seem to follow the pecking order hypothesis since firms with higher cash flows are less likely to step in the public debt market.

5.3   Public debt and firm valuation

The main purpose of this paper is to examine whether the decision to issue bonds affects the firm's stock market valuation. We examine the association between firm valuation and bonds issuances by estimating alternative versions of Equation 2. The estimation results of these regressions are reported in Table 5. The two-way fixed effects regressions include proxies for firm size, leverage, liquidity, interest coverage, and profitability. We also include proxies for firm's access to foreign capital and growth. In Models 1 and 2, we use industry dummies instead of firm fixed effects. As can be noted from the table, these models have a good explanatory power for firm performance with adjusted R-squares being around 30%. The estimated coefficient for $SIZE$, as proxied by the logarithm of total assets, is positive and statistically significant at the 1% level in Model 1, while being insignificant in Model 2. The coefficient estimates for LEV and $PROF$ are positive and statistically highly significant in both models, indicating that higher profitability and financial leverage may increase market valuation of the firm in the emerging Russian market. Moreover, it can be noted that Tobin's Q is negatively associated with LIQ, as the coefficient estimates are negative and significant in both models. Model 2 also shows that the firm's growth and access to foreign capital markets may have a positive effect on its market value, as the coefficients for $GROWTH$ and DR are positive and statistically highly significant.

Our test variable of interest is $PDEBT$, a dummy variable that equals one for firms with outstanding bonds. The estimated coefficients for $PDEBT$ are negative and statistically significant in both regression specifications. Hence, these estimates provide strong evidence to suggest that the presence of public debt is negatively as-

Table 5. Public debt and firm valuation.

The table reports the estimates of Equation (2) based on an unbalanced panel data on 353 publicly traded Russian firms for the period 2003-2012. The dependent variable in all columns is the logarithm of Tobin's Q which is calculated as the ratio of the firm's market value to its replacement costs of assets. Market value is calculated as the market value of equity (market capitalization) plus the book value of preferred stock and the book value of debt. The test variable of interest is Public debt, a binary variable that takes the value of one if a firm has issued bonds. Size is measured by the logarithm of total assets. Leverage is measured by the debt to assets ratio and calculated as total debt divided by total assets. Liquidity is proxied by the current ratio which is calculated as current assets divided by current liabilities. Interest coverage is a ratio calculated as earnings before interest and taxes divided by interest expenses. Profitability is measured by the EBIT divided by the book value of total assets. Foreign capital access is a dummy variable that equals one for firms that have securities traded on other than domestic market. Sales growth is the annual growth rate of sales. All the independent variables are lagged by one year. Models 1-2 include industry dummies, while firm fixed effects are included in Models 3-4. All specifications include year dummies. Absolute values of t-statistics are reported in brackets. In Models 3-4, standard errors are corrected for heteroskedasticity and within-firm error clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Explanatory Variables	Dependent Variable: Ln (Tobin's Q)			
	Model 1	Model 2	Model 3	Model 4
Public debt	-0.08***	-0.08***	-0.04	-0.09**
	[2.73]	[2.69]	[1.00]	[2.23]
Size	0.02***	0.01	-0.10***	-0.09
	[2.65]	[0.60]	[2.73]	[1.04]
Leverage	0.003***	0.003***	0.002*	0.00
	[4.86]	[3.73]	[1.64]	[0.35]
Liquidity	-0.12***	-0.14***	-0.05*	-0.05
	[6.26]	[6.72]	[1.85]	[1.55]
Interest coverage	0.00	0.00	0.00	0.00
	[0.48]	[0.59]	[0.76]	[0.54]
Profitability	1.19***	1.15***	0.38***	0.19
	[9.62]	[8.76]	[2.63]	[1.28]
Foreign capital access		0.09***		0.05
		[2.83]		[0.78]
Sales growth		0.07***		0.04*
		[2.72]		[1.64]
Constant	-0.41***	-0.25	1.78***	1.48
	[3.08]	[1.58]	[2.68]	[1.05]
No. of observations	1,312	1,131	1,312	1,131
Adj. R-squared	0.28	0.30	0.62	0.64
Industry dummies	Yes	Yes	No	No
Firm fixed effects	No	No	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

sociated with the firm's market valuation. The magnitudes of the estimated coefficients indicate that Tobin's Q is approximately 0.08 units lower for firms that rely on public debt, corresponding to about 8% decrease in market valuation for the median firm in our sample.

To address potential biases related to omitted unobservable variables, we next estimate our models with firm fixed effects instead of industry effects (Models 3-4). As can be seen from Table 5, the inclusion of firm fixed effects considerably increases the explanatory power of the regressions. The adjusted R-squares of Models 3-4 are around 60%, which implies that omitted variables are important for explaining the cross-sectional variations in firm performance. Consistent with Models 1-2, the coefficients for the control variables in Model 3 indicate that more profitable firms with higher leverage and lower liquidity have higher stock market valuations. In contrast to Model 1, the coefficient estimate for $SIZE$ in Model 3 is now negative and statistically significant at the 1% level. Regarding the variable of interest, it can be noted from Table 5 that the estimated coefficients for $PDEBT$ are negative, indicating that firms with public debt have lower Tobin's Qs. Albeit being statistically insignificant in Model 3, the coefficient for $PDEBT$ appears highly significant in Model 4 after the inclusion of additional controls for growth and firm's access to foreign markets.[9] These estimates suggest that observed negative relationship between public debt source and firm market performance is robust and should not be driven by omitted unobservable firm-specific variables.

Another concern in firm performance regressions is reverse causality. The reverse causality problem arises because performance may affect the choice of debt source. To address this issue, we next apply two-stage instrumental variable regressions. For this purpose, we need an instrument that is correlated with the presence of public debt in the firm's capital structure and essentially uncorrelated with firm performance. As discussed above, we propose that firm age is a valid instrument for our test variable $PDEBT$ in the Russian environment. Given that it may be easier for older firms to obtain debt financing by issuing bonds due to better public recognition among market participants, we postulate that firm age should be positively correlated with the presence of public debt in the firm's capital structure. The obvious counterargument is that younger firms, which are on the early stages of their life cycle, may often perform worse at least in terms of operating revenues and profitability. This, in turn, would lead to direct positive correlation between firm age and firm performance, thereby violating the essential prerequisite for the instrument. However, due to the Russian listing requirements, all firms included in our sample, regardless of their age, must have demonstrated stable financial perfor-

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[9]We also test for potential multicollinearity in our regression specifications. Model 4 in Table 5 is estimated in seven different variations that exclude one of the other control variables (unreported for the sake of brevity). The coefficient for PDEBT is insensitive to deletion of any particular control variables and remains negative and statistically significant in every specification at the 5% level.

Table 6. Instrumental variable regressions.

The table reports the results of the instrumental variables regressions with Log(Firm Age) as an instrument for the presence of Public debt. The estimates are based on an unbalanced panel data on 353 publicly traded Russian firms for the period 2003-2012. Models 1-2 are the first stage estimates with Public debt as the dependent variable. Models 3-4 are the second stage estimates with Log(Tobin's Q) as the dependent variable. Public debt is a binary variable that takes the value of one if a firm has issued bonds. Tobin's Q is calculated as the ratio of the firm's market value to its replacement costs of assets. Market value is calculated as the market value of equity (market capitalization) plus the book value of preferred stock and the book value of debt. Size is measured by the logarithm of total assets. Leverage is measured by the debt to assets ratio and calculated as total debt divided by total assets. Liquidity is proxied by the current ratio which is calculated as current assets divided by current liabilities. Interest coverage is a ratio calculated as earnings before interest and taxes divided by interest expenses. Profitability is measured by the EBIT divided by the book value of total assets. Foreign capital access is a dummy variable that equals one for firms that have securities traded on other than domestic market. Sales growth is the annual growth rate of sales. All the independent variables are lagged by one year. All specifications include year dummies and firm fixed effects. Standard errors are corrected for heteroskedasticity and within-firm error clustering in all columns. Absolute t-values are reported in brackets. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Explanatory Variables	Dependent Variable			
	Public debt		Ln (Tobin's Q)	
	Model 1	Model 2	Model 3	Model 4
Fitted Public debt			-0.56**	-0.52*
			[2.28]	[1.66]
Size	0.04***	0.05***	-0.07	-0.06
	[2.94]	[2.78]	[1.40]	[0.62]
Leverage	0.003***	0.002***	0.003**	0.00
	[4.77]	[5.14]	[2.07]	[0.74]
Liquidity	0.00	0.00	-0.02	-0.03
	[0.42]	[0.22]	[0.76]	[0.73]
Interest coverage	-0.00***	-0.00***	0.00	0.00
	[3.70]	[4.20]	[0.38]	[0.22]
Profitability	0.06	0.06*	0.43***	0.18
	[1.31]	[1.78]	[2.74]	[1.21]
Firm age	0.04***	0.06**		
	[2.96]	[2.48]		
Foreign capital access		0.11***		0.09***
		[3.96]		[2.79]
Sales growth		0.00		0.05*
		[0.12]		[1.94]
Constant	-0.49**	-0.72***	1.26*	1.18
	[2.32]	[3.23]	[1.63]	[0.72]
No. of observations	1,891	1,614	1,307	1,131
Adj. R-squared	0.78	0.80		
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

mance before admittance to public listing.

Nevertheless, as argued by previous literature, young firms may have greater growth opportunities (Claessens et al., 2002) that potentially affect firm value. As this argument goes strictly against our assumption of non-existent relationship between performance and firm age, we test the correlation coefficient between firm age and Tobins Q of our sample firms (unreported). The magnitude of this coefficient is negligible and negative (-0.087). Moreover, firm age fails to explain much of the variation in firms market valuations. OLS results from regressing Tobins Q on a constant term and firm age (unreported) provide R-squared of less than 1%. Thus, we assume that there is no direct relationship between performance and firm age within our sample of publicly traded Russian firms.

The results of the two-stage instrumental variable regressions are presented in Table 6. Models 1 and 2 are the first stage regressions with $PDEBT$ as the dependent variable and the logarithm of firm age as the instrument. The estimation results verify the validity of our instrument. The estimated coefficient for the $FIRM\ AGE$ is positive and highly significant in both models, indicating that there is a strong positive relationship between firm age and the presence of public debt in its capital structure. The estimates also suggest that larger firms with higher leverage ratios and default risk, and with access to foreign capital markets are more likely to have public debt. Models 3 and 4 present the second stage regressions, where the $PDEBT$ is replaced with the fitted values from the first stage estimates. As can be noted from the table, the coefficient estimates for the $PDEBT$ dummy variable are negative and statistically significant at the conventional levels in both models. Therefore, the results of the instrumental variable regressions indicate that the firms which rely on public debt may underperform relative to firms with other sources of debt in terms of stock market valuation.

6 Conclusions

In this paper, we empirically examine the association between firm valuation and the sources of debt financing. We use data on large, publicly traded Russian firms for the period 2003-2012. During this period, the Russian debt market experienced substantial growth, and hence, serves as an interesting setting to examine whether the decision to issue public debt affects firm performance. To the best of our knowledge, this paper is the first attempt to examine the direct effects of public debt issuances on firm valuation by utilizing cross-sectional panel regressions. Furthermore, we extend the existing literature by focusing on emerging markets.

The empirical findings reported in this paper indicate that the choice between bonds and other sources of debt financing may affect firm performance in emerging markets. In particular, we find that market valuations, as measured by Tobin's Q, are

significantly lower for firms that have decided to issue bonds. These results are broadly consistent with the previous event studies that report negative abnormal stock returns after announcements of bond issuances (see e.g. Howton et al., 1998; Lee & Loughran, 1998; Spiess & Affleck-Graves, 1999; Godlewski et al., 2011), and moreover, with the prior literature that documents the benefits of bank debt financing in the developed and emerging markets (see e.g. Haan & Hinloopen, 2003; Shirasu & Xu, 2007; Davydov & Vähämaa, 2013).

Given that our firm valuation regressions are potentially affected by endogeneity problems, we also utilize two-stage instrumental variable techniques in our empirical analysis. After addressing endogeneity concerns, our results provide considerable evidence to suggest that the presence of public debt is negatively associated with the firm's market valuation. The deterioration of firm performance after public debt issuances may be related to the debt overhang hypothesis. This theory suggests that firms with a higher degree of financial leverage might forgo positive NPV investments since net payoffs from these projects are decreased by paybacks on debt obligations. As a result, decreased growth option might lead to a lower market valuation. This theory is consistent with our findings as we document that firms which have issued public debt have a higher degree of financial leverage than firms without outstanding bonds.

Our results also indicate that determinants of debt issuance seem to follow pecking order theory in the emerging Russian markets. This theory suggests that financing of a firm follows hierarchical distribution, starting with internal sources as the most preferred funds, followed by the debt and then equity as a last resort. Given that public debt can be considered as a more risky source of financing, the announcement of bond issuances could trigger a decrease in stock market valuation. Another reason for the lower market valuation of firms with public debt may lie in the monitoring functions of credit institutions. In the emerging countries like Russia, the moral hazard problem is particularly relevant, requiring more external monitoring in order to decrease manager's incentives to undertake value-diminishing actions. Given the weak credit ratings system and high information asymmetries, market-based governance mechanisms do not provide sufficient monitoring tools in Russia, while financial intermediaries may better resolve this problem. Assuming that firms without public debt obtain debt financing from credit institutions, our empirical findings indicate that the advantages of bank-based governance mechanisms may positively affect the firm's market valuation.

Overall, our results demonstrate that public debt does not improve market-based performance despite its typically longer maturity, lower interest rates, and more flexibility. Instead, our findings suggest that the presence of public debt in the firm's capital structure may be negatively associated with its market valuation. Firms decision to issue bonds must be motivated by other than value maximization objective. Less keen monitoring by the market, for example, creates incentives for sharehold-

ers or managers to avoid stricter bank monitoring and issue public debt. Moreover, reliance on bank debt instead of public debt may cause hold up problems and inefficient investment choices and distort managerial incentives (see e.g. Rajan, 1992; Weinstein & Yafeh, 1998). However, our empirical findings indicate that these disadvantages may be outweighed in terms of market valuations in the Russian markets by the benefits of bank-based governance mechanisms.

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Debt source choices and stock market performance of Russian firms during the financial crisis

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ABSTRACT

This paper examines the relationship between stock returns and the sources of corporate debt during the financial crisis of 2008. In particular, using data on large-capitalization Russian firms, we investigate whether dependence on either bank debt or bonds affected stock returns during the credit crunch. Our results indicate that the firms which rely entirely on bank debt significantly outperformed the firms with public debt amidst the crisis. This finding suggests that bank debt may be particularly valuable in harsh times. However, we also document that the stock prices of the bank dependent firms recovered more slowly in the post-crisis period.

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1. Introduction

It has been argued that the financial crisis of 2008 spread to emerging economies to a large extent through the debt markets. Increased risk aversion of investors and tightened terms of foreign borrowing caused significant liquidity shocks on capital markets of many emerging countries. While there is a direct linkage between shocks on capital suppliers and the impact of these shocks on their borrowers (see e.g. Chava and Purnanandam, 2011), there is relatively little empirical evidence that focuses on the relationship between the borrower's stock market performance and different debt capital suppliers. The recent economic crisis reemphasized the importance of this relationship. If firms are able to quickly readjust their debt financing, they should be able to minimize the effect of external economic shocks by relying on the debt source that provides a higher degree of financial flexibility. In this paper, we examine the association between stock

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returns and the sources of corporate debt capital during the financial crisis of 2008. In particular, using data on large publicly traded Russian firms, we investigate whether the choice between bank debt and public debt in form of bonds affected stock returns during the credit crunch.

There are at least three theories that point out why firms should care about their debt source choices. First, asymmetry of information between investors and shareholders might limit the firm's choice between financing sources (Boyd and Prescott, 1986; Johnson, 1997; Leland and Pyle, 1977; Rajan, 1992). Second, monitoring function of banks may reduce agency problems that arise within a company, which potentially positively affect firm performance (Diamond, 1984, 1991). Finally, it has been argued that renegotiation feature of debt capital is of particular importance in harsh times (Chemmanur and Fulghieri, 1994; Gertner and Scharfstein, 1991; Rajan and Winton, 1995). The empirical evidence on the effects of different sources of debt financing on firm performance is somewhat mixed. While the studies by Haan and Hinloopen (2003), Shirasu and Xu (2007), and Cantillo and Wright (2000) provide evidence of a positive association between bank-based debt financing and firm performance, Arikawa (2008) and Weinstein and Yafeh (1998) document, on the other hand, that market-based debt financing may be more beneficial in terms of financial flexibility and growth opportunities.

The existing empirical literature on the implications of debt source choices on firm performance during periods of market stress is scarce and concentrates mostly on only one side of the debt market-banks. Khawaja and Mian (2008), Paravisini (2008), Kroszner et al. (2007), Ongena et al. (2003) examine the relationship between bank health and the performance of the borrowing firm. In general, these studies find a close relationship between the performance of banks and the borrowing firms during credit crunches or liquidity shocks. However, only a few studies try to compare the performance of bank dependent firms to firms that rely on other sources of debt capital. One of these exceptions is Kang and Stulz (2000), who show that bank dependent firms performed worse than similar companies that used other means of financing during the banking crisis in Japan in 1990–1993. More recently, Chava and Purnanandam (2011) examine the variation in stock returns across firms with access to public debt markets and bank dependent firms during bank loans contraction in the U.S. in 1998. They document that firms that relied mostly on bank debt experienced larger valuation losses than firms that had access to bond markets. In this paper, we aim to contribute to the above literature by focusing on the association between debt source choices and stock market performance of Russian firms during the financial crisis of 2008.

There are a number of reasons why the Russian market serves as an interesting setting for examining the impact of different debt capital suppliers on stock market performance during the crisis. First, unlike the crisis of the 1990s for Japanese firms, the financial crisis of 2008 originated from the U.S. sub-prime mortgage sector, and thereby is completely exogenous to the Russian economy. At the same time, high reliance on natural resources and plummeting of commodities' prices during the crisis as well as high integration with the western economies,[1] Russia was hit hard by the crisis. In fact, the Russian capital market was among the worst performers worldwide during the fourth quarter of 2008. Second, although firms still mostly rely on bank debt, Russian financial system sharply differs from the traditional bank-oriented economies such as Japan and Germany, while also being different from the U.S. and U.K. systems on the other hand. The financial system in Russia is characterized by a concentrated banking sector and a more constrained availability of external equity and debt capital than in most developed markets.[2] Nevertheless, there is evidence that at least the weak form of stock market efficiency holds in Russia. Previous studies show that there are no predictable profitable trading strategies on the Russian capital market (see e.g. Abrosimova et al., 2005; Hall and Urga, 2002). Moreover, Buklemishev and Maliutina (1998) study the development of the Russian stock market and argue that the effect of information on stock quotes in Russia depends significantly on the level of the market development. Given the previous evidence of market efficiency and the recent rapid development and growth of the Russian stock market, we can argue that our analysis should not be affected by any market-specific inefficiency.

The empirical findings reported in this paper demonstrate that debt source choices may affect the firm's stock market performance during period of market stress. We document that there was significant variation in the cross-section of stock returns of large Russian firms during the financial crisis of 2008. We

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[1] Central Bank of Russia owned about 100 billion U.S. dollars of mortgage-backed securities.

[2] A more detailed discussion of the Russian stock market and banking system is provided in Goriaev and Zabotkin (2006) and Anzoategui et al. (2012).

exploit this variation across 102 Russian firms that relied either mostly on bank loans or on bonds to examine the effect of debt source choices on firm performance. While in the pre-crisis period the difference in stock returns was insignificant, we find that the firms which rely mostly on bank debt significantly outperformed the firms with public debt amidst the crisis. These results indicate that bank debt may be particularly valuable in harsh times, which is broadly consistent with the prior evidence on the advantages of bank debt (see e.g. Cantillo and Wright, 2000; Haan and Hinloopen, 2003; Shirasu and Xu, 2007). On the other hand, we also document that the stock prices of the bank dependent firms recovered more slowly in the immediate aftermath of the crisis. This, in turn, supports the argument that public debt may provide more financial flexibility in economic evolvement, while banks, requiring more risk-averse investments, may alleviate the firm's rate of return (see e.g. Arikawa, 2008; Weinstein and Yafeh, 1998). Finally, we do not find any statistically significant relationship between debt source choices and stock returns in the post-crisis period.

The rest of the paper is organized as follows. In Section 2, we describe our data on large-capitalization Russian firms. Section 3 presents the empirical methodology, while Section 4 reports the empirical findings on implications of debt source choices on stock market performance. Finally, Section 5 concludes the paper.

2. Data

The sample used in our empirical analysis consists of publicly traded, large-capitalization Russian firms. We collect data on (*i*) stock prices to determine stock market performance, (*ii*) debt structure information to identify debt source choices, and (*iii*) financial statement variables to control for firm-specific characteristics. The stock market and accounting data are obtained from Thomson Reuters Datastream and Worldscope, respectively. We exclude all financial firms and utilities (except electricity sector that takes large proportion on the Russian capital markets) from our sample due to dissimilarities in capital structure and potential governmental regulations that may affect firm performance in these industries. In order to ensure that our results are not affected by outliers we winsorize the data at the 1% and 99% levels. We also remove firms with incomplete financial data and firms that do not have information on stock returns available around the financial crisis of 2008. In our analysis we define three distinct periods around the crisis. The *pre-crisis* period extends from June 2007 to June 2008, the *crisis* period from July 2008 to March 2009, and the *post-crisis* period from April 2009 to April 2010.[3]

We use data on corporate bonds issues from two main Russian stock exchanges (Moscow Interbank Currency Exchange and Russian Trading System) to determine firms' reliance on different sources of debt. Firms that had outstanding bonds in a particular period are defined to be reliant on public debt. Next, we ascertain whether the firm used bank debt by accessing quarterly reports. Given this information, we construct a dummy variable which equals one if a firm was bank dependent in the specified period and zero otherwise. Conceptually, given that a sample firm could rely both on public and private debt simultaneously, we define a firm as bank dependent if more than 50% of its debt in a given year was obtained as loans from banks. We also account for the possibility that a firm switches from one source of debt to another during our sample period and construct this dummy separately for each period. For instance, if a firm issues bonds in 2008 in order to repay its bank debt that was taken in 2007, the bank-dependence dummy would equal one in 2007 and zero in 2008. In addition to the bank dependence dummy variable, we also use the proportion of bank debt to the firm's total debt as an alternative measure of bank dependence in our multivariate tests. In contrast to previous studies where the absence of public debt ratings quite often was used as the proxy for bank dependence (see e.g. Chava and Purnanandam, 2011; Kashyap et al., 1994), our approach provides a more accurate distinction between bank dependent firms and those that actually have issued public debt.

In our empirical setting, firms without debt or with other than public or bank debt may potentially bias estimates since it is not clear why they have chosen not to leverage or to rely on other source of debt.

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[3] We define these periods based on general Russian stock market performance. The main stock indices started to decline starkly in July 2008. The bottom of this drop was reached in February 2009, while the recovery started from April 2009.

These capital decisions may be due to specific information asymmetries or reasons suggested by the pecking order theory or reliance on other private sources of debt which are out of context of this research. Therefore, to avoid potential biases, we exclude the firms that were unleveraged for at least three consecutive years and those that relied on neither public nor bank debt during the sample period.

The final sample consists of 102 individual firms. Table 1 presents summary statistics for the sample firms. The descriptives of financial variables and market characteristics are calculated across firms during the 2006–2010 fiscal years. The table shows that about 60% of the firm-year observations are classified as bank dependent firms. Firm size as measured by the log of total assets (sales) varies from 12.40 (5.62) to 22.95 (21.93), with the mean of 16.53 (16.57). Moreover, it can be noted from the table that the average sample firm is moderately leveraged and reasonably liquid. The average liquidity as measured by the current ratio is 1.91, while debt-to-assets ratio is around 26%. The sample firms are fairly profitable, with the average return on assets (equity) of about 8% (7%).

Table 1 also reports holding period stock returns of the sample firms during the three distinct periods around the crisis. As can be noted from the table, the average sample firm lost more than 50% of its market value during the crisis period (7/2008–3/2009), while gaining about 20% in the pre-crisis period (6/2007–6/2008). Finally, it can be observed that the post-crisis period (4/2009–4/2010) was characterized by a substantial recovery of market values with an average stock return of about 75%.

Table 1
Summary statistics. The table reports descriptive statistics on 102 Russian large-capitalization firms. Stock returns are calculated as the holding period returns for three points in time: June 2007–June 2008, July 2008–March 2009, and April 2009–April 2010. Bank dependence is a dummy variable which takes the value of one if a firm relied mostly on bank debt. Bank debt ratio is a proportion of bank debt in total debt. Liquidity is presented by the current ratio and calculated as current assets divided by current liabilities. Debt-to-assets and LT debt-to-capital are measured as total debt divided by the book value of total assets and long-term debt by the sum of common equity and total debt correspondingly. ROA (ROE) is net income divided by book value of total assets (equity). Market-to-book ratio is calculated as the ratio of market value of firm's equity to its book value of common equity. Beta coefficient is estimated against MICEX Index and includes 48 monthly return observations. The sample period extends from 2006 to 2010.

Variable	Mean	Median	Min	Max	Standard deviation
Stock returns:					
June 2007–June 2008	20.55	1.93	−62.50	378.5	70.79
July 2008–March 2009	−50.84	−57.7	−100.0	76.47	30.73
April 2009–April 2010	74.95	67.8	−72.73	382.9	91.79
Firm characteristics:					
Bank dependence	0.59	1.00	0.00	1.00	0.49
Bank debt ratio	0.67	0.95	0.00	1.00	0.38
Log (assets)	16.53	16.20	12.4	22.95	2.19
Log (sales)	16.57	16.33	5.62	21.93	1.93
Equity (millions)	119,000	4478	−2405	6.25e+06	517,000
Total debt (millions)	36,478	2087	0.00	1.63e+06	1.55e+05
Long-term debt (millions)	24,011	596.5	0.00	1.19e+06	1.09e+05
EBIT (millions)	29,055	800.2	−45,024	1.24e+06	1.18e+05
Financial ratios:					
Liquidity (current ratio)	1.91	1.31	0.09	44.1	2.70
Leverage (debt-to-assets)	26.2	23.44	0.00	102	20.0
Leverage (LT debt-to-capital)	18.5	10.12	−144.4	117	24.6
ROA	7.95	6.28	−70.09	97.4	11.8
ROE	6.92	10.16	−1586	164	82.5
Market characteristics:					
Market-to-book ratio	1.82	1.25	−8.20	27.36	2.43
Beta	0.46	0.44	−0.54	1.79	0.40
Std of stock returns	44.05	4.33	0.00	1961	144.1

3. Methodology

We start our empirical analysis by dividing the data into two subsamples: (*i*) bank dependent firms and (*ii*) firms with outstanding public debt. With simple univariate tests, we first compare the differences in means and medians in the two subsamples for the whole period, and we then proceed by comparing the stock returns of the best (the top quartile) and the worst (the bottom quartile) performing firms during the financial crisis of 2008. Finally, as the main part of our analysis, we focus on the association between debt source choices and the firm's stock market performance in a multivariate setting.

We examine the relationship between the firm's debt source choices and stock market performance in the pre-crisis, crisis, and post-crisis periods with the following cross-sectional regression specification:

$$
\begin{aligned}
r_{i,t} = {} & \alpha + \beta_1 BD_{i,t} + \beta_2 SIZE_{i,t-1} + \beta_3 LEV_{i,t-1} + \beta_4 MB_{i,t-1} + \\
& + \beta_5 BETA_{i,t-1} + \sum_{k=1}^{n-1} \alpha_k IND_i^k + \varepsilon_{i,t}
\end{aligned}
\tag{1}
$$

where $r_{i,t}$ denotes the holding period return for firm i at time t (at pre-crisis, crisis, and post-crisis periods), $BD_{i,t}$ is either a dummy variable for a firm being bank dependent or a bank debt ratio – proportion of bank debt in total debt, $SIZE_{i,t-1}$ denotes firm size, $LEV_{i,t-1}$ is financial leverage, $MB_{i,t-1}$ is the market-to-book ratio, $BETA_{i,t-1}$ is the beta coefficient estimated against two major stock indices in Russia – either MICEX Index or RTSI, and IND_i denotes industry dummies according to the industry classification codes.

In the regressions, we control for differences in firm size, financial leverage, market-to-book ratios, and the level of systematic risk. Firm size is measured by the natural logarithm of book value of total assets. Since the degree of financial leverage is potentially the most important variable in our empirical set-up, we use two alternative measures of leverage to ensure the robustness of our estimates. Thus, financial leverage is measured by either debt-to-assets ratio, which is calculated as the book value of total debt divided by the book value of total assets, or by long-term debt-to-capital ratio, calculated as the book value of long-term debt divided by the sum of common equity and total debt. Market-to-book ratio controls for growth expectations and is calculated as the ratio of the market value of equity to the book value of common equity. Finally, we control for the level of systematic risk by including the firm's beta coefficient in the regression. Betas are estimated against the two major Russian stock indices – either MICEX Index or RTSI – using 24 or 36 monthly return observations, depending on the availability of historical stock price data. The control variables are lagged by one year to avoid any influence of anticipated change in these variables during the test period. It is also important to account for industry affiliation since some firms might potentially cluster in specific industries with more cyclicality or macroeconomic sensitivity. Therefore, we include industry dummies in our regressions.

In contrast to previous studies that focus on the association between financial choices and firm performance, our regression estimates should not be subject to endogeneity concerns for several reasons. First, we are not focusing directly on the relationship between the performance of the bank and the borrowing firm, but rather, we examine the difference in stock market performance of firms with alternative debt sources. Second, the issue of reverse causality is not relevant in our regression specifications because we are using data on the largest publicly traded Russian firms which all should be desirable clients for banks and should also have equal access to the public debt market. Moreover, reverse causality problem should be mitigated by the use of lagged firm characteristics as control variables. Finally, the nature of the financial crisis of 2008 generated completely exogenous shocks to emerging economies. Both financial institutions and the real sector faced difficulties with credit crunch and loss of liquidity. Therefore, in contrast to the U.S. where the problems in the financial sector caused recession to the whole economy, there was no such causal effect in the Russian economy, where both the financial and real sectors experienced a common economic shock.

Nevertheless, we acknowledge that government interventions during the crisis may also affect our results, although we did not find any evidence of government participation on the corporate debt market around the crisis period. Similarly, we acknowledge that some of the Russian banks, being state controlled, may have received additional support from the government during our sample period. We are unfortunately unable to distinguish these banks. However, given that there are more than 1000 commercial banks in Russia and vast

majority of them are privately owned, we believe that state ownership of some banks should not cause a bias in our estimates.

4. Results

4.1. Univariate tests

We begin our empirical analysis with univariate tests. Table 2 compares firm characteristics as well as the distribution of returns between firms that rely mostly on bank debt and those that have issued bonds. The differences in means and medians are tested with a simple two-tailed *t*-test and with the nonparametric Wilcoxon/Mann–Whitney test, respectively. As can be noted from the table, the differences in the mean and median stock returns during the pre-crisis phase (i.e. from June 2007 to June 2008) across the two sub-samples were statistically insignificant. Interestingly, however, we observe large and highly significant differences in means and medians during the crisis (July 2008–March 2009) and the post-crisis (April 2009–April 2010) periods.

The results reported in Table 2 indicate that bank dependent firms lost much less of their market value during the crisis period. The mean holding period return for bank dependent firms was −42.3%, while the corresponding return for firms with public debt was −64.6%. These results may suggest that bank-based debt financing provides a higher degree of financial flexibility during economic downturns. Nevertheless, in contrast to the crisis period, bank dependent firms underperformed relative to firms with public debt during the post-crisis period. The mean holding period return for bank dependent firms was 54.97%, while being 104.4% for firms with public debt. The observed difference in returns is statistically significant at the 1% level, implying that firms with public debt recovered more quickly from the shock. Overall, the variation in holding period returns observed in Table 2 demonstrates that debt source choices may have important implications for firm performance amidst periods of market stress.

Regarding firm characteristics, Table 2 shows that firms with outstanding public debt are slightly larger based on total assets and are associated with a higher degree of systematic risk than bank dependent firms. The differences in means and medians of these variables are statistically significant at the 1% level. There are, however, no statistically significant differences in profitability (ROA), financial leverage (debt-to-assets ratio), liquidity (current ratio) or market-to-book ratio. Table 2 also shows that two firms issued public debt instead of bank loans, while three firms switched from public to bank debt during the

Table 2

Comparison of stock returns and firm characteristics. This table reports comparisons of means and medians of firm characteristics of two sub-samples. Bank dependent firms are firms that relied mostly on bank debt, while firms with public debt are those that have accessed the public debt market. Firm characteristics are defined as in Table 1. The number of firms that actually change with respect to the bank dependence dummy between the sub-periods is reported in brackets. The difference in means (medians) is tested with *t*-test (Wilcoxon/Mann–Whitney test).

	Bank dependent firms		Firms with public debt		Difference in means	Difference in medians
	Mean	Median	Mean	Median		
	n = 62		n = 40			
Pre-crisis returns	22.44	5.05	17.63	0.68	4.80	4.37
	n = 63	[−2;+3]	n = 39	[−3;+2]		
Crisis returns	−42.3	−50.0	−64.6	−69.3	22.33***	19.29***
	n = 61	[−6;+4]	n = 41	[−4;+6]		
Post-crisis returns	54.97	40.35	104.7	100.0	−49.72***	−59.65***
Log (Assets)	15.8	15.4	17.8	17.8	−2.03***	−2.40***
ROA	6.96	5.13	7.54	6.53	−0.58	−1.41
Debt-to-assets	27.0	24.8	27.8	25.4	−0.77	−0.66
Current ratio	1.76	1.21	2.08	1.37	−0.32	−0.16
Market-to-book ratio	1.81	1.2	1.52	1.04	0.29	0.16
Beta	0.38	0.31	0.58	0.59	−0.20***	−0.28***

*** Denotes significance at the 1% level.

crisis period (net change in the bank dependence dummy equals $+1$). In the post-crisis period, six firms issued bonds and four firms preferred bank debt to public debt (net change in the bank dependence dummy equals -2).

As the next step of our analysis, we compare firm characteristics in two sub-samples that are created based on stock returns during the crisis period. In particular, we focus on characteristics of the firms in the top and bottom quartiles of the holding period return distribution from July 2008 to March 2009. 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 significantly different with respect to their debt source choices. Less than a third (29%) of the worst performing firms were relying mostly on bank debt, while a vast majority (79%) of the best performing firms were bank dependent.

Consistent with Table 2, the holding period returns for the three distinct sub-periods demonstrate substantial differences in stock market performance between the firms with different debt financing sources in different phases of the crisis. The best performing firms during the financial crisis, which on average tend to be bank dependent, significantly underperformed in the pre- and post-crisis periods. The differences in average returns between the subsamples in these two periods were about 20.5% and 130%, respectively.

Table 3 further demonstrates that there are statistically significant differences in firm characteristics between the two sub-samples. More specifically, we observe that the worst performing firms are slightly larger based on total assets and have a higher degree of financial leverage based on debt-to-assets ratio. Furthermore, these firms are less profitable, have marginally lower market-to-book ratios, and have substantially larger beta coefficients.

Overall, the results reported in Tables 2 and 3 imply that bank dependent firms significantly outperformed the firms with public debt amidst the crisis. The bank dependent firms are on average smaller, less leveraged and less risky. On the other hand, the firms with public debt recovered more quickly in the post-crisis period. The observed return differences between firms with different debt financing sources are illustrated in Fig. 1. The figure plots cumulative logarithmic returns for two hypothetical portfolios that consist of solely bank dependent firms and firms that relied mostly on public debt. It is noticeable that the drop in the market valuation of the firms with issued bonds was much sharper during the crisis, while the stock prices of these firms appear to have recovered more quickly in the immediate aftermath of the crisis in 2009.

Table 3

Comparison of firms in the top and bottom quartiles of stock return distribution during the crisis. The table presents comparison of means of firm characteristics in the bottom quartile of stock return performance during the crisis period relative to those in the top quartile of return distribution. Bank dependence is a dummy variable which takes the value of one if a firm relied mostly on bank debt. Firm characteristics are calculated across years 2007–2010 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 return distribution	Mean of firms in the top quartile of return distribution	Difference in means
Bank dependence	0.29	0.79	0.5***
Stock returns			
Pre-crisis returns	24.0	3.51	-20.50**
Crisis returns	-81.7	-7.72	73.98***
Post-crisis returns	145.6	16.15	-129.4***
Firm characteristics			
Log (assets)	16.6	16.0	-0.55**
ROA	3.74	8.98	5.24***
Debt-to-assets	30.5	22.8	-7.65***
Current ratio	2.22	2.10	-0.12
Market-to-book ratio	1.36	1.87	0.51*
Beta	0.72	0.19	-0.53***
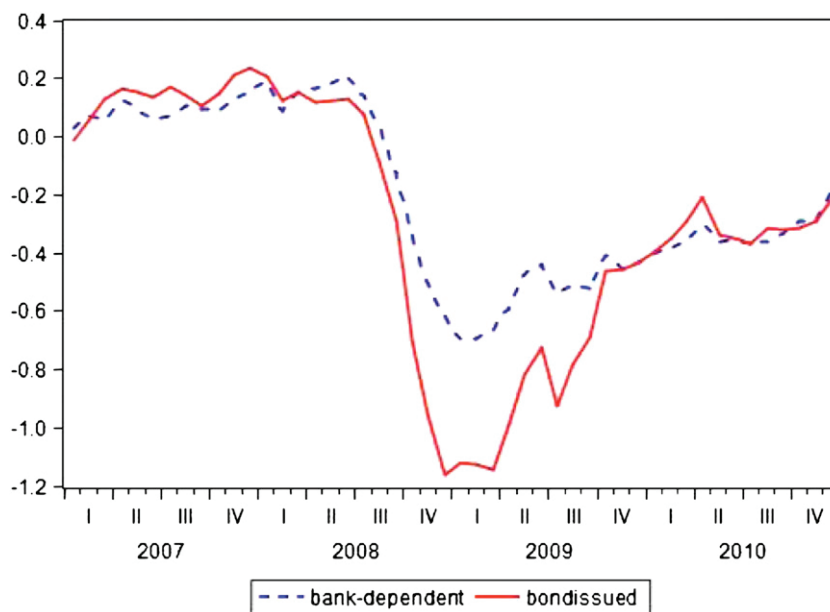
Fig. 1. Cumulative logarithmic returns on stock portfolios.

4.2. Cross-sectional regressions

We next examine the relationship between debt source choices and stock market performance in a multivariate setting with cross-sectional regressions. Table 4 reports the estimation results of Eq. (1) for three different sub-periods: the (*i*) pre-crisis, (*ii*) crisis, and the (*iii*) post-crisis periods. Columns 1, 3, and 5 report results with a bank dependence dummy as the main explanatory variable, while Columns 2, 4, and 6 use the proportion of bank debt to total debt as the measure of bank dependence. As can be noted from the table, the regression models have a good explanatory power for the cross-sectional variation in stock returns with the adjusted R-squares varying between 19% and 47%.

Regarding our test variables of interest, it can be noted from Table 4 that the estimated coefficients for the bank dependence dummy are positive and statistically significant at the 10% and 5% levels in the pre-crisis and the crisis periods, respectively. The coefficient estimates for the bank debt ratio are consistent with the estimated coefficients for the bank dependence dummy variable, although being statistically significant only in the crisis period. The analysis suggests that bank dependent firms, on average, experienced about 34% higher returns than firms with public debt in the pre-crisis period and about 21% higher returns during the crisis. Interestingly, despite that our univariate tests indicate that the stock prices of the firms with public debt recovered more quickly, the coefficient estimates for the bank dependence dummy and bank debt ratio are statistically insignificant in the post-crisis period.

The significance of the estimated coefficients for the control variables varies across the sub-periods. The regressions indicate that stock returns were negatively related to the degree of financial leverage during the crisis period.[4] The level of systematic risk, as measured by the beta coefficient, is significantly positively related to stock returns during the post-crisis period, while being insignificant in the other two sub-periods.[5] Finally, firm size seems to be negatively associated with stock returns during the post-crisis period.

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[4] We use two alternative measures of leverage – debt-to-assets and long-term debt-to-capital – as the results for these two measures were similar, we report only estimates for debt-to-assets ratio due to space limits.

[5] We use two alternative betas estimated against either MICEX index or RTS index. Since the results were identical, we report the estimation results only for RTS beta due to the same reasons as above.

Table 4

Debt source choices and stock returns around the financial crisis. The Table reports the estimates of Eq. (1) for three distinct sub-periods around the financial crisis. The number of observations used in the regressions varies due to lack of historical data on some of the control variables. Bank dependence is a dummy variable which takes the value of one if a firm relied on bank debt. Bank debt ratio is the proportion of bank debt to total debt. Beta is the beta coefficient estimated against RTS index using 24 or 36 monthly return observations, depending on the availability of historical stock price data. The remaining control variables are defined as in Table 1. Absolute values of *t*-statistics are reported in brackets. Standard errors in all specifications are adjusted for potential heteroskedasticity. * and ** denote significance at the 10% and 5% levels, respectively.

	Stock returns					
	Pre-crisis period (June 07–June 08)		Crisis period (July 08–March 09)		Post-crisis period (April 09–April 10)	
Independent variable	1	2	3	4	5	6
Constant	−9.45	22.6	−100.0*	−118.3*	337.4*	353.4
	[0.08]	[0.20]	[1.87]	[1.91]	[1.75]	[1.55]
Bank dependence	34.3*		21.6**		−70.9	
	[1.74]		[2.00]		[1.57]	
Bank debt ratio		31.9		33.7**		−91.3
		[1.48]		[2.04]		[1.33]
Assets	5.69	4.01	1.83	2.79	−20.2*	−18.1
	[0.82]	[0.63]	[0.59]	[0.80]	[1.84]	[1.59]
Debt-to-assets	0.58	0.50	−0.44*	−0.41*	−0.22	−0.13
	[0.84]	[0.72]	[1.79]	[1.71]	[0.22]	[0.13]
Beta	−14.3	−14.3	0.22	1.03	103.3**	93.3**
	[1.16]	[1.15]	[0.03]	[0.16]	[2.20]	[2.07]
Market to book ratio	0.89	1.15	1.02	1.22	−4.06	−5.40
	[0.32]	[0.42]	[0.95]	[1.04]	[0.89]	[1.40]
Industry controls	Yes	Yes	Yes	Yes	Yes	Yes
Number of firms	77	77	101	101	100	100
Adj. R-squared	0.42	0.38	0.45	0.47	0.19	0.19

4.3. Discussion

Overall, the regression results suggest that reliance on bank debt was positively associated with stock returns at the onset of the crisis and during the period of exceptional turmoil from July 2008 to March 2009. These findings may indicate that bank-based debt financing provides a higher degree of financial flexibility during periods of severe market stress. One potential, somewhat speculative, explanation for a such relationship between debt source choices and stock returns may be related to the unique nature of bank debt. Specifically, the ability of banks to provide credit lines, drawdowns on which can be stretched along multiple periods, may have allowed corporate borrowers to obtain more financial flexibility in harsh times. Naturally, firms with public debt may always turn to banks in hard times for further loans. However, during crisis periods, this possibility may be limited because of the more restrictive covenants that banks place on the new debt contracts. Thus, a company with existing public debt may face difficulties to borrow sufficient amount of funds from banks during periods of market stress.

The credit line argument is supported by statistics of commercial loans issued by Russian banks. Fig. 2 plots the developments of loan volumes for mid-term (1–3 years), long-term (above 3 years), and total commercial loans from 2008 onwards. As shown in the figure, the amount of mid-term commercial loans was raising sharply from July 2008 to February 2009, indicating that firms were increasing their borrowing from banks during the most severe part of the crisis. This finding is consistent with the corporate borrowers' usage of credit lines in the U.S. markets during the financial crisis (Ivashina and Scharfstein, 2010). In the Russian market, the total amount of loans issued by banks increased by roughly one third between 2008 and the spring of 2009, and decreased slightly in the post-crisis period.
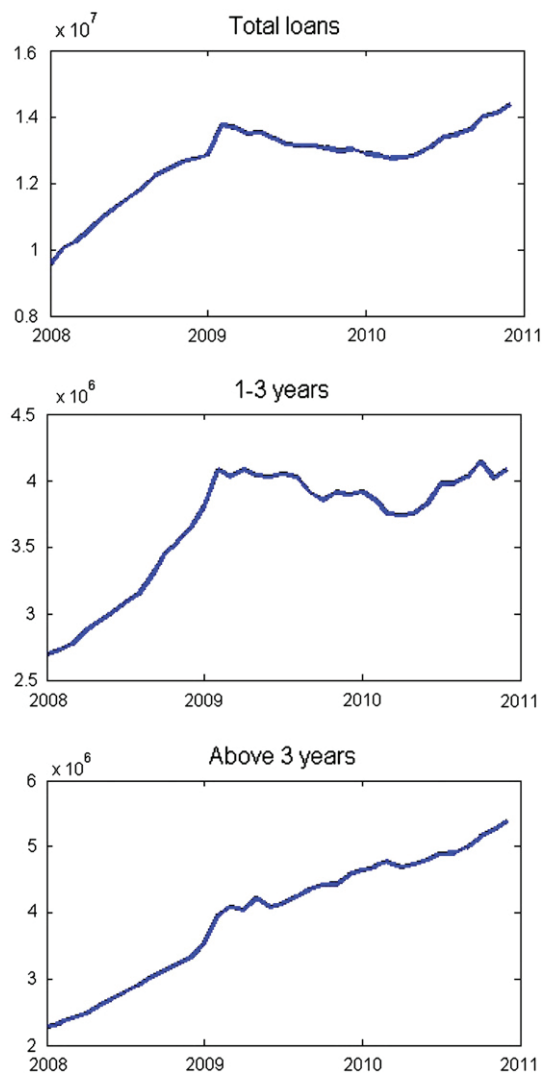
Fig. 2. Commercial loans issued by Russian banks.
(source: Central Bank of Russia).

5. Conclusions

In this paper, we examine the association between stock returns and the sources of corporate debt capital during the financial crisis of 2008. In particular, using data on large publicly traded Russian firms, we investigate whether the choice between bank debt and public debt in form of bonds affected stock returns during the credit crunch. It is widely acknowledged that there are both costs and benefits associated with reliance on either bank-based or market-based debt capital. The purpose of this paper is to empirically address the implications of the firm's debt source choices on stock market performance amidst the financial turmoil of 2008.

The empirical findings reported in this paper indicate that debt source choices may affect the firm's stock market performance. Specifically, we document that firms which rely entirely on bank debt

significantly outperformed the firms with public debt amidst the financial crisis. These results are broadly consistent with the prior evidence on the advantages of bank debt (see e.g. Cantillo and Wright, 2000; Haan and Hinloopen, 2003; Shirasu and Xu, 2007). Moreover, our findings from the emerging Russian stock markets are also consistent with the recent evidence from developed markets (Allen and Paligorova, 2011), and thereby provide further support for the view that bank dependence may be particularly valuable during periods of market stress.

A potential explanation for the positive effects of bank-based debt financing may be related to banks' ability to provide credit lines to their borrowers. Consistent with this view, we document that the amount of commercial loans issued by Russian banks rose significantly from 2008 onwards. We also document that stock prices of bank dependent firms recovered more slowly in the immediate aftermath of the crisis. This finding is consistent with the argument that bank-based debt capital may instigate more conservative investment policies due to greater risk-aversion of banks (see e.g. Arikawa, 2008; Weinstein and Yafeh, 1998). Finally, we find no relationship between the firm's debt sources and stock returns in the post-crisis phase.

Acknowledgments

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Debt Structure and Corporate Performance in Emerging Markets*

Abstract

This paper examines the effects of public and bank debt financing on firm performance in emerging markets. Using data on 700 publicly traded firms from the BRIC countries, it is documented that bank debt may have a positive effect on firm profitability. While overall market assessment of bank debt financing is negative, it is found that fully bank-financed firms lose less of their market value. Main findings remain unchanged after addressing potential endogeneity issues by introducing a novel instrumental variable. Overall, the results suggest that higher levels of bank financing may have positive effects on firm profitability and market valuation.

JEL classification: G15; G30; G32

Keywords: debt financing, bank debt, firm performance, emerging markets

1   Introduction

Existing corporate finance theories suggest that different sources of corporate debt exert distinctive effects on firm performance. Private sources of debt, like bank loans, may rule out adverse selection and moral hazard problems by more efficient monitoring features (Diamond, 1984, 1991), as well as minimize costs of renegotiation (Chemmanur & Fulghieri, 1994; Gertner & Scharfstein, 1991; Rajan & Winton, 1995). Public debt, in form of bonds, in turn, is able to resolve information asymmetries (Fama, 1985; Johnson, 1997; Leland & Pyle, 1977). Consequently, maximizing the benefits and minimizing the costs, theoretical research developed optimal debt structures that would potentially affect firm performance positively (see e.g. Bolton & Scharfstein, 2000; Bolton & Freixas, 2000; Park, 2000). These theories suggest that the optimal choice between private and public debt is conditional on firm's credit quality and on debt's priority and maturity. Particularly, bank debt is more preferable if it is senior in the capital structure, as it provides more efficient incentives to monitor, and (or) if firm's credit quality deteriorates.

Yet, an important question that remains is whether different levels of public and bank debt in a firm's capital structure affect firm performance. Hence, this paper empirically investigates whether different sources of debt in the firm's capital structure affect financial and market performance. Using data on publicly traded firms from the largest emerging economies - Brazil, Russia, India, and China (BRIC) - over the period 2003-2012, this paper aims to contribute to the prior literature by examining the association of different levels of public and bank debt with the firm's profitability and market valuation.

With few exceptions, previous empirical literature in this area mainly focuses on the reaction of stock returns on public or bank loan arrangement announcements using event study framework. In general, these studies find a positive stock market reaction to bank loan arrangements (James, 1987; Kang & Liu, 2008). However, the effect may be dependent on the firm, contract, or bank specific factors. For example, Aintablian & Roberts (2000) and Lummer & McConnell (1989) argue that only revisions to existing bank credit agreements cause significant excess returns, while Slovin et al. (1992) find that bank loan announcements positively affect mostly small firms. It is also documented that higher abnormal returns are associated with higher lender's credit quality and better reputation (Billet et al., 1995; Bushman & Wittenberg-Moerman, 2012), while announcements of loans from low-quality banks lead to significantly negative stock returns of the borrowing firm (Huang et al., 2012). At the same time, stock market reaction is more prominent when the bank is foreign or located in the same state as the borrower's headquarters (Ongena & Roscovan, 2013). Correspondingly, the prior literature mainly finds significant negative effect on stock returns after bond issue announcements (see e.g. Eckbo, 1986; Gilson & Warner, 1998; Godlewski et al., 2011; Spiess & Affleck-Graves,

1999).

Despite the vast body of event studies on the effects of particular debt financing source on the stock market movements, there is only scarce evidence on the differences in firm performance between bank dependent firms and firms with other sources of debt and this evidence is quite specific. Kang & Stulz (2000), for instance, examine this issue around the banking crisis in Japan in the 1990's. They document that bank dependent firms underperform their peers with other sources of debt. On the other hand, Chava & Purnanandam (2011) find that firms that mostly rely on bank debt suffer larger valuation losses than firms with access to public debt but this relationship is documented during the episode of bank lending contraction in the U.S. in 1998. Finally, Davydov & Vähämaa (2013) document strong positive relation between reliance on bank debt and stock returns of Russian firms during the financial crisis of 2008.

This paper, in turn, focuses on the association between different debt sources composition and firm performance, using an unbalanced panel of 700 publicly traded firms from Brazil, Russia, India, and China over the period 2003-2012. In particular, it is examined whether the reliance on public or bank debt or a certain composition of the two affects firm performance. The empirical findings reported in this paper demonstrate that bank debt in the firm's capital structure may have a positive effect on firm profitability. It is also documented that bank debt has a non linear relationship with firm market valuations. While in general, bank loans may have a negative effect on market valuations, firms with higher levels of bank debt are able to diminish this effect. Moreover, the results also suggest that the relationship between bank debt levels and firm valuation is different for financially distressed firms. These results indicate that market participants appreciate bank's involvement in debt contracts of financially distressed firms but do not believe in bank's ability to recover the firm's financial situation alone. 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 performance of financially stable firm.

The paper contributes to the existing literature in several ways. First, it utilizes cross-sectional panel regressions to empirically analyze the effect of public and bank debt levels on firm performance. Instead of focusing on the immediate reaction of stock market on debt arrangements, continuous effect of debt source choices on profitability and market valuation is examined. Such approach enables the elimination of potential market over- (under-) reaction on debt placements.

Second, instead of dummy variables, the analysis uses exact ratios of bank debt in the total debt of the firm. These ratios allow to account for potential nonlinearity

in the relationship between the levels of the debt source and firm performance.[1] However, using debt ratios to assess the influence of debt source choices on firm performance may lead to fault conclusions due to endogeneity problems. Therefore, potential reverse causality issues are addressed by instrumental variable techniques. For this purpose, the paper introduces a novel instrument that was not used in the prior literature.[2]

Third, the paper uses data on firms that have access to both bank debt and bond markets which create more homogeneous determinants of debt source choices. Hence, the results should not be affected by firm-specific characteristics that determine the choice between bank debt and bonds. Fourth, instead of focusing on a specific period (like crisis episodes in 1990's and late 2000's), the estimations are conducted on a larger time span which also includes crisis periods. Therefore, this approach allows to capture any differences in the effect of debt sources composition on firm performance during the normal times and periods of financial distress.

Finally, the paper uses data from the four largest emerging economies: Brazil, Russia, India, and China. Characterized by the prominent growth rates, emerging markets became an important sector for investors. Besides other differences, emerging markets distinctly differ in firm behavior on the debt markets. Traditionally, being more bank-oriented, emerging markets experienced substantial growth of the bond markets during the last decades. In contrast to the U.S., where even relatively small firms can tap the bond market, emerging economies are significantly different in the determinants of debt source choices. One of such differences is frequent change from one source of debt to another. While in the developed markets firms are most likely to stick with a particular debt type (Denis & Mihov, 2003), the choice of financing source in the emerging economies is rather continuous. Thus, debt source choices are more likely to have a more pronounced effect on firm performance in emerging rather than in developed markets, making emerging economies an appropriate setting to examine this issue.

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 presents the empirical methodology, while Section 4 reports the findings on whether different levels of public and bank debt affect firm performance. Finally, Section 5 concludes the paper.

2   Data

The empirical analysis in this paper is based on data on large, publicly listed firms from the four largest emerging economies - Brazil, Russia, India, and China (BRIC).

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[1]As suggested by previous literature, the debt-performance relationship may be nonlinear (see e.g. Campello, 2006).

[2]This instrument is discussed in more details in Section 3.

The data are obtained for fiscal years 2003-2012 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. To avoid any selection bias, the sample includes only firms that have access to both bank debt and bond market, i.e. had been using both sources of debt during the sample period. Such approach causes more homogeneous characteristics of firms in terms of debt source choices. Hence, the assessment of performance differences between firms that mostly rely on bank debt and firms with public debt is less vulnerable to determinants of a firm's decision to issue one or another type of debt.

Following previous literature (see e.g. Lin et al., 2013), unleveraged firms are excluded from the sample. Firms with insufficient financial information are also removed from the sample. To ensure that outliers do not affect the results, the data are winsorized at the 1% and 99% levels. The final sample used in the empirical analysis consists of an unbalanced panel of 1,536 firm-year observations on 700 individual firms. The amount of observations varies across variables due to lack of historic financial data.

The main variable of interest is bank debt ratio. This variable is constructed as the ratio of total amount of bank loans to 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.

Table 1 reports summary statistic for the variables used in the empirical analysis. Following previous literature (see e.g. Anderson et al., 2012; King & Santor, 2008; Lang & Stulz, 1994), there are two primary measures of performance: return on assets (ROA) and Tobin's Q. Traditionally, accounting-based performance measure is represented by the return on assets (ROA). It is 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. As can be noted from Table 1, the data sample is very heterogeneous in terms of firm performance. Tobin's Q varies between 0.47 and 6.01 with mean of 1.14, while ROA varies between -258% and 93% with average of 10.5%.[3]

Table 1 also shows that the data sample is very diverse in terms of firm size, measured by the logarithm of total assets. Varying between 3.06 and 19.1, the average logarithm of total assets is 13.5. An average sample firm is also rather liquid and reasonably leveraged. The average debt-to-assets ratio is 61%, while average liq-

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[3]Such a wide variance in performance measures can be explained by the crisis period of 2008-2010 which is included in the analyzed time period rather than by outliers.

uidity ratio is 1.12. Debt-to-assets ratio is calculated as book value of total debt to book value of total assets, while liquidity ratio is calculated as current assets divided by current liabilities. The table also demonstrates that the average Altman's (1968) Z-score is 2.63, while average interest coverage is 7.56. These indicates that the sample firms are relatively creditworthy and generate sufficient revenues to cover interest expenses. 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). Interest coverage is measured as earnings before interest and taxes divided by the interest expense plus dividends on preferred stock.

Table 1. Summary statistics

The table reports descriptive statistics of the unbalanced panel data on 700 individual firms for the fiscal years 2003-2012. Tobin's Q is the ratio of the firm's market value to its replacement costs of assets. Market value is calculates as market capitalization plus the book value of preferred stock and the book value of debt. ROA is return on assets calculated as earnings before interest, taxes, depreciation, and amortization divided by the book value of total assets. Debt-to-assets is measured as total debt to total assets ratio. Interest coverage defined as earnings before interest and taxes to total interest expenses ratio. Liquidity ratio is measured as current assets divided by current liabilities. Sales growth is the annual growth rate of gross sales. 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). Bank debt ratio is the ratio of bank loans to total long-term interest bearing 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. Brazil, China, India, and Russia are dummy variables that take the value of 1 for each country, correspondingly.

Variable	No. of unbalanced observations	Mean	Median	Std. deviation	Min	Max
Tobin's Q	3,791	1.37	1.14	0.73	0.47	6.01
Log (Tobin's Q)	3,791	0.21	0.13	0.43	-0.75	1.79
ROA	6,116	10.5	9.77	0.10	-258	93.0
Log (Assets)	6,168	13.5	13.5	1.68	3.06	19.1
Debt-to-assets	6,043	0.61	0.62	0.20	0.12	2.23
Interest coverage	5,933	7.56	3.32	14.2	-4.55	138
Liquidity ratio	6,035	1.12	0.88	0.92	0.12	8.12
Sales growth	5,417	1.38	1.20	2.41	0.00	137
Z-score	3,272	2.63	2.12	2.12	-2.22	14.6
Bank debt ratio	4,543	0.73	0.87	0.32	0.00	1.00
Banking sector concentration	6,300	64.3	70.8	13.3	29.7	76.9
Brazil	7,000	0.18	0.00	0.39	0.00	1.00
China	7,000	0.58	1.00	0.49	0.00	1.00
India	7,000	0.23	0.00	0.42	0.00	1.00
Russia	7,000	0.01	0.00	0.07	0.00	1.00

Table 1 also shows that the average firm has obtained 73% of its debt financing

from banks. As can be noted from the table, about 18% of observations are from Brazil, 23% from India, 1% from Russia, while the majority of observations come from China (58%). Such distribution of sample origins implies that it is important to control for country-specific factors, for example, by including country fixed effects. Finally, Table 1 presents characteristics of the banking sector concentration of examined countries, which are used as an exogenous instrumental variable for reliance on bank debt. The variable is calculated as top 5 banks' total assets divided by the sum of total assets of all banks in the sector. The average banking sector concentration ratio is about 64%, varying across countries and across years from roughly 30% to 77%. The data on banking sector concentration are obtained from the World Bank databank and are based on the raw data from BankScope.

3   Methodology

The empirical analysis begins with simple univariate tests of differences in means and medians between two subsamples: bank dependent firms and firms which are mainly financed by public debt ("bank independent"). Given that the analyzed data consist of only large publicly traded firms that have been relying on both sources of debt during the sample period, it is reasonable to assume that a firm is bank dependent if its major sources of financing are banks, i.e. its bank debt ratio is more than 50%.

Next, the relationship between debt source choices and firm performance is examined with fixed effects panel regressions. Consistent with prior empirical research on debt financing (see e.g. Agarwal & Elston, 2001; Campello, 2006; Rahaman, 2011), firm size, financial leverage, liquidity, firm growth, default risk and interest coverage are included as control variables in the multivariate analysis. Financial leverage is a proxy for financial risk, while Z-score proxies for default risk. Interest coverage controls for the firms ability to repay the interest on outstanding debt. As debt ratings in the emerging markets are not as common as in the developed countries, interest coverage ratio is often used instead to assess firms burden by debt expenses and its ability to issue additional debt. Firm size is measured as the logarithm of book value of total assets, financial leverage is debt-to-assets ratio, firm growth is the annual growth rate of gross sales, while liquidity is the ratio of current assets and current liabilities. Interest coverage is calculated as earnings before interest and taxes divided by the interest expense plus dividends on preferred stock, while default risk is represented by the Altman's (1968) Z-score, 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).

More formally, alternative versions of the following regression specifications are

estimated:

$$PERF_{i,t} = \alpha_0 + \beta_1 BD_{i,t-1} + \beta_n X_{i,t-1} + \sum_{k=1}^{n-1} \alpha_k FIRM_i^k + \sum_{k=1}^{n-1} \delta_k COUNTRY_i^k +$$
$$+ \sum_{y=2004}^{2012} \omega_y YEAR_i^y + \varepsilon_{i,t} \quad (1)$$

where $PERF$ stands for firm performance and is either ROA or log of Tobin's Q, BD_i is a bank debt ratio calculated as bank loans to total long term interest bearing loans. $X_{i,t-1}$ is a matrix of lagged firm-specific control variables discussed above. $FIRM$ and $COUNTRY$ denote dummy variables for firm i and for country i, correspondingly, while $YEAR$ is a dummy variable that indicates fiscal years. To ensure robustness of the results, industry dummies instead of firm dummies are included in some specifications. It should be noted that the main explanatory variable, BD, is also lagged by one year in all regression specifications as the effect of the issuance of either source of debt on firm performance is less likely to be immediate.

The prior literature on the determinants of debt source choices in firm's capital structure suggests that the decision to issue public or private debt may be affected by firm performance (see e.g. Altunbaş et al., 2010; Faulkender & Petersen, 2006; Hale & Santos, 2008; Hoshi et al., 1993). Thus, it is acknowledged that the relationship between firm performance and debt source choices in this analysis may be endogenous due to reverse causality. The paper addresses this problem with instrumental variable (IV) techniques. This approach requires an instrument that would correlate with the endogenous variable - bank debt ratio, and essentially would not be related to the independent variable - firm performance. Existing literature suggests that banking sector and financial markets' development do not necessarily correlate. For example, Rajan & Zingales (2003) argue that banks oppose financial development due to potential competition emerging from the public debt market. Demirgüç-Kunt & Huizinga (2001), in turn, show that any move 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 banking sector should be negatively associated with expansion of the financial markets. Furthermore, Dickie & Fan (2005) demonstrate that the more concentrated the banking sector, the smaller the corporate bond market is.

Following this literature, it is proposed that country-level banking sector concentration ratio is a valid instrument for the bank debt ratio. Given that the higher concentration in the banking sector may cause underdevelopment of public debt market, it is argued that there is a positive correlation between banking sector concentration and firms' reliance on bank debt. However, there is no direct relationship between firm performance and overall banking sector concentration. The validity

of this instrument is discussed in detail in the next section.

4 Empirical Results

4.1 Univariate tests

Table 2 reports the results of univariate comparisons of firm performance and characteristics for two subsamples: bank dependent and bank independent firms. A firm is defined as bank dependent if its bank debt ratio is more than 50%. The table shows the total number of cross-sections included in each subsample. There are 402 firms that were defined as bank dependent and 315 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 total sample's size of 700. The differences in firm-specific variables are tested with a two-tailed t-test for means and with the Wilcoxon/Mann-Whitney test for medians. As can be noted from the table, two subsamples are significantly different in terms of firm characteristics. Bank dependent firms tend to be larger based on total assets and have higher degree of financial leverage if compared by the debt-to-assets ratio. The observed differences in means and medians of these variables are highly statistically significant. The table also shows that bank dependent firms are more risky as interest coverage and Z-score are significantly lower than for bank independent firms. Finally, it can also be noted that bank dependent firms are less liquid but experience faster growth rates based on the annual growth rate of gross sales. Although the difference in means and medians for liquidity ratio is statistically significant at the 1% level, the difference in growth rates is only significant in medians.

The univariate tests reported in Table 2 provide mixed evidence on the firm performance differences between bank dependent and bank independent firms. T-test and the Wilcoxon test suggest that there is no statistically significant difference in the accounting-based measure of performance - return on assets. The mean (median) ROA is about 10.2% (9%) for bank dependent firms, and 10% (9.3%) for bank independent firms. However, the analysis suggests that bank dependent firms on average experience significantly lower market valuations. The difference in means and medians of Tobin's Q is -0.07 between bank dependent and bank independent firms and statistically significant at the 5% level in means and the 1% level in medians.

Although univariate tests indicate that there is no statistically significant difference in profitability across two subsamples, it is found that there is significant variation in firm-specific characteristics. These findings indicate that the effect of debt sources

on firm performance may be affected by firm-specific characteristics that need to be controlled for in the multivariate setup.

Table 2. Comparison of firm performance and firm characteristics

The table reports comparisons of means and medians of firm characteristics for bank dependent and bank independent firms. The firm is defined as bank dependent if its bank debt ratio is more than 50%. Bank debt ratio is the ratio of bank loans to total long-term interest bearing debt. Tobin's Q is the ratio of the firm's market value to its replacement costs of assets. Market value is calculates as market capitalization plus the book value of preferred stock and the book value of debt. ROA is return on assets calculated as earnings before interest, taxes, depreciation, and amortization divided by the book value of total assets. Debt-to-assets is measured as total debt to total assets ratio. Interest coverage defined as earnings before interest and taxes to total interest expenses ratio. Liquidity ratio is measured as current assets divided by current liabilities. Sales growth is the annual growth rate of gross sales. Z-score is Altman's (1968) Z-score and calculated as $(1.2 \times$ working capital $+ 1.4 \times$ retained earnings $+ 3.3 \times$ earnings before interest and taxes $+ 0.999 \times$ sales) / total assets $+ 0.6 \times$ (market value of equity/book value of debt). The difference in means (medians) is tested with a two-tailed t-test (Wilcoxon test). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Bank dependent firms		Bank independent firms		Difference in means	Difference in medians
	Bank debt ratio $> 50\%$		Bank debt ratio $\leq 50\%$			
	Mean	Median	Mean	Median		
No. of cross-sections	402		315			
Bank debt ratio	0.82	0.85	0.26	0.27	0.56***	0.58***
Tobin's Q	1.29	1.11	1.36	1.18	-0.07**	-0.07***
ROA	10.2	9.13	9.96	9.38	0.27	-0.25
Log (Assets)	14.0	14.0	13.8	13.9	0.22***	0.11***
Debt-to-assets	0.65	0.65	0.62	0.61	0.03***	0.04***
Interest coverage	5.90	2.74	6.71	3.32	-0.81*	-0.58***
Liquidity ratio	0.93	0.77	1.13	0.93	-0.20***	-0.16***
Sales growth	1.31	1.21	1.32	1.17	-0.01	0.04***
Z-score	2.20	1.72	2.60	2.30	-0.40***	-0.58***

4.2   Debt structure and firm profitability

Next, the association between firm performance and reliance on either bank debt or public debt is examined by estimating alternative versions of Equation 1. The estimation results on the relationship between bank debt ratio and firm profitability (ROA) are reported in Table 3. Following previous literature (see e.g. Agarwal & Elston, 2001; Campello, 2006; Rahaman, 2011), firm size, financial leverage, liquidity, firm growth, default risk and interest coverage are included as control variables in the two-way fixed effects regressions. As the relationship between bank debt ratio and firm performance may vary across different industries and countries,

Table 3. Bank debt and firm profitability

The table reports the estimates of different versions of Equation 1 using unbalanced panel data on 700 large publicly traded firms from the BRIC countries for the period 2003-2012. The dependent variable in columns 1, 2, 5, and 6 is ROA, calculated as earnings before interest, taxes, depreciation, and amortization divided by total assets. Columns 3 and 4 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 and measured as the ratio of the top 5 banks' total assets to the sum of total assets of all banks in the sector. Size is measured by the logarithm of total assets. Leverage is the debt-to-assets ratio, while liquidity is the ratio of current assets to current liabilities. Interest coverage defined as earnings before interest and taxes to total interest expenses ratio. Sales growth is the annual growth rate of gross sales. 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). All independent variables are lagged by one period. Models 1, 3, and 5 include industry and country dummies, while Models 2, 4, and 6 include firm fixed effects. All specifications include period fixed effects. Standard errors are corrected for heteroskedasticity and within-firm error clustering. Absolute t-values are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

| | Dependent Variable | | | | | |
| | ROA | | Bank debt ratio | | ROA | |
Explanatory Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Bank debt ratio	0.00	0.01***			0.38	0.06**
	[0.96]	[3.06]			[0.71]	[2.41]
Bank concentration			0.01***	0.01***		
			[7.64]	[9.64]		
Size	0.004***	0.02***	0.01	0.00	0.01	0.02***
	[4.91]	[3.45]	[0.85]	[0.03]	[1.24]	[3.04]
Leverage	0.00	0.05***	0.25***	0.12	-0.06	0.05***
	[0.04]	[4.72]	[8.10]	[1.07]	[0.70]	[5.11]
Interest coverage	0.001***	0.001***	-0.001*	0.00	0.001**	0.00**
	[4.30]	[2.92]	[1.94]	[0.82]	[2.38]	[2.38]
Liquidity	-0.01***	-0.01	-0.01	-0.02**	-0.005	-0.003
	[3.25]	[0.92]	[0.63]	[2.03]	[0.46]	[0.44]
Sales growth	0.003***	0.005***	-0.03	-0.03	0.01	0.004***
	[4.18]	[4.34]	[1.26]	[1.51]	[1.01]	[2.97]
Z-score	0.02***	0.02***	0.00	0.00	0.01***	0.02***
	[6.22]	[6.51]	[0.31]	[0.18]	[3.37]	[6.38]
Constant	0.11***	-0.21***	-0.11	-0.19	-0.12	-0.25***
	[2.86]	[3.03]	[0.41]	[0.59]	[0.36]	[2.97]
No. Of observations	1,536	1,536	1,677	1,677	1,536	1,536
Adj. R-squared	0.36	0.71	0.17	0.53	-	-
Regression type	OLS with FE	OLS with FE	First stage IV	First stage IV	IV with FE	IV with FE
Industry dummies	Yes	No	Yes	No	Yes	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	Yes	No	Yes	No	Yes
Country fixed effects	Yes	No	Yes	No	Yes	No

Model 1 in Table 3 uses industry dummies and country fixed effects instead of firm fixed effects. Model 2, in turn, presents the estimation results with firm fixed effects. As can be noted from the table, the model with firm fixed effects has much better explanatory power than the model with industry and country effects as the adjusted R-squared almost doubles from 36% to 71%. These numbers indicate that omitted unobservable firm specific variables may be important in explaining the cross-sectional variations in firm profitability. The estimated coefficients for firm size, interest coverage, growth, and default risk are positive and statistically significant at the 1% level in both models, indicating that larger size, better interest coverage, lower probability to default, and higher growth rates may increase profitability of the firm in the emerging markets. The coefficient estimates for leverage, as proxied by the debt-to-assets ratio, are positive and highly statistically significant in Model 2, while being insignificant in Model 1. Liquidity seems to have negative effect on firm profitability however the estimated coefficient is significant in Model 1, while insignificant but still negative in Model 2.

The variable of interest is bank debt ratio, the ratio of bank loans to total long-term interest bearing debt. The estimated coefficients for bank debt ratio are positive in both regression specifications but significant at the 1% level only in Model 2. The magnitude of the estimated coefficient in Model 2 indicates that fully bank-financed firms experience on average 1% higher return on assets than firms that rely on public debt.

However, the relationship between firm performance and debt source choices may be endogenous as banks, for example, may prefer to finance more profitable firms. This reverse causality problem is addressed by two-stage instrumental variable regressions. The novel instrumental variable utilized in the regressions that is correlated with bank debt ratio and unrelated to firm performance is banking sector concentration ratio. Given that higher concentration in the banking sector causes underdevelopment of public debt market (see e.g. Demirgüç-Kunt & Huizinga, 2001; Dickie & Fan, 2005; Rajan & Zingales, 2003), it is argued that there is a positive correlation between banking sector concentration and firms' reliance on bank debt. However, there is no direct relationship between firm performance and overall banking sector concentration.

The results of the two-stage instrumental variable estimations are reported in Models 3-6 in Table 3. The validity of the proposed instrument is verified in Models 3 and 4 that report the first stage regressions where the bank debt ratio is the dependent variable and the banking concentration ratio is the main explanatory variable. As can be noted from the table, the estimated coefficients for the bank concentration are positive and highly statistically significant in both models, with industry and country effects, and with firm fixed effects. These results indicate that there is a strong positive relationship between firm's reliance on bank debt and overall banking sector concentration. Results of the second stage regressions are presented

in Models 5 and 6. The coefficient estimates for the instrumented bank debt ratio are still positive but significant only in the model with firm fixed effects. Consistent with Model 2, the results of the instrumental variable regressions in Model 6 indicate that higher levels of bank debt in the firm's debt structure may enhance firm profitability. However, this effect may depend on industry or country characteristics.

4.3 Debt structure and firm valuation

As the next step of the analysis, the association between firm valuation and bank debt ratio is examined. Table 4 reports these estimation results. As in Table 3, Model 1 in Table 4 uses industry dummies and country effects, while Model 2 estimates Equation 1 with firm fixed effects. As can be noted from the table, the model with firm fixed effects again has better explanatory power as the adjusted R-squared is 81%, in contrast to 57% in the model with industry and country effects. These models suggest that higher degree of financial leverage and lower default risk are positively associated also with firm market performance. The relationship between firm size and Tobin's Q seems to be dependent on either industry or country specific factors as the estimated coefficient for size is negative and significant in Model 1, while being positive and significant in Model 2. Interest coverage seems to have negative relation to firm valuation however it is only significant in Model 1.

Table 4 shows that the estimated coefficients on the bank debt ratio are negative and significant at the 1% level in both Models 1 and 2. These results indicate that Tobin's Q decreases by about 0.18 units for fully bank-financed firm, which corresponds to about 18% lower market valuation for the average sample firm. These findings are somewhat inconsistent with the results obtained in the previous section. If bank debt is able to improve firm profitability, the market assessment is expected to be positive. However, the data sample used in this paper does not contain observations on only new debt contracts and therefore, the captured effect may be due to general negative market reactions to debt financing. Anticipating potential debt overhang problem, markets are most likely to react negatively to any additional debt issuances.

Another way to test the effect of different levels of bank debt on firm valuation is to account for potential nonlinearity.[4] As can be noted from Models 1 and 2 in Table 4, the squared terms of bank debt ratios are positive and significant at the 10% and 5% levels, respectively. These results indicate that fully bank-financed firms may

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[4]Nonlinearity in the relationship between bank debt ratio and firm profitability had also been tested. These tests did not provide any evidence of non linear relationship.

Table 4. Bank debt and firm valuation

The table reports the estimates of different versions of Equation 1 using unbalanced panel data on 700 large publicly traded firms from the BRIC countries for the period 2003-2012. The dependent variable in all columns is the logarithm of Tobin's Q, calculated as the ratio of the firm's market value to its replacement costs of assets. Market value is calculates 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. Size is measured by the logarithm of total assets. Leverage is the debt-to-assets ratio, while liquidity is the ratio of current assets to current liabilities. Interest coverage defined as earnings before interest and taxes to total interest expenses ratio. Sales growth is the annual growth rate of gross sales. 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). All independent variables are lagged by one period. Models 1 and 3 include industry and country dummies, while Models 2 and 4 include firm fixed effects. All specifications include period fixed effects. Standard errors are corrected for heteroskedasticity and within-firm error clustering. Absolute t-values are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: Ln (Tobin's Q)			
Explanatory Variables	Model 1	Model 2	Model 3	Model 4
Bank debt ratio	-0.17***	-0.19***	-4.08***	-2.83**
	[2.73]	[2.76]	[3.89]	[2.17]
Bank debt ratio (squared)	0.12*	0.14**	3.68***	2.36***
	[1.88]	[2.34]	[3.60]	[2.68]
Size	-0.06***	0.04**	-0.06***	0.05*
	[10.0]	[2.37]	[6.78]	[1.68]
Leverage	0.65***	0.59***	0.64***	0.67***
	[20.5]	[7.00]	[7.96]	[5.46]
Interest coverage	-0.003***	0.00	-0.004***	0.00
	[5.40]	[0.02]	[4.55]	[0.88]
Liquidity	0.00	0.00	-0.01	-0.01
	[0.29]	[0.01]	[0.83]	[0.41]
Sales growth	-0.01	0.00	-0.02	-0.01
	[1.05]	[0.18]	[1.42]	[0.47]
Z-score	0.16***	0.14***	0.16***	0.14***
	[24.4]	[26.0]	[35.0]	[25.7]
Constant	0.38***	-1.08***	1.40***	-0.55
	[2.94]	[4.60]	[4.21]	[0.71]
No. Of observations	1,530	1,530	1,530	1,530
Adj. R-squared	0.57	0.81	-	-
Regression type	OLS with FE	OLS with FE	IV with FE	IV with FE
Industry dummies	Yes	No	Yes	No
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	No	Yes	No	Yes
Country fixed effects	Yes	No	Yes	No

experience higher market valuation. However, the magnitudes of the coefficients for the raw bank debt ratio are 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 1.

Figure 1. Tobin's Q and bank debt ratio

The figure plots the relationship between different levels of bank debt and firm market performance measured by Tobin's Q. Vertical axis reports average Tobin's Q for different brackets of bank debt ratio that are presented on the horizontal axis. The picture is based on averages across 1,801 observations on 700 individual firms front the BRIC countries for the period 2003-2012.
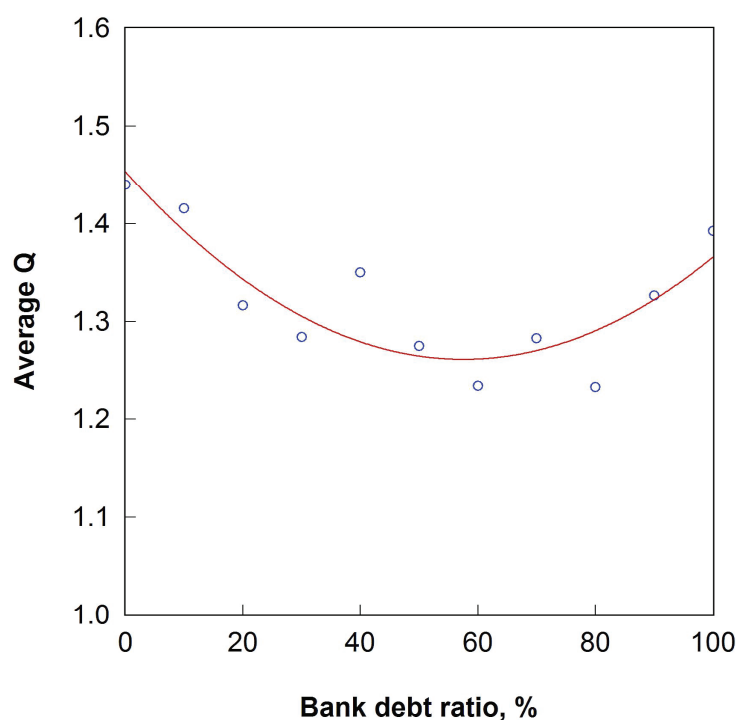
The figure plots the average Tobin's Q for different levels of bank debt in firm's total debt. As can be seen from the figure, once the firm increases bank loans in the debt structure, its market value, measured by Tobin's Q, diminishes. The negative relationship is observed up to the point when the firm is financed by bank loans by about 60%. However, once bank debt occupies more than 70%, the relationship turns to positive and fully bank-financed firm loses only marginal amount of market value compared to fully bond-financed firms.

Further, Models 3 and 4 in Table 4 report estimation results from the IV regressions. First stage regressions are the same as in Table 3 and therefore are not reported in Table 4. As can be noted from the table, IV estimations confirm findings from Models 1 and 2, capturing significant negative relationship between the level of bank debt and firm valuations. But this effect diminishes for fully bank-financed

firms.

4.4   Bank debt and financially distressed firms

The analysis so far focuses on the association of different levels of bank debt on firm profitability and market valuation. The sample period includes the episode of severe liquidity shock during the financial crisis of 2008. This episode is characterized by high levels of financial constraints that lead individual firms to financial distress. Given the recent empirical evidence that indicates that the level of reliance on public or private debt may be dictated by the extent of financial constraints of a firm (Behr et al., 2013), it may be important to treat financially distressed firms as a separate subgroup. Thus, as the final stage of the analysis, the question of whether different degrees of financial distress affect the relationship between debt sources and firm performance is examined. Table 5 reports the OLS estimation results on the association of the level of bank debt and market valuation in two sub-samples of financially distressed and non-distressed firms.[5]

Financial distress is assessed with the Altman's Z-score.[6] Firms are defined as financially distressed if they are in the bottom third of the sample's Z-score distribution. Financially non-distressed firms constitute the top third of the distribution, while the middle third is characterized by the average financial stability and excluded from this part of the analysis.

Model 1 in Table 5 reports the estimation results for financially non-distressed firms. These firms have Z-scores of more than 2.46. As can be noted from the table, the relationship is consistent with the earlier findings from Table 4. The general association between bank debt and firm valuation is negative and highly statistically significant. However, this relationship is still non linear, implying only marginal losses of market value of fully bank-financed firms. Magnitudes of the coefficients are even larger, indicating even stronger effects for financially unconstrained firms. As suggested by Model 1, firm size has a negative effect on market valuation, while all other control variables are insignificant.

Model 2 in Table 5, in turn, reports the estimates for financially distressed firms. Z-scores of these firms are lower than 1.42, which indicates that firms are most likely heading to bankruptcy. Interestingly, the estimation results suggest a completely different relationship between the level of bank debt and market valuation. The

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[5]The results are reported only for OLS estimations since earlier analysis in Table 4 showed that the relationship between bank debt ratio and market valuation is not subject to endogeneity problems and do not require further IV estimations.

[6]It is acknowledged that Altman's (1968) Z-score was initially developed for the U.S. manufacturing sector but given recent evidence on suitability of Z-score outside the U.S.(see e.g. Agarwal & Taffler, 2007), it is argued that Z-score is an appropriate measure of individual firm's financial distress in emerging markets.

general association between the level of bank debt and Tobin's Q for financially distressed firms is now positive. These results imply that market appreciates bank's participation in the firm's debt contracts in times of financial difficulties. However, the relationship between the level of bank debt and market value of fully bank-financed financially distressed firms is negative and significant. It should also be noted that the magnitude of the squared term is larger, implying that the negative

Table 5. Bank debt and valuation of financially distressed firms

The table reports the estimates of Equation 1 for sub-samples of financially distressed and non-distressed firms based on the Altman's (1968) Z-score. The dependent variable in all columns is the logarithm of Tobin's Q, calculated as the ratio of the firm's market value to its replacement costs of assets. Market value is calculates 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. Size is measured by the logarithm of total assets. Leverage is the debt-to-assets ratio, while liquidity is the ratio of current assets to current liabilities. Interest coverage defined as earnings before interest and taxes to total interest expenses ratio. Sales growth is the annual growth rate of gross sales. All independent variables are lagged by one period. All specifications include period and firm fixed effects. Standard errors are corrected for heteroskedasticity and within-firm error clustering. Absolute t-values are reported in brackets. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: Ln (Tobin's Q)	
Explanatory Variables	Model 1 z-score>2.46	Model 2 z-score<1.42
Bank debt ratio	-0.63***	0.27*
	[3.58]	[1.66]
Bank debt ratio (squared)	0.53***	-0.29**
	[2.94]	[2.04]
Size	-0.12**	-0.11***
	[2.31]	[4.28]
Leverage	0.29	0.28***
	[0.99]	[3.28]
Interest coverage	0.00	-0.005**
	[1.25]	[2.21]
Liquidity	0.00	0.05***
	[0.02]	[3.70]
Sales growth	0.02	-0.01
	[0.65]	[1.41]
Constant	2.12***	1.39***
	[2.88]	[3.63]
No. Of observations	505	505
Adj. R-squared	0.62	0.82

effect for fully bank-financed firms is even greater than the general positive effect. Furthermore, in contrast to the sub-sample with financially non-distressed firms, most of the control variables are significant in the model with financially distressed firms. In particular, liquidity and leverage are positively related to market valuation, while size and interest coverage seem to have negative effect on Tobin's Q.

The estimation results suggest that market participants appreciate bank's involvement in debt contracts of financially distressed firms.[7] This finding is consistent with the hypothesis on the benefits of bank debt in terms of easiness of renegotiation in case of financial distress. Nevertheless, high levels of bank debt in the firm's capital structure, on the other hand, may trigger even larger valuation losses, which indicates that markets do not believe in bank's ability to recover the firm's financial situation alone.

4.5   Robustness tests

Robustness of the results is ensured with several additional test that are not tabulated. First, it is acknowledged that the investigated relationship between debt sources and firm performance may be affected by country-specific characteristics that are not captured by the country fixed effects. Moreover, given the data sample distribution used in this analysis with the most observations coming from China, it is important to control for results to be not driven by observations from any single country. This issue is addressed by including interaction variable of the country dummies and the main explanatory variable - bank debt ratio. The inclusion of interaction variables does not affect the main results. Moreover, the interaction variables have the same vector of relationship with the dependent variable but are not significant in all regression specifications. F-tests also indicate that the coefficients of interaction variables and bank debt ratio are not statistically different.

Second, the sample period used in the analysis includes the episode of severe financial turmoil in 2008-2010. Emerging markets were also affected by the global financial crisis and experienced large valuation losses. Despite time fixed effects that are used in all regression specifications, the episode of financial crisis may have important implications for the relationship between debt sources and firm performance that are not captured by the fixed effects. To address this issue, the main model of Equation 1 is augmented with a crisis dummy that takes the value of one in 2008, 2009, and 2010 and zero otherwise.[8] In addition, the interaction variable of the crisis dummy and bank debt ratio is included. The findings from this part

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[7] It should be noted that the analysis on implications of debt source levels and firm profitability (ROA) of financially distressed and non-distressed firms did not discover any differences with the results from the full sample estimations. Hence, it is not reported.

[8] Years of the financial crisis are determined based on the general market movements in BRIC countries.

indicate that the reported relationship between firm performance and bank debt ratio remains unchanged during the crisis episode. The relationship between bank debt ratio and market valuation still remains non linear and statistically significant, while the association between bank debt ratio and profitability remains positive and significant. While the crisis dummy is significantly negatively related to ROA, the interaction variable of bank debt ratio with the crisis dummy is also positive and highly statistically significant. The magnitude of the coefficient is even larger than for the raw bank debt ratio, implying that bank debt is especially valuable for a firm profitability levels during the crisis.

5   Conclusions

The prior literature suggests that different debt sources provide different features that may have either good or bad effects on firm performance (see e.g. Diamond, 1984, 1991; Rajan, 1992). Monitoring function of banks, for example, may enhance managerial incentives and resolve moral hazard and adverse selection problems but may also cause hold-up problem by employing information monopoly. Yet, little is known about whether different levels of different 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 association of different levels of public and bank debt with firm profitability and market valuation.

Using an unbalanced panel of 700 publicly traded firms from Brazil, Russia, India, and China over the period 2003-2012, it is examined whether the reliance on public or bank debt or a certain composition of the two affects firm performance. The sample includes firms that are relying on both bank loans and bonds. Hence, the assessment of performance differences between firms that mostly rely on bank debt and firms with public debt is less vulnerable to determinants of a firm's decision to issue one over another type of debt.

The empirical findings reported in this paper suggest that different debt sources as well as different compositions of debt sources in a firm's capital structure may affect its performance. The results provide evidence to suggest that higher levels of bank debt may enhance firm profitability, as measured by ROA. At the same time, bank debt seems to be negatively related to firm valuation, as measured by Tobin's Q. These results are broadly consistent with the prior evidence on the negative reaction of debt arrangements on stock returns (see e.g. Cai & Zhang, 2011; Godlewski et al., 2011). The estimation results suggest that Tobin's Q is significantly lower for firms with bank debt than for firm with public debt. However, 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. The main findings remain virtually similar after addressing potential endogeneity problems.

Moreover, it is also documented that the relationship between bank debt levels and firm valuation is different for financially distressed firms. The empirical results indicate that market participants appreciate bank's involvement in debt contracts of a distressed firm but do not believe in bank's ability to recover firm's financial situation alone. These findings are broadly consistent with the prior evidence on the relationship between debt source choices and financial constraints of a firm (Behr et al., 2013).

Overall, the results reported in this paper suggest that debt source choice is an important determinant of firm performance. The study primarily focuses on the dynamic ratio of bank debt in the interest bearing long-term debt and does not distinguish between new and continuous debt arrangements. Therefore, the observed general negative relationship between bank debt and firm valuations is not necessarily inconsistent with findings on positive relation of bank debt and firm profitability, as the market may react negatively to any additional debt issuances, anticipating debt overhang problems. Moreover, observed nonlinearity in the relationship between bank debt ratio and Tobin's Q suggests that further research is needed in order to identify optimal debt sources composition. Future research could distinguish between new and continuous debt issuances and their effects on firm performance.

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Does state ownership of banks matter? Russian evidence from the financial crisis.*

Abstract

This paper examines whether the level of state ownership affects bank lending behavior and capitalization over the period 2005-2011. Using data from the highly concentrated and state-influenced Russian banking sector, it is documented that the relationship between state ownership and lending is nonlinear. While overall loan growth decreased and interest rates rose, it is found that fully state-controlled banks increased their lending and charged lower interest rates during the financial crisis of 2008-2010. Moreover, state-owned banks were better protected against asset default. These findings suggest that state ownership of banks may be particularly valuable during periods of financial turmoil.

JEL classification: G01; G21; G32; H12

Keywords: bank lending, state ownership, privatization, financial crisis

1   Introduction

It is generally accepted that state ownership of commercial banks is inefficient, may have a negative effect on financial performance, and is not superior to other forms of ownership (see e.g. La Porta et al., 2002; Barth et al., 2004; Bonin et al., 2005a; Boubakri et al., 2009; Cornett et al., 2010). Consequently, over the past few decades governments of many developed countries have been rapidly transferring their ownership rights to the market and private investors. At the same time, many emerging countries that still have high levels of state ownership in their banking sectors have been actively developing privatization programs (Megginson, 2005).

However, since 2008 and the onset of the global financial crisis, instead of massive privatization, both developed and emerging countries experienced large scale nationalization and bailouts of private banks (Brunnermeier, 2009; Erkens et al., 2012). Such actions were inevitable in most of the cases and were conducted in order to avoid large scale bankruptcies and meltdowns of financial systems.[1] This reverse transfer of ownership may indicate that state ownership of banks is not necessarily harmful and may even be more desirable in times of financial turmoil.

This paper focuses on the effects of government ownership on lending behavior and capitalization of commercial banks over the period 2005-2011. Using data from the highly concentrated and state-influenced Russian banking sector, it is documented that the relationship between state ownership and lending behavior is nonlinear. While overall loan growth decreased and interest rate rose, banks that were fully controlled by the government significantly increased lending amounts and charged lower interest rates during the crisis of 2008-2010. Furthermore, state-owned banks appeared to be better capitalized, and therefore, were more protected against asset default than privately-owned banks. These empirical findings suggest that high levels of state ownership of banks may be particularly valuable during periods of financial turmoil.

Existing theories suggest that state ownership of commercial enterprises is ineffective because of at least three reasons. First, political interference always conflicts with market objectives, and therefore, would certainly deviate a firm from a value maximization aims (Shleifer & Vishny, 1994; Boycko et al., 1996). Second, managerial incentives in state-owned enterprises tend to be weaker compared to those in privately owned firms (Shleifer, 1998). Finally, inferior incentives of government as an owner to implement monitoring efforts may lead to sub-optimal levels of performance (Shirley & Walsh, 2000).

The prior empirical literature on state ownership of banks in general supports the theory and suggests that commercial banks with state ownership usually underper-

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[1]In the United Kingdom, for example, the British government had to step in and nationalize such banks as Northern Rock and Royal Bank of Scotland because of their inability to cope with financial difficulties caused by the financial crisis during 2008. In the U.S., Federal program of capital purchases accounted for more than 200 bill. USD that were spent on bailing out such banks as Citigroup, Wells Fargo and many others. These actions can be considered as partial nationalization.

form those that are privately owned. A large number of studies primarily focus on the non-crisis periods and examine the association between state participation in the banking sector and either financial stability and development or bank performance itself. Many cross-sectional studies find a negative relationship between government ownership of banks and financial development, stability, and economic growth (Barth et al., 1999, 2004; La Porta et al., 2002; Gur, 2012). It is also well documented that government participation in the banking sector may affect lending behavior and be more politically connected (Sapienza, 2004; Dinç, 2005; Khwaja & Mian, 2005; Micco & Panizza, 2006; Micco et al., 2007; Carvalho, 2014).

Another strand of literature suggests that state ownership of banks is also associated with lower performance, weaker corporate governance, and higher levels of risk. Cross-country studies find that state-owned banks are less efficient, experience lower profitability, have worse loan quality and higher interest expenses, lower governance quality, and tend to be more risky despite their lower average costs (Hawkins & Mihaljek, 2001; Mian, 2003; Bonin et al., 2005b; Iannotta et al., 2007; Borisova et al., 2012; Shen & Lin, 2012). Several country- or region-specific studies confirm these findings (see e.g. Berger et al., 2005, 2009; Lin & Zhang, 2009; Cornett et al., 2010). More recently, it has been documented that state-owned banks tend to have higher levels of operating risk (which especially increases in election years) but much lower default risk compared to privately owned banks (Pennathur et al., 2012; Iannotta et al., 2013).

According to previous empirical evidence, bank efficiency and profitability as well as financial stability of the whole economy is less likely to be associated with state participation in the banking sector as an owner. Ideally, as proposed by the theory, state ownership in the banking sector is desired to approach zero. However, since the majority of the empirical evidence comes from normal, non-crisis periods, the only conclusion we can make is that state ownership does not create any additional value during the stages of economic evolvement. Yet, facing crises and economic downturns, governments are more likely to interfere and serve as a guarantee for distressed banking sector.[2] Therefore, state ownership of banks may actually be particularly valuable in harsh times.

There are only a few studies that investigate the behavior of state-owned banks during crisis periods. One of these exceptions is Brei & Schclarek (2013), who show that government-owned banks in general increased lending during the financial crisis of 2008-2010 by using a sample of 764 banks from 50 countries. They also find that typical state-owned banks do not receive more equity or deposits during the harsh times, and hence, the increase in lending is most likely to be associated with the government response to crisis situation. Another recent study by Cull & Martinez Peria (2013) examines the impact of bank ownership on credit growth in developing countries around the financial crisis of 2008-2010. They document that government ownership has different effects on lending growth in Eastern Europe

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[2]Extensive literature review on the role of state ownership during the crisis is provided in the World Bank Global Financial Development Report (World Bank).

and Latin America. In particular, state-owned banks significantly increased lending during the crisis compared to private and foreign banks in Latin America, while state ownership of banks in Eastern European countries did not impose notable lending growth during the credit crunch episode.

Furthermore, De Haas, Korniyenko, Loukoianova & Pivovarsky (2012) argue that state-owned banks can be considered as a relatively stable source of credit compared to foreign bank subsidiaries that are found to decrease their lending even before the financial crisis of 2008-2010 had started in a number of Eastern European countries. Finally, Fungáčová, Herrala & Weill (2013) document that credit supply levels varied across ownership types in Russia during the financial crisis of 2008-2010. Using stochastic frontier approach, they find that while overall credit supply diminished, the reduction was lower for state-owned banks and higher for foreign banks.

Given the relatively scarce empirical evidence from the crisis periods, this paper aims to contribute to the above literature by examining the direct effects of state ownership on lending behavior and bank capitalization, specifically around the time of the global financial crisis of 2008-2010 using a panel of Russian banks. A within-country analysis that is less prone to endogeneity issues compared to large cross-country studies is expected to provide a more detailed view on the effects of state ownership on bank lending behavior and capital buffer. In addition, the Russian banking sector, which can be characterized as highly state-influenced with dense concentration, provides an appropriate environment to examine this issue. Moreover, privatization of the financial sector is an ongoing concern in Russia as its government recently announced plans on selling of all state holdings in other than energy and defense industries by 2016. Therefore, the empirical analysis presented in this paper may have important policy implications for the emerging markets with high state influence in the banking sector. Furthermore, this paper contributes to the previous literature by accounting for potential nonlinearity by examining whether the level of state ownership matters for bank lending behavior and capitalization. The issue of possibly nonlinear relationship between ownership structure and different bank operations is raised in several recent studies (see e.g. Barry et al., 2011; Iannotta et al., 2013) and therefore is important to account for.

Using a sample of 348 large Russian banks, it is found that the relationship between state ownership and lending behavior is nonlinear and high levels of state ownership may be more valuable during financial crises. In particular, the results indicate that growth of loans is positively associated with high levels of government participation in the ownership stake of banks, especially during the crisis period. At the same time, fully state-owned banks charge lower interest rates on loans. It is also documented that there is a positive relationship between capital ratios and state ownership around the crisis, implying that government as an owner may provide more protection from asset default.

These results are broadly consistent with the existing studies that focus on the financial crisis period (see e.g. Brei & Schclarek, 2013; Fungáčová et al., 2013; Cull

& Martinez Peria, 2013; De Haas et al., 2012). Although state ownership has a negative impact on bank performance, efficiency and economic development in normal times (see e.g. La Porta et al., 2002; Barth et al., 2004; Bonin et al., 2005a; Cornett et al., 2010), the empirical findings of this paper demonstrate that government participation in the banking sector may outweigh these disadvantages during crises episodes.

The remainder of this paper is organized as follows. Section 2 describes the Russian banking sector and discusses government participation in it. Section 3 introduces the data, while Section 4 presents the methodology. Empirical findings on the effects of government ownership of banks on lending behavior and capitalization are reported in Section 5. Finally, Section 6 concludes the paper and discusses potential policy implications.

2 Overview of the Russian Banking Sector

Although the number of commercial banks in Russia has been constantly decreasing over the last decade (from 1253 in 2005 to 978 in 2011), this number is still relatively high if scaled to the size of the economy. For comparison, in the similar emerging market of Brazil there are less than 150 commercial banks. Hence, the Central Bank of Russia still follows the policy on diminishing the amount of commercial banks by increasing minimum capital requirements and imposing stricter financial standards. Minimum capital requirements, for example, doubled since 1997 from 5% to 10%. Nevertheless, even with such a large amount of financial institutions, Russian banking sector is relatively concentrated both geographically and assets-wise.[3] The top 200 banks account for more than 94% of total assets of the Russian banking sector, while the top 5 banks hold up to 50%. Similar picture can be observed on the capital side - the top 200 banks hold 93%, while the top 5 banks account for more than 50% of total capital. At the same time, Herfindahl-Hirschman Index (HHI) being on the moderate levels for assets (0.092) and capital (0.101) mainly due to the large amount of financial institutions, still remains relatively high for deposits (0.225).[4]

While high concentration can potentially cause lower levels of competition and lead to higher interest rates and fees, it may also lead to higher stability in the banking industry through better diversification, higher profitability and easiness of monitoring of large banks. In fact, it has been argued that high concentration is associated with higher interest margins only for foreign banks in Russia, while state-owned banks, despite their large market share, do not exploit their market power in terms of interest rates (Fungáčová & Poghosyan, 2011).

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[3]For a more detailed description of concentration and competition in the Russian banking sector, see Anzoategui, Martinez Peria & Melecky (2012).
[4]Numbers as of end of 2011 according to the Central Bank of Russia.

Table 1. Main characteristics of the Russian banking industry.

The table reports an overview of the Russian banking industry. Panel A describes the main financial characteristics of the Russian banking sector, while Panel B portrays the ownership structure of the industry. The data are obtained from the Central Bank of Russia reports.

Panel A. Russian banking sector	2005	2011	*Change*	*Change, %*
Total assets, in bill. RUB	9 750.3	41 627.5	+31 877.2	+426.9
Total capital, in bill. RUB	1 241.8	5 242.1	+4 000.3	+422.1
- % to total assets	*12.74*	*12.59*		*-0.15*
Total loans to non-financial firms and households, in bill. RUB	5 454.0	23 266.2	+17 812.2	+426.6
- % to total assets	*55.94*	*55.89*		*-0.05*
Capital adequacy, %*	16.0	14.7		-1.30

Panel B. Ownership structure	2005			2011		
	Number	% of total assets	% of total capital	Number	% of total assets	% of total capital
State-owned banks**	32	40.7	33.8	26	50.2	50.8
Foreign banks	51	8.3	9.2	108	16.9	17.6
Large private banks	183	41.2	42.8	132	27.5	24.9
Other private banks	939	9.3	14	656	5.0	6.5
Other credit institutions	48	0.5	0.2	56	0.4	0.2
Total	**1,253**	**100**	**100**	**978**	**100**	**100**

* minimum required ratio is 10.0%
** numbers according to the CBR's classification of state ownership - direct holding of more than 50%

Table 1 presents the main characteristics of the Russian banking sector. As can be noted from Panel A of the table, Russian banking sector experienced substantial growth over the last 6 years. Total assets as well as total capital grew by more than 4 times during 2005-2011. Commercial lending to non-financial firms and households also quadrupled over the same period. It can be also seen from the table that capital and commercial loans were growing proportionally to total assets of the banking sector. Hence, total capital to assets ratio remained approximately at the same level - 12.5%, while the ratio of commercial loans to total assets stayed at around 56%.

Being moderately concentrated in terms of assets and capital, ownership density on the Russian banking sector is even more compact. Panel B of Table 1 characterizes ownership structure of the banking industry. As can be seen from the table, according the Central Bank of Russia (CBR) 50.2% (50.8%) of the industry's total assets (capital) were controlled by the state-governed banks by the end of 2011. It is important to note that there are no large differences in target markets between state-owned and privately held banks in Russia. Most of the banks apply the universal model of banking and follow the same regulations of the Central Bank of Russia, irrespective of their ownership structure.[5] It should also be noted that state

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[5]However, some of the state-owned banks may have politically related connections with their cus-

ownership of commercial banks in Russia is customary. The largest three banks in Russia have always been state-owned. Hence, in contrast to most of the developed markets, the process of bailouts of banks in Russia during the financial crisis of 2008-2010 had only marginal effect on the distribution of state-controlled banking assets. In particular, the Russian government bailed out only a few relatively small regional banks in 2008-2010, while the reduction of systemic risk in the economy was achieved solely through the existing large state-owned commercial banks.

Although CBR defines a bank as state-owned if more than 50% of equity belongs to the government, certain influence on decision making may be exerted even when government does not hold majority stake. Vernikov (2009), for example, finds that the difference between state-owned and state-controlled banks may significantly affect the determinants of market shares. He documents that the gap between state-owned and state-controlled (influenced) banks is nearly 13% of industry's total assets. Thus, the definition of state ownership must be treated with some caution. The CBR classification does not necessarily describe the overall influence of the government in the sector also because it does not consider a bank as a state-owned if the bank's equity is held by state-owned industrial companies.

Although foreign banks have doubled their market share since 2005, they still account only for about 17% (17.6%) of industry's total assets (capital). Nevertheless, it has been found that foreign banks tend to be more efficient than domestic private banks in Russia (Karas et al., 2010). Interestingly, it can be noted from Panel B of Table 1 that large private banks lost substantial amount of market share around the crisis. The total assets held by those banks decreased from 41.2% in 2005 to 27.5% in 2011. Finally, it can be seen from the table that the number of other private banks decreased almost by one third - from 939 to 656 banks, while the market share held by these banks fell by roughly 4%.

Apart from concentration of the banking sector, all commercial banks in Russia experienced significant difficulties during the financial crisis of 2008-2010. Formal indicators of the crisis first started to appear on the capital side of banks. Expecting and preparing for the possibility of bank runs, many financial institutions preferred to transfer their assets into more liquid instruments, which significantly distressed profitability and consequently negatively affected capital ratios. In addition, financial difficulties of borrowers forced many banks to increase their reserves and loan loss provisions. As a result, some banks ended up with negative capital. But in contrast to the Russian crisis of 1998, Russian banking sector managed to avoid massive bank runs and bankruptcies largely due to the extensive government support. While developed countries had to initiate exceptional monetary policies and force significant nationalization of financial institutions (Laeven & Valencia, 2010; Lenza et al., 2010), Russian government stepped in with capital injections, preferential loans on favorable terms, and long term deposits to state-owned banks. To a

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tomers. It is acknowledged that these connections may potentially affect banks lending behavior. Unfortunately, the data on exact borrowers of banks are not available and hence cannot be controlled for in the empirical analysis.

large extent, these actions allowed Russian banking sector to avoid a collapse.

3   Data

The empirical analysis in this paper is based on data on large Russian banks for fiscal years 2005-2011. The data are mainly obtained from Bureau Van Dijk's BankScope. Given the peculiarities of the Russian banking sector and its concentration, smaller banks that operate in specific fields or regions are not of great interest to this analysis. Therefore, all banks that had less than 100 mill. USD in total assets by the end of 2007 (the year prior to the crisis) are omitted from the sample. Further, banks with insufficient financial information are left out. Specialized credit institutions that mainly serve as development banks and governed by distinctive regulations are also excluded from the sample.[6] Lastly, to avoid any potential bias, banks owned by foreign governments are not included in the analysis. In order to ensure that results are not affected by outliers, the data used in the analysis are winsorized at the 1% and 99% levels.

The main variable of interest is state ownership. Many previous studies on state ownership of banks use a dummy variable that takes the value of one if government holds a certain percentage of equity (see e.g. Brei & Schclarek, 2013; Shen & Lin, 2012; Lin & Zhang, 2009; Iannotta et al., 2007). However, quite often the obtained dummies are rather static over time and account only for exceptional changes in ownership, depending on the definition of the variable. Moreover, dummy variables cannot capture nonlinear relationship, and therefore, may lead to incorrect inferences. In contrast to previous studies, this paper uses a different approach that accounts for possible dynamic changes in state ownership and for potential non-linearities. Thus, instead of a dummy, this paper uses a continuous ownership variable defined as the percentage held by the government in bank's equity.

There are, however, two potential problems with this approach. First is the lack of historic data. For certain banks, usually smaller ones, BankScope does not contain all historical information on shareholders. If that was the case, the information on owners was manually collected from different publicly available sources.[7] The second problem arises from the complex ownership structures. As pointed out by Vernikov (2009), official classification of state ownership by the Central Bank of Russia is very narrow and congregates only on direct participation of federal or local government in more than 50% of equity stakes. In practice, governments may exert certain influence on bank's governance mechanisms even without holding controlling stakes. Moreover, governments may affect bank's behavior indirectly, through

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[6]For example, large state-owned bank Vnesheconombank is excluded from the sample because of its specialized activity and its exposure to special regulations by the Federal Law "On the Bank for Development".

[7]Mainly these sources are either the official web pages of banks or service of information disclosure operated by the Interfax media company that is available online at www.e-disclosure.ru.

sophisticated pyramid-type ownership structures. Chernykh (2008), for instance, shows that Russian government exercises its control over some financial and industrial companies using extensive ownership pyramids. Therefore, to account for hidden state control, it is essential to determine the final ultimate owner. For this purpose, BankScope ownership data on financial institutions is augmented with Bureau van Dijk's Orbis database that also contains information on ultimate owners of industrial firms.

Table 2. Summary statistics.

The sample includes observations on 348 individual banks over the 2005-2011 fiscal years. Assets growth is calculated as the percentage of current year's total assets to total assets at *t-1*. Liquid assets to customer deposits and short term funds is a deposit run off ratio and shows what percentage of deposits and funds could be repaid in case of unexpected withdrawal. Return on average assets is net income divided by book assets. Cost to income is measured by the ratio of operating costs to operating income. State (foreign) share is a percentage of equity stake directly or indirectly held by the government (foreigners). Listed is a dummy variable that takes value of 1 if a bank was listed on a stock exchange during the sample period. H-quarters is a dummy variable for having headquarters in the capital city.

Variable	No. of Obs.	Mean	Median	Standard Deviation	Min	Max
Asset structure						
Total assets (mill. USD)	2,196	2,496	276.8	153.3	2.12	336,534
Loans/Assets	2,145	56.64	59.20	16.04	5.81	86.59
Assets growth	2,007	29.82	23.05	38.24	-49.92	231.7
Loan loss reserves/Gross loans	2,148	8.21	5.83	8.57	0.00	108.9
Capital structure						
Equity/Assets	2,152	15.85	12.84	9.93	4.78	72.92
Equity/Net loans	2,140	33.81	22.58	40.03	8.02	423.9
Deposits/Assets	2,147	56.39	57.62	18.74	5.58	88.93
Liquid assets/Deposits and s.t. funds	1,952	34.80	32.64	15.09	10.80	77.35
Income structure						
Return on average assets	2,152	1.44	1.20	1.56	-6.59	8.51
Profit before taxes/Assets	2,152	1.96	1.68	1.74	-6.95	11.33
Net interest revenue/Assets	2,152	5.19	4.97	2.03	0.86	13.98
Cost to income ratio	2,145	75.70	80.63	20.96	24.37	121.7
Ownership structure						
State share	2,196	4.50	0.00	18.14	0.00	100.0
Foreign share	2,196	10.0	0.00	28.77	0.00	100.0
Listed	2,196	0.16	0.00	0.37	0.00	1.00
H-quarters	2,196	0.56	1.00	0.49	0.00	1.00

The ownership structure was ascertained up to the third level of major stake holders. For example, if a bank's equity was mainly held by an industrial company that

in turn was controlled by the federal or local government, this bank was defined as state-owned and the percentage of equity belonging to the government was calculated proportional to the stakes held in the industrial company. Fortunately, these pyramid ownership structures in Russia mostly prevail only in larger banks.

The final sample used in the empirical analysis consists of an unbalanced panel of 2,196 bank-year observations on 348 individual banks for the fiscal years 2005-2011. The amount of observations varies across variables due to lack of financial data. The data cover about 90% of the country's banking assets and can thereby be considered representative of the whole Russian banking sector.

Table 2 reports summary statistics of the sample. As can be noted from the table, the sample is quite heterogeneous in term of bank size. Total assets vary from 2.12 to 336,534 million USD with mean of about 2.4 billion USD. Average growth rate of banks' total assets is fairly high - around 30% per annum. Russian bank also make an average reserve of 8.2% of gross loans to cover their potential losses. On average, 56% of assets consist of commercial loans, while equity covers about 16% of assets and 34% of net loans. Around 56% of assets are financed by customers' deposits, whereas an average bank can immediately repay about 35% of deposits and short term funds by its liquid assets. The table also shows that the average Russian bank is rather profitable. While the mean of return on assets is only 1.44%, average earnings before taxes to total assets are about 2%. Average net interest revenue to assets is more than 5% and cost to income ratio of about 75% imply that Russian banks are relatively efficient and exert utility from attracting cheaper funds and maintaining running costs at lower levels.

4   Methodology

The empirical analysis begins with the examination of the relationship between bank ownership and growth of loans supply with the following regression specification:

$$\Delta L_{i,t} = \alpha_0 + \beta_1 GOV_{i,t} + \beta_2 GOV_{i,t}^2 + \beta_3 SIZE_{i,t-1} + \beta_4 DEP_{i,t-1} + \beta_5 PROF_{i,t-1}$$

$$+ \beta_6 INC_{i,t-1} + \beta_7 CTI_{i,t-1} + \beta_8 CAP_{i,t-1} + \beta_9 LLR_{i,t-1} + \sum_{k=1}^{n-1} \alpha_k BANK_i^k$$

$$+ \sum_{y=2006}^{2011} \omega_y YEAR_i^y + \varepsilon_{i,t} \quad (1)$$

where $\Delta L_{i,t}$ is the growth rate of total loans by bank *i* at time *t*. Following (Micco & Panizza, 2006), the growth rate of loans is defined as the difference between log-loans at time *t* and log-loans at time *t-1*. $GOV_{i,t}$ is the percentage of equity stake directly or indirectly held by the government and $GOV_{i,t}^2$ is a squared term of state ownership. Following recent literature on the ownership structure and banking

(see e.g. Brei & Schclarek, 2013; Craig & Dinger, 2013; Cull & Martinez Peria, 2013), several control variables are included. $SIZE_{i,t-1}$ is the logarithm of total assets, while $DEP_{i,t-1}$ is the logarithm of deposits to assets ratio. $PROF_{i,t-1}$ denotes profit before taxes scaled to total assets, $INC_{i,t-1}$ is a proxy for income diversification calculated as net interest revenue divided by average assets, $CTI_{i,t-1}$ is the logarithm of cost to income ratio measured by operating costs divided by operating income, $CAP_{i,t-1}$ is the logarithm of capital ratio calculated as equity to assets ratio, $LLR_{i,t-1}$ is the logarithm of loan loss reserves to gross loans ratio, $BANK$ denotes a dummy variable for bank *i*, and $YEAR$ is a fiscal years dummy variables. All the bank-specific control variables are lagged by one year.

In addition to the above two-way fixed effects panel regression specification, further analysis uses a crisis dummy variable $CRISIS$ that equals one in fiscal years 2008, 2009, and 2010, and the interactions of $GOV_{i,t}$ and $GOV_{i,t}^2$ with the crisis dummy. This approach allows capturing the effect of state ownership on lending behavior relative to private banks during the crisis period.

Given the relatively high concentration of the Russian banking sector and differences in funding, it is important to control for the geographical location of banks as well as for the easiness of access to external sources of financing. To ensure robustness, two additional dummy variables are included in some specifications. $Listed_{i,t}$ denotes whether a bank was listed on stock exchange during the sample period, while *H-quarters*$_{i,t}$ takes value of one if bank's headquarters were located in Moscow.

As the next step of the analysis, to examine the relationship between bank ownership and interest rates on loans, the following regression specification is estimated:

$$AIR_{i,t} = \alpha_0 + \beta_1 GOV_{i,t} + \beta_2 GOV_{i,t}^2 + \beta_3 SIZE_{i,t} + \beta_4 DEP_{i,t} + \beta_5 PROF_{i,t}$$
$$+ \beta_6 INC_{i,t} + \beta_7 CTI_{i,t} + \beta_8 CAP_{i,t} + \beta_9 LLR_{i,t} + \beta_{10} GROWTH_{i,t} + \beta_{11} ARD_{i,t}$$
$$+ \sum_{k=1}^{n-1} \alpha_k BANK_i^k + \sum_{y=2006}^{2011} \omega_y YEAR_i^y + \varepsilon_{i,t} \quad (2)$$

where $AIR_{i,t}$ is the average interest rate on loans measured as interest income on loans divided by average gross loans. $GOV_{i,t}$, $GOV_{i,t}^2$, $SIZE_{i,t}$, $DEP_{i,t}$, $PROF_{i,t}$, $INC_{i,t}$, $CTI_{i,t}$, $CAP_{i,t}$, $LLR_{i,t}$, $BANK$, and $YEAR$ are defined as in Equation (1). $GROWTH_{i,t}$ is the growth rate of total assets measured as a percentage of the current to the previous year's assets, $ARD_{i,t}$ is the average interest rate on deposits measured as interest expenses on customer deposits divided by average customer deposits. It is important to note that the bank-specific control variables are not lagged in these regression specifications. As described in Lainela & Ponomarenko (2012), high volatility of interest rates in Russia is customary and has been especially substantial in periods of markets stress. Given high volatility of interest rates in Russia, it is reasonable to use contemporary control variables since lagged values are less likely to capture associated effects on the current levels of interest rates.

Finally, the impact of state ownership on bank capitalization is examined with the following regression specification:

$$CAP_{i,t} = \alpha_0 + \beta_1 GOV_{i,t} + \beta_2 GOV^2_{i,t} + \beta_3 SIZE_{i,t-1} + \beta_4 DEP_{i,t-1} + \beta_5 PROF_{i,t-1}$$

$$+ \beta_6 INC_{i,t-1} + \beta_7 CTI_{i,t-1} + \beta_8 LLR_{i,t-1} + \beta_9 GROWTH_{i,t-1} + \sum_{k=1}^{n-1} \alpha_k BANK^k_i$$

$$+ \sum_{y=2006}^{2011} \omega_y YEAR^y_i + \varepsilon_{i,t} \quad (3)$$

where $CAP_{i,t}$ is the logarithm of capital ratio of bank i at time t, measured by total equity divided by total assets. $GOV_{i,t}$, $GOV^2_{i,t}$, $SIZE_{i,t-1}$, $DEP_{i,t-1}$, $PROF_{i,t-1}$, $INC_{i,t-1}$, $CTI_{i,t-1}$, $LLR_{i,t-1}$, $GROWTH_{i,t-1}$, $BANK$, and $YEAR$ are defined as in Equations (1) and (2). All control variables in this regression specification are one year lagged.

5   Empirical Results

5.1   Univariate tests

Table 3 reports the comparison of the main variables between state-owned and privately owned banks. The differences in means are tested with a two-tailed t-test, while the differences in medians are tested with Wilcoxon test. As can be noted from Panel A of the table, average growth rate of loans seems to be on the same level for state- and privately owned banks during the whole sample period 2005-2011. Loan portfolios of these banks were growing on average by 35% per annum. Average capital ratio measured by the equity to total assets ratio is about 16% for all ownership types and the difference between them is not statistically significant. However, as can be noted from the table, there is highly statistically significant difference in average interest rates on loans between banks. State-owned banks charged on average about 13% on their commercial loans, while private banks were charging 134 basis points higher interest rates on their loans.

Next, the means of the same variables are compared exclusively during the crisis period - 2008-2010. Panel B of Table 3 reports comparisons of means and medians of lending behavior and bank capitalization variables between state-owned and privately owned banks year by year. As can be noted from the table, the growth rates of loans are significantly lower in periods of markets stress for both types of commercial banks. The average growth rate of loans for state-owned banks varies between roughly 8% and 11.5%, while the corresponding number for private banks is much more volatile and varies from -4.9% to 24.3%. However, statistical significant difference between two type of banks can be observed only in 2008 in median

Table 3. Univariate tests.

The table reports comparisons of means and medians of lending behavior and bank capi-
talization variables across different ownership types. Panel A presents comparisons for the
full sample period, while Panel B compares the crisis period year by year. Loans growth
is the percentage growth of total loans over the previous year. Capital ratio is measured
by equity to total assets ratio. Average interest on loans is measured as interest income
on loans divided by average gross loans. The difference in means (medians) is tested with
t-test (Wilcoxon/Mann-Whitney). ***, **, and * denotes significance at the 1%, 5%, and
10% levels, respectively.

Panel A: Full sample period 2005-2011	State	Private
Loans growth		
Mean	35.00%	34.92%
Median	21.17%	17.32%
No. of obs.	130	1,701
Capital ratio		
Mean	15.61%	15.87%
Median	12.21%	12.92%
No. of obs.	147	2,005
Average interest rate on loans		
Mean	12.98%***	14.32%
Median	12.92%***	14.13%
No. of obs.	144	1,759

Panel B: Crisis period	2008		2009		2010	
	State	Private	State	Private	State	Private
Loans growth						
Mean	7.94%	-1.04%	11.57%**	-4.92%	11.18%	24.34%
Median	7.29%*	-4.53%	-3.07%	-6.38%	12.00%	16.27%
No. of obs.	20	314	22	290	25	287
Capital ratio						
Mean	13.19%	16.35%	18.61%	17.02%	18.43%	15.76%
Median	10.94%	13.65%	14.17%	14.18%	12.80%	12.79%
No. of obs.	19	310	22	291	24	285
Average interest rate on loans						
Mean	13.41%**	15.08%	14.10%**	15.59%	12.08%***	14.19%
Median	13.16%**	14.71%	13.96%***	15.51%	11.55%***	13.88%
No. of obs.	20	294	22	279	25	276

and in 2009 in mean loan growth rate. Median privately owned bank shrank its
lending by more than 4.5% in the beginning of the crisis, while the credit portfolio
of median state-owned bank grew by more than 7% in 2008. This difference is

significant at the 10% level. Moreover, in the pick year of the crisis, in 2009, the average credit portfolio of state-owned bank experienced faster growth than in 2008 and rose up to 11.5%, while lending by privately owned banks continued shrinking and decreased by 4.9%. This difference is statistically significant at the 5% level. Nevertheless, in 2010 both types of banks experienced growth in lending but the difference is not statistically significant.

As can be seen from the table, average capital ratios of private and state-owned banks were increasing in 2008 and 2009 and continued to increase in 2010 for state-owned banks but slightly decreased for private banks. However, the difference between two samples is not statistically significant in non of the years. At the same time, the difference in interest rates on loans is consistently significant at the 1% and 5% levels through out the whole crisis period. Thus, in 2008 state-owned banks charged 167 basis points lower interest than their private rivals. However, as can be noted from the table, average interest rates on loans slightly increased in 2009 but state-owned banks still were charging 149 basis points lower interest rate. Furthermore, interest rates decreased to pre-crisis levels in 2010, while the interest rate spread between state-owned and privately owned banks increased even more. Government-owned banks charged 211 basis points lower interest rate on their loans than privately owned banks. Overall, Panel B of Table 3 indicates that there are some significant differences in lending behavior between state-owned and private banks during the crisis period that need to be further examined in the multivariate setting.

5.2   State ownership and bank lending behavior

Table 4 presents the estimation results of Equation (1) with the growth of total loans as the dependent variable. Models 1-3 are estimated for the whole sample period 2005-2011, while Models 4-5 examines specifically the crisis period 2008-2010. Model 1 includes dummy variables for banks that are listed and located in the capital city but excludes bank fixed effects, whereas Model 2 is a two-way fixed effects regression. Model 3, in turn, includes a dummy variable that proxies for the crisis period that equals one in fiscal years of 2008, 2009, and 2010. In addition, interactions of the state ownership and squared state ownership with the crisis dummies are included into the model. Model 4 is estimated in a similar manner as Model 2 but for the crisis period only, whereas Model 5 uses variable with high levels of state ownership (at least 95% of equity) for robustness check of nonlinear relationship between growth of loans and state ownership of banks. As can be noted from the table, all models have a good explanatory power with adjusted R-squares varying between 25% and 42%.

First four models in Table 4 suggest that state ownership in general is negatively related to the loan growth rates. However, higher levels of state participation in banks' equity has a reverse effect and render statistically significant positive effect

Table 4. State ownership and growth of total loans.

The table reports the estimates of Equation (1) based on an unbalanced panel on 348 banks. The dependent variable in all specifications is Loans Growth rate - the difference between log-loans at time *t* and log-loans at time *t-1*. Columns 1-3 examine whole sample period 2005-2011, while Columns 4-5 focus specifically on the crisis period 2008-2010. GOV_t is the percentage of equity stake directly or indirectly held by the government and GOV_t^2 is the squared term of the state ownership variable. $GOV\text{-}High$ contains ownership stakes for banks where the government held at least 95% of equity. Column 1 includes *Listed* and *H-quarters* that are dummy variables for a bank being listed on a stock exchange during the sample period and having headquarters in the capital city, respectively. In Columns 2-5, bank fixed effects are included. Specification in Column 3 includes a dummy variable for crisis period *Crisis* that takes value of 1 in fiscal years of 2008, 2009, and 2010, as well as the interaction of the crisis dummy with state and squared state ownership - $Crisis \times GOV_t$ and $Crisis \times GOV_t^2$. Absolute values of t-statistics are in brackets. All specifications contain heteroskedasticity consistent standard errors. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: *Loans Growth*				
Explanatory Variables	1	2	3	4	5
GOV_t	-0.003**	-0.005**	-0.008**	-0.016***	
	[2.28]	[1.95]	[2.14]	[2.71]	
GOV_t^2	0.00***	0.0001*	0.0001**	0.0003***	
	[2.79]	[1.64]	[2.03]	[2.61]	
GOV-High$_t$					0.015***
					[5.11]
Crisis			-0.27***		
			[4.33]		
Crisis×GOV$_t$			0.004*		
			[1.71]		
Crisis×GOV$_t^2$			-0.00		
			[1.26]		
Assets$_{t-1}$	0.01	-0.37***	-0.37***	-0.27	-0.24
	[0.50]	[7.08]	[13.3]	[1.31]	[1.25]
Deposits$_{t-1}$/Assets$_{t-1}$	0.03*	0.06***	0.06***	0.08*	0.07*
	[1.75]	[3.06]	[3.91]	[1.89]	[1.93]
Profit BT$_{t-1}$/Assets$_{t-1}$	0.02*	0.03***	0.02**	0.02	0.02*
	[1.63]	[4.12]	[2.38]	[1.43]	[1.65]
Net interest revenue$_{t-1}$/Average assets$_{t-1}$	-0.00	-0.02***	-0.03**	-0.02***	-0.02***
	[0.70]	[2.92]	[2.22]	[7.97]	[5.67]
Cost to income ratio$_{t-1}$	0.001*	0.002***	0.002	0.003***	0.003***
	[1.91]	[3.05]	[1.30]	[5.63]	[6.06]
Capital ratio$_{t-1}$	0.03	-0.01	-0.03	0.24***	0.25***
	[1.14]	[0.81]	[0.38]	[5.99]	[6.39]
Loan loss reserves$_{t-1}$/Gross loans$_{t-1}$	-0.02	0.01	0.04	0.06	0.06
	[1.47]	[0.31]	[1.04]	[0.54]	[0.57]
Listed	-0.01				
	[1.15]				
H-quarters	0.01				
	[0.31]				
Constant	0.08	4.68***	4.88***	3.56	3.27
	[0.41]	[6.62]	[10.6]	[1.26]	[1.21]
N. of observations	1,681	1,681	1,681	889	889
Adj. R-squared	0.28	0.42	0.37	0.25	0.25
Bank fixed effects	No	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	No	Yes	Yes

on growth rates of loans, implying that the relationship between state ownership and lending growth is nonlinear. The observed nonlinearity in state ownership and loan growth is illustrated in Figure 1. The Figure plots the annual loan growth rates for different levels of state stakes in banks' equity during the crisis of 2008-2010. As can be seen from the figure, the loan growth was around zero for an average bank where the government held up to 50% of equity. But those banks where the government kept greater equity stakes were able to sustain higher loan growth rates. The average growth rate of loans for fully state-owned banks during the crisis was about 20% per annum.

Figure 1. Loan growth and state ownership
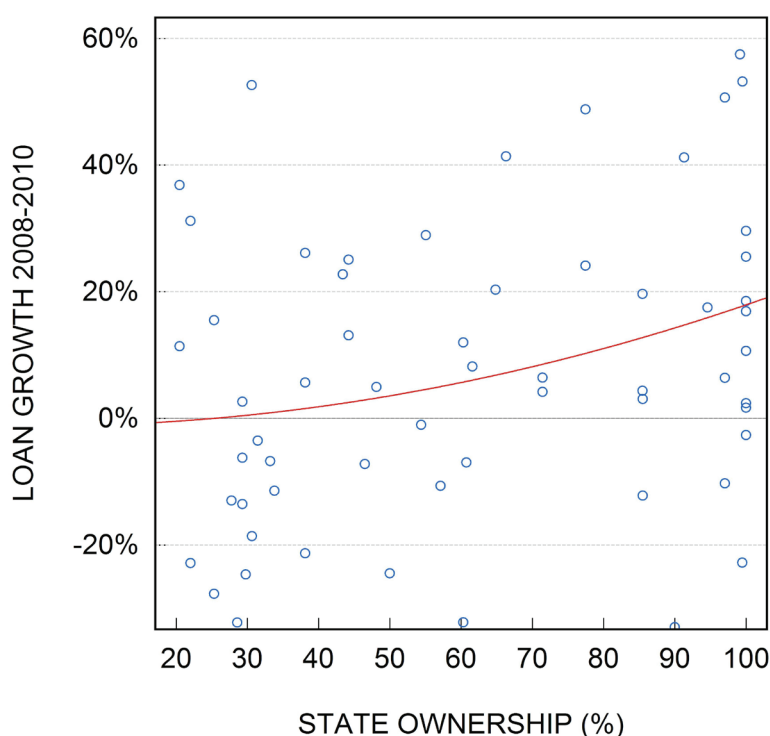
Model 3 in Table 4, in turn, implies that the crisis of 2008-2010 had a significant negative effect on loans growth. However, the interaction of state ownership and the crisis dummy, $Crisis \times GOV_t$, is positive and significant at the 10% level. Unreported F-test indicates that the hypothesis that the sum of the coefficients on GOV_t and $Crisis \times GOV_t$ is equal to zero cannot be rejected, suggesting that general negative effect of state ownership on loan growth may be canceled out during the crisis period. Magnitudes of these estimates suggest that state-owned banks decreased their lending by less than did private banks in 2008-2010. This conclusion is supported by the univariate tests reported in Table 3.

However, the estimates of Model 5 suggest that banks that were fully owned by the government had a positive impact on loans growth particularly during the crisis period. The magnitude of the estimated coefficients indicates that loans on average grew by one and a half percentage points faster in fully state-owned banks during

Table 5. State ownership and interest rates on loans.

The table reports the estimates of Equation (2). The dependent variable in all columns - Average interest rate on loans - interest income on loans divided by average gross loans. Columns 1-3 examine whole sample period 2005-2011, while Columns 4-5 focus specifically on the crisis period 2008-2010. GOV_t is the percentage of equity stake directly or indirectly held by the government and GOV_t^2 is the squared term of this variable. GOV-$High$ contains ownership stakes for banks where the government held at least 95% of equity. Column 1 includes $Listed$ and H-$quarters$ that are dummy variables for a bank being listed on a stock exchange during the sample period and having headquarters in the capital city, respectively. In Columns 2-5, bank fixed effects are included. Specification in Column 3 includes a dummy variable for crisis period $Crisis$ that takes value of 1 in fiscal years of 2008, 2009, and 2010, as well as the interaction of the crisis dummy with state ownership and its squared term. Absolute values of t-stats are in brackets. All specifications contain heteroskedasticity consistent standard errors. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Explanatory Variables	Dependent Variable: *Average interest rate on loans*				
	1	2	3	4	5
GOV_t	-0.07***	0.01	0.00	0.02	
	[6.82]	[0.13]	[0.03]	[1.63]	
GOV_t^2	0.001***	-0.00	-0.00	-0.001***	
	[6.65]	[0.49]	[0.41]	[4.79]	
GOV-$High_t$					-0.06***
					[15.2]
Crisis			1.33***		
			[4.09]		
Crisis×GOV_t			-0.01*		
			[1.75]		
Crisis×GOV_t^2			0.00		
			[0.85]		
Assets$_t$	-0.11**	0.06	-0.25	0.39	0.33
	[1.99]	[0.17]	[1.54]	[0.57]	[0.47]
Deposits$_t$/Assets$_t$	0.19	-0.03	0.10	-0.26	-0.27
	[1.38]	[0.14]	[0.40]	[0.71]	[0.81]
Profit BT$_t$/Assets$_t$	0.10	0.19**	0.14	0.06	0.04
	[1.32]	[2.07]	[1.46]	[0.98]	[0.60]
Net interest revenue$_t$/Average assets$_t$	0.66***	0.72***	0.71***	0.75***	0.76***
	[8.41]	[15.6]	[30.2]	[14.5]	[15.1]
Cost to income ratio$_t$	0.01	-0.00	-0.01**	-0.01	-0.01
	[1.10]	[0.02]	[2.01]	[0.74]	[0.97]
Capital ratio$_t$	-1.16***	-1.45***	-1.35***	-0.73	-0.73
	[3.66]	[3.96]	[3.03]	[1.15]	[1.13]
Loan loss reserves$_t$/Gross loans$_t$	0.09	0.30*	0.35*	0.66***	0.61***
	[1.16]	[1.85]	[1.77]	[9.47]	[8.14]
Growth$_t$	0.00	-0.00	-0.00	-0.00	-0.00
	[0.44]	[0.74]	[0.63]	[0.99]	[0.92]
Average rate on deposits$_t$	0.01*	0.01*	0.01*	0.03***	0.03***
	[1.72]	[1.91]	[1.89]	[3.07]	[2.96]
Listed	0.19				
	[1.16]				
H-quarters	-1.42***				
	[5.76]				
Constant	9.40***	5.86	9.81***	2.99	4.12
	[8.50]	[1.36]	[5.14]	[0.36]	[0.49]
N. of observations	1,587	1,587	1,587	751	751
Adj. R-squared	0.29	0.64	0.62	0.70	0.71
Bank fixed effects	No	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	No	Yes	Yes

the episode of financial stress. The estimated coefficients also suggest that smaller, better capitalized, less efficient but more profitable banks with larger deposits base and diverse income structure are positively associated with loan growth rates.

Next, the relationship between state ownership of banks and average interest rates charged on loans is examined. The estimation results of Equation (2) with the interest income on loans to average gross loans ratio as the dependent variable are reported in Table 5. Models are specified in a similar manner as in Table 4.

As can be noted from the table, the estimates of Model 1 suggest that average interest rates on loans are negatively associated with state ownership. Yet, the model also indicates that this relationship may be nonlinear. The estimated coefficients for GOV_t and GOV_t^2 are not statistically significant in Models 2 and 3. However, Model 3 provides strong evidence to suggest that average interest rates on loans increased by more than 1.3 percentage points during the crisis period but state-owned banks increased rates by much less than the private banks. Figure 2 plots the relationship between state participation in bank's equity and average interest rates on loans during the crisis of 2008-2010. The Figure shows that the difference in interest charged on loans is about 0,5% between partly and fully state-owned banks. While partly state-owned banks charged, on average, about 13,25%, fully state-owned bank required about 12,75% on their loans during the crisis period.

Figure 2. Interest rates on loans and state ownership
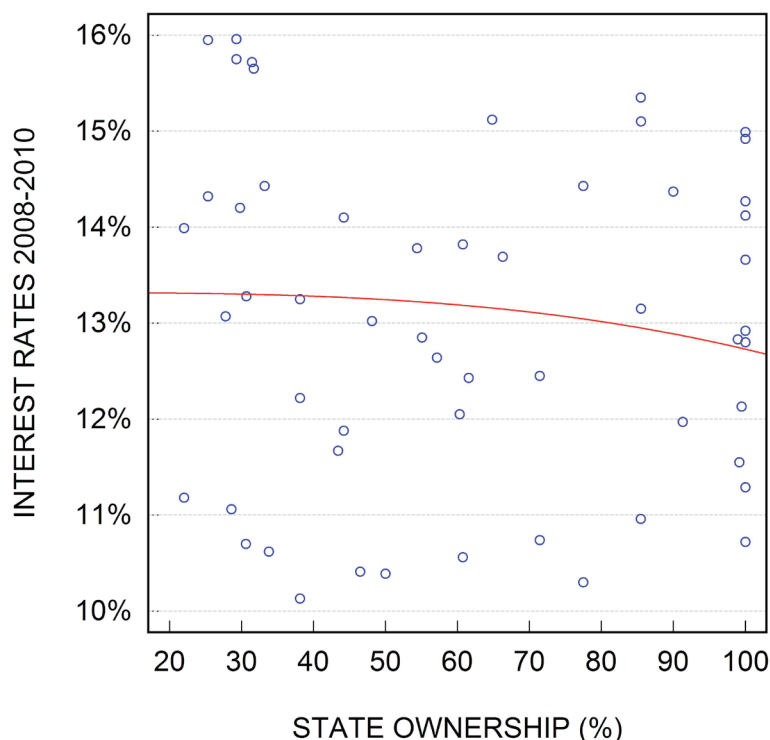
Model 4 in Table 5 confirms these findings and implies that fully state-owned banks charged lower interest rates on their loans during the financial crisis of 2008-2010

as the estimated coefficient for GOV_t^2 is negative and statistically significant at the 1% level. Model 5 supports these findings as the estimated coefficient for $GOV\text{-}High_t$ is negative and significant, implying that conditional average interest rate on loans for fully state-owned banks is six percentage points lower, assuming that bank-specific control variables are fixed.

The significance of the estimated coefficients for the control variables varies across the models. As one would expect, with the change in market rates, average rates on loans and rates on deposits are positively related across all models. Similarly, net interest revenue to average assets ratio is positively associated with interest rates on loans. In the full sample period estimations interest income on loans to average gross loans ratio is negatively associated with the capital ratio, while this significance is, however, vanished in the crisis period. Finally, positive relationship between interest rates on loans and loan loss reserves to gross loans ratio is observed in most of the models, implying that banks charge higher interest rates if the quality of their loan portfolio is worsening. All models have very good explanatory power with R-squares varying between 29% and 71%.

5.3   State ownership and bank capitalization

As the final step of the analysis, the association between state ownership and bank capitalization is examined. Table 6 presents estimation results of Equation (3). The dependent variable now is the logarithm of capital ratio, measured as total equity divided by total assets.

Similarly to Tables 4 and 5, Model 1 in Table 6 uses two additional dummy variables, $Listed$ and $H\text{-}quarters$, that proxy for whether a bank is listed on a stock exchange and whether the headquarters of the bank is located in the capital city. The estimated coefficient for $Listed$ appears negative and statistically significant at the 10% level, implying that publicly listed banks are more risky than non-listed banks. In contrast, the estimated coefficient for $H\text{-}quarters$ is positive and statistically highly significant, suggesting that banks located in Moscow are better capitalized. The model also shows that the squared term of state ownership is positively related to the capital ratio. However, Models 2, 3 and 4 that also include bank fixed effects do not provide strong evidence to suggest that capital ratios are associated with state ownership.

Consistent with the univariate tests in Table 3, Model 3 in Table 6 shows that average capital ratio increased during the financial crisis of 2008-2010 as the estimated coefficient for $Crisis$ is positive and statistically highly significant. While there is no evidence that state-owned banks behaved differently relative to private banks, and furthermore, given that the relationship between state ownership and bank capitalization appears to be linear, Model 5 estimates Equation (3) using a dummy variables that take the value of one if the government held more than 20% of a bank's equity. The estimates of this specification indicate that state-owned banks,

Table 6. State ownership and bank capitalization.

The table reports the estimates of Equation (3). The dependent variable in all columns is logarithm of capital ratio measured by total equity divided by total assets. Columns 1-3 examine whole sample period 2005-2011, while Columns 4-5 focus specifically on the crisis period 2008-2010. GOV_t is the percentage of equity stake directly or indirectly held by the government and GOV_t^2 is the squared term of this variable. GOV_{Dum} is a dummy variable that takes value of 1 if government held more than 20% of bank's equity. Column 1 includes *Listed* and *H-quarters* that are dummy variables for a bank being listed on a stock exchange during the sample period and having headquarters in the capital city, respectively. In Columns 2-5, bank fixed effects are included. Specification in Column 3 includes a dummy variable for crisis period *Crisis* that takes value of 1 in fiscal years of 2008, 2009, and 2010, as well as the interaction of the crisis dummy with state ownership and its squared term. Absolute values of t-stats are in brackets. All specifications contain heteroskedasticity consistent standard errors. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Explanatory Variables	Dependent Variable: *Capital ratio*				
	1	2	3	4	5
GOV_t	0.00	0.00	0.00	0.01	
	[0.64]	[0.71]	[0.85]	[1.57]	
GOV_t^2	0.00*	0.00	0.00	0.00	
	[1.67]	[0.91]	[1.14]	[1.40]	
GOV_{Dum}					0.18**
					[2.32]
Crisis			0.08***		
			[4.13]		
Crisis×GOV_t			0.00		
			[0.38]		
Crisis×GOV_t^2			0.00		
			[0.84]		
$Assets_{t-1}$	-0.06***	-0.08**	-0.08***	0.02	0.02
	[7.97]	[2.38]	[4.67]	[0.28]	[0.23]
$Deposits_{t-1}/Assets_{t-1}$	-0.12***	-0.02	-0.02	0.04**	0.04***
	[8.38]	[1.19]	[0.65]	[2.27]	[3.21]
Profit $BT_{t-1}/Assets_{t-1}$	0.06***	0.00	0.01**	0.00	0.00
	[7.36]	[0.88]	[1.97]	[0.36]	[0.32]
Net interest $revenue_{t-1}/Average\ assets_{t-1}$	0.02***	0.00	0.00	0.00	0.00
	[4.17]	[0.02]	[0.84]	[0.61]	[0.70]
Cost to income $ratio_{t-1}$	-0.002***	-0.001**	-0.001*	-0.001**	-0.001***
	[3.92]	[2.49]	[1.68]	[2.48]	[2.76]
Loan loss $reserves_{t-1}/Gross\ loans_{t-1}$	0.02	0.06***	0.03***	0.05***	0.05***
	[1.50]	[6.29]	[2.59]	[3.26]	[3.28]
$Growth_{t-1}$	-0.002***	-0.001***	-0.001***	-0.00	-0.00
	[5.63]	[2.85]	[3.88]	[0.99]	[0.95]
Listed	-0.02*				
	[1.91]				
H-quarters	0.17***				
	[6.10]				
Constant	-1.40***	-0.94**	-0.94***	-2.25**	-2.21**
	[40.4]	[2.08]	[4.08]	[2.24]	[2.21]
N. of observations	1,514	1,514	1,514	842	842
Adj. R-squared	0.23	0.77	0.76	0.83	0.83
Bank fixed effects	No	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	No	Yes	Yes

on average, were better capitalized during the crisis period as the coefficient for the dummy variable is positive and statistically significant at the 5% level. The explanatory power of this model is very high - 83%, while in Models 1-4, the R-squares vary between 23% and 83%.

Regarding the control variables, $SIZE$, CTI and $GROWTH$ seem to be negatively related to the capital ratio, while profitability and loan loss reserve to gross loans ratio seem to have positive effect on banks' capitalization. The coefficients for these variables are statistically significant at the conventional levels in most of the specifications. Finally, being negatively related to the capital ratio in the whole sample period (as suggested by Model 1), deposits to assets ratio seems to switch its relationship to positive during the crisis period.

5.4   Robustness checks

To ensure robustness of the results, several additional tests are performed. First, main specifications of Equations 1, 2 and 3 are re-estimated using a dummy variable instead of ownership percentages. Given that governments may exert certain influence on bank's governance mechanisms even without holding controlling stakes this variable takes the value of one if the government holds more than 20% of the bank's equity. Similar tests are also performed using a 50% ownership definition. To account for non-linearity in Equations 1 and 2, this dummy variable was split into two variables for high and low levels of state influence. Specifically, high level of state influence is defined if the government holds at least 95% of equity, while low level is defined if less than 50% belongs to the government. All results obtained with dummy variables confirm main conclusions of the paper.

Second, possible differences between private foreign and domestic banks may drive some of the estimated coefficients for state-owned banks. Therefore, additional variable for foreign ownership of banks is included in all regression specifications of all models. Similarly to state ownership variable, foreign ownership is varying from 20% to 100%. Conclusions made in this paper remain unchanged after accounting for the foreign ownership of banks.

Third, Equations 1-3 are estimated in the two sub-samples of privately owned and publicly traded banks. There are 54 banks that were listed on stock exchanges during the sample period. The results on the effect of state ownership on lending behavior and bank capitalization hold for both privately held and publicly traded banks.

6   Conclusions and Policy Implications

While the issue of privatization of state-owned financial institutions is an ongoing concern, the global financial crisis of 2008-2010 reemphasized the importance of government support of these institutions in many developed and emerging countries. This paper examines the association between different levels of state ownership and lending behavior and capitalization of commercial banks. In particular, using data on 348 large banks from the highly concentrated and state-influenced Russian banking sector over the period 2005-2011, the paper investigates whether government ownership of banks has any implications for loan growth rates, interest rates charged on loans, and capital ratios.

The empirical findings reported in this paper contribute to the previous literature by documenting potential non-linearity in the relationship between state ownership and lending behavior of banks. While commercial lending decreased and average interest rates rose during the crisis of 2008-2010, it is found that state-owned banks decreased lending and increased interest rates by less than private banks. Moreover, the results indicate that fully state-owned banks, in fact, enhanced lending and charged lower interest rates. These results are broadly consistent with the recent literature that focuses on the association of state ownership and lending behavior of banks around the crisis episodes (see e.g. Brei & Schclarek, 2013; Fungáčová et al., 2013; Cull & Martinez Peria, 2013). The results of this paper also suggest that state-owned banks were better protected against asset default by having higher capital ratios during the crisis relatively to private banks. These findings, in turn, provide further evidence on the importance of state ownership of banks during periods of markets stress.

The observed large scale nationalization of banks in many countries during the global financial crisis brought the argument of a negative effect of state ownership of banks to a substantial controversy. The results of this paper have policy implications which are especially relevant in times of markets stress. First, they suggest that state-owned banks may serve as a stabilizing power on the commercial loans market. Instead of mass bailouts of private banks in times of crisis, governments may exploit their participation in equity stakes and make direct liquidity injections through capital increases and preferential loans. Such actions, if implemented properly, may lead to general stabilization of the banking sector as a whole.

Second, during crises uninsured depositors are more likely to run rather than monitor or verify leaked negative information on commercial banks. Despite the existence of deposit insurance systems, privately owned banks are more susceptible to bank runs amidst financial turmoil. Recent example of the Northern Rock - a British bank that suffered a severe bank run and was fully nationalized during the crisis of 2008-2010 - supports this statement. In contrast, as a bank's shareholder, government may act as an additional guarantee to depositors and thus prevent them from a funds withdrawal.

Third, the existing evidence on benefits of bank dependence during the crisis periods and superiority of bank debt to other sources of corporate debt for industrial firms (see e.g. Allen & Paligorova, 2011; Davydov & Vähämaa, 2013) implies that state ownership of banks may have an important implications not only for the financial but also for the real sector. If governments are acting as a stable source of credit in crises times, firms that have relationships with state-owned banks would potentially have better options for refinancing and renegotiations in case of financial distress.

Finally, these arguments lead to a conclusion that government-owned banks should not necessarily be completely privatized, even though they are less efficient and profitable. Instead, governments may focus on the enhancement of the quality of corporate governance mechanisms and improvement of efficiency of these banks by decreasing political influence. Several recent studies provide empirical evidence to suggest that privatization of state-owned banks may in fact have harmful effects on financial stability and development and argue that governments should not hurry to privatize their financial sectors (see e.g. Andrianova et al., 2008; Karas et al., 2010; Körner & Schnabel, 2011; Andrianova, 2012). The empirical findings of this paper suggest that state ownership of banks may be particularly valuable in periods of financial turmoil, when governments exert their interventions through state-controlled banks and provide stability to the whole financial system.

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