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Government ownership and the cost of debt: Evidence from government investments in publicly traded firms ☆

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ABSTRACT

We investigate how government equity ownership in publicly traded firms affects the cost of corporate debt. Using a sample of bond credit spreads from 43 countries over 1991–2010, we find that government ownership is generally associated with a higher cost of debt, consistent with state-induced investment distortions, but is associated with a lower cost of debt during financial crises and for firms more likely to be distressed, when implicit government guarantees become the dominant effect. Our results are robust to controls for the endogeneity of government ownership, and we find these effects to be specific to domestic government ownership.

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1. Introduction

Contrary to public perceptions and despite the worldwide success of state privatizations, from 2003 to 2013, governments have acquired more assets through stock purchases ($1.52 trillion) than they have sold through privatizations ($1.48 trillion).[1] This is puzzling, since extensive research shows dramatic performance improvements for privatized enterprises, suggesting that states should be reducing their ownership of corporate equity, rather than increasing it.[2] Part of the recent surge in state ownership resulted from firm rescues that began with the 2008 financial crisis, but an even larger fraction resulted from government purchases of stock as investments unrelated to the crisis. While a vast literature examines the impact of government shareholdings on firm behavior and equity valuation (examples include Eckel and Vermaelen, 1986; Shleifer, 1998; Chen, Firth, and Xu, 2009; Ben-Nasr, Boubakri, and Cosset, 2012), little attention has been given to the impact on the cost of debt.

The influence of government ownership on the cost of debt is especially complex, as governments impose non-profit-maximizing social and political objectives yet also offer implicit guarantees against default. Given these conflicting channels of influence and the predominant role of debt in corporate financing, we investigate the impact of government equity ownership on the cost of corporate debt.[3] The current study is the first, to our knowledge, to explicitly test this impact and to examine whether this effect is due to implicit debt guarantees.

We collect annual spreads for publicly traded bonds and stock ownership data over 1991–2010, focusing on stakes of at least 1% per shareholder, for a sample of firms identified as targets of investments by government entities in the Thomson Reuters SDC Platinum M&A database. Since government owners can purchase additional shares or completely divest stakes over time, our panel data include firm-years both with and without government ownership. Our final sample consists of 6,670 yearly credit spreads from 1,723 bonds issued by 226 companies from 43 countries. The main analysis relies on panel regressions in which we model bond credit spreads as a function of government ownership, while controlling for factors found in previous research to affect the cost of debt and including year and firm fixed effects. We distinguish between the recent 2008 financial crisis and previous non-crisis years, as government guarantees are likely to be more valuable during times of economic hardship when defaults are more probable (Ivashina and Scharfstein, 2010). Our initial results indicate that government ownership is associated with an increase in the cost of debt during non-crisis years—each percentage point increase in government ownership is associated with about a one basis point (bp) increase in the cost of debt. During the financial crisis, however, government ownership is associated with lower spreads, and each additional percentage point of government ownership translates into a 0.21 bp decrease in the cost of debt.

We recognize that government ownership is not random. Indeed, governments invest selectively, which could lead to reverse causality between government ownership and the cost of debt. To ensure that our results are not affected by the government's selection of investment targets and to test the generalizability of our findings, we identify a benchmark sample of firms subject to acquisitions by non-government investors and that have never been owned by the government. We confirm our main findings by using the full benchmark sample in models with Heckman treatment effects and instrumental variables to control for the potential endogeneity of government ownership. Next, we establish that the relation between government ownership and the cost of debt is not driven by the divergence between the largest shareholder's voting and cash-flow rights, as studied by Lin, Ma, Malatesta, and Xuan (2011), or by the post-privatization residual holdings examined by Borisova and Megginson (2011). Finally, to ensure the generalizability of our results to other types of debt financing besides publicly traded bonds, we examine the relation between syndicated loan spreads and government ownership and again confirm our results.

Our findings are not specific to the 2008 financial crisis; we obtain similar results during national banking crises identified by Laeven and Valencia (2013) and Reinhart and Rogoff (2011). Analogous to its impact during macroeconomic distress, government ownership could also reduce the cost of debt when individual firms have a relatively higher default risk. We examine firm-specific measures of risk by investigating firms issuing non-investment-grade bonds, as well as firms classified as financially constrained and small (based on total assets). We find that credit spread reductions associated with government ownership are larger in these firms, consistent with the greater value of implicit government guarantees during times of distress.

Government ownership can manifest itself in both local and cross-border forms, as highlighted by Karolyi and Liao (2015). We hypothesize that social goals are less likely to be imposed on foreign targets, as employment maximization, for example, is not typically a goal sought by foreign government owners. Accordingly, we find that only domestic government ownership is associated with higher spreads in non-crisis years, consistent with state investors diverting corporate resources to meet local social and political goals. However, implicit government guarantees should also be strongest for domestic targets, as the default of a foreign investment target is less likely to carry the "political stigma" associated with failures of domestic state-owned companies. We find that the implicit debt guarantee during the recent financial crisis is specific to domestic government presence, as no such relation is documented for foreign government ownership.

Our paper contributes to the literature on how ownership structure affects the cost of debt (Anderson, Mansi, and Reeb, 2003; Lin, Ma, Malatesta, and Xuan, 2011) and the impact of government ownership on firm value and

[1] Based on data from the Thomson Reuters Securities Data Corporation (SDC) Platinum Mergers and Acquisitions (M&A) database.

[2] Early privatization studies are summarized in Megginson and Netter (2001). More recent research includes Boubakri, Cosset, and Guedhami (2005), Gupta (2005), and Estrin, Hanousek, Kočenda, and Svejnar (2009).

[3] According to data from Thomson One Banker, 82.8% of the $121 trillion of global corporate security issuance over 1991–2010 is debt-related.

behavior.[4] However, with the exception of Borisova and Megginson (2011), this literature has not examined the impact of government ownership on the cost of debt. We provide new evidence that, during times of firm-specific or economy-wide distress, the dominant effect of state equity ownership is a reduction in the cost of debt, consistent with an implicit debt guarantee of government ownership. Furthermore, our empirical setup differs from Borisova and Megginson (2011) in important ways. First, Borisova and Megginson (2011) examine residual state ownership following privatization—the reduction of state control in firms, often concomitant with regulatory changes and firm reorganization—while we also look at the government as a strategic investor in publicly traded firms. Second, in our analysis we control for post-privatization stakes, the control-ownership wedge (Lin, Ma, Malatesta, and Xuan, 2011), as well as for individual and institutional ownership above 1% and find that our measures of government ownership influence the cost of debt even with the inclusion of these controls. Third, we provide evidence that our core results are not specific to bond markets but are replicated in a sample of syndicated loans, suggesting the importance of government ownership to different sources of debt financing. Finally, our sample spans 43 countries, allowing our results to be more applicable to firms from North America and Asia, while Borisova and Megginson (2011) focus solely on domestic government ownership of European firms.

Further, we contribute to research examining government debt guarantees which focuses on how market expectations of government bailouts lead to implicit subsidies to financial institutions, as in O'Hara and Wayne (1990) and Acharya, Anginer, and Warburton (2014), or to a lack of market discipline, as documented by Flannery and Sorescu (1996). This literature has recently gained renewed interest in light of the 2008 financial crisis (Veronesi and Zingales, 2010; Demirgüç-Kunt and Huizinga, 2013). Our paper shows that government ownership can lead to similar implicit guarantees outside of the financial sector and quantifies the impact of such guarantees on the cost of debt of publicly traded firms.

2. Hypothesis development

While private investors are generally concerned with wealth maximization, government owners can induce companies to pursue socially desirable and/or politically expedient objectives (Shleifer, 1998). Kahan and Rock (2010) discuss how, despite nominal fiduciary duties, governments can impose their own goals on a firm more easily than can private controlling shareholders. Therefore, government investors might influence investment target debt pricing through unique channels not shared by private-sector investors, with effects varying based on economic conditions and target firm traits as discussed in the remainder of this section.

2.1. How state ownership can influence firms' cost of debt

Government ownership can carry an implicit guarantee on the debt of the firm, since it is less likely that a firm with state ownership would be allowed to fail. This unwillingness of governments to allow firm default is due to several reasons: pursuit of political and socially desirable goals, such as low unemployment and domestic investment; the desire to maintain key industries providing crucial services to the country; and the reluctance to be associated with a failed investment. Research suggests that such guarantees are likely to lower the perceived risk of default, which, in turn, reduces the risk premiums required by investors and, hence, lowers the cost of debt for the issuing firm (Faccio, Masulis, and McConnell, 2006; Borisova and Megginson, 2011; Iannotta, Nocera, and Sironi, 2013; Acharya, Anginer, and Warburton, 2014).[5]

However, several factors resulting from government ownership could raise firms' cost of debt. The above-mentioned political factors could lower the risk-adjusted performance of government-owned firms, and result in a higher cost of debt, as profitability affects the firm's ability to repay borrowed funds. Ben-Nasr, Boubakri, and Cosset (2012) find government ownership to be associated with a higher cost of equity due to the political interference of state owners, and this relation could similarly extend to the cost of debt. Stulz (2005) shows that firms subject to the "twin agency" problems, where the threat of insider expropriation is compounded by that of government expropriation, face a higher cost of capital. Further, Stiglitz, Jaramillo-Vallejo, and Park (1993) discuss the moral hazard associated with implicit government guarantees, which allows shareholders and managers to benefit from risk taking, while public funds are used to keep firms afloat when such behavior results in distress. Consequently, we expect managers of the guaranteed firm to increase levels of risk taking, as discussed in Iannotta, Nocera, and Sironi (2013) and Gropp, Gruendl, and Guettler (2014), which can affect firm performance and, in turn, increase the cost of debt.

This moral hazard problem can be reinforced by a monitoring gap that occurs because governments lack the incentives or skills (possibly due to political appointments) to supervise management.[6] Further, other stakeholders might limit their monitoring as they expect

[4] A recent strand of literature examines effects related to ownership by various government entities, including state-owned enterprises (SOEs) (Lin and Su, 2008; Blundell-Wignall and Wehinger, 2011), sovereign wealth funds (SWFs) (Bortolotti, Fotak, and Megginson,2015; Truman, 2010), and state pension funds (Woidtke, 2002; Giannetti and Laeven, 2009).

[5] Our implicit assumption, based on the cited literature, is that government ownership affects the probability of default of the firm itself. Another possible channel of state influence on credit spreads lies in bondholder recovery rates during default when explicit government backing of debt instruments exists. In our sample, the instances of direct government guarantees on firm debt are rare and affect 0.67% of the total number of observations. In particular, we find the following bond collateral types that imply a direct government guarantee: "Federal Deposit Insurance Corporation (FDIC) Guaranteed" (2 obs), "Govt Guaranteed" (11 obs), and "Govt Liquid Guaranteed" (32 obs). Accordingly, we focus on the effect implicit government guarantees can have on the probability of default, rather than on recovery rates.

[6] Borisova, Brockman, Salas, and Zagorchev (2012) document that ownership by central and local governments is associated with worse corporate governance.

governments to rescue distressed firms (Organization for Economic Co-operation and Development (OECD), 1998). Eckel and Vermaelen (1986) also point to the fact that government ownership can decrease the probability of a takeover, hence reducing the disciplining effect associated with an open market for corporate control and increasing the cost of debt (Qiu and Yu, 2009).

We further note that the impact government ownership has on the firm is likely conditioned by the size of the government-owned stake. Governments could be more protective of firms in which they own larger stakes, thus reinforcing the implicit debt guarantee. Between implicit debt guarantees, moral hazard, ineffective monitoring, and political goals linked to state owners, the *net* impact of government ownership on the investment target firm's cost of debt is difficult to predict theoretically, and instead becomes a matter of empirical investigation.

2.2. Differential effects of government stock ownership during financial distress

The value of a government guarantee is related to the perceived probability of distress and the perceived probability of government intervention. In normal economic times, the probability of default of a firm could be viewed as remote. As a consequence, a government bailout or other rescuing intervention would be unlikely and hence not have a meaningful impact on the cost of debt. As economic conditions deteriorate and the probability of default increases, the value of a government guarantee increases, possibly leading to a substantial effect on the cost of debt. Recent research documents that corporate bond and loan spreads increased dramatically during and after the financial crisis that engulfed the world after Lehman Brothers' collapse in September 2008 (Santos, 2011; Dick-Nielsen, Feldhütter, and Lando, 2012), and earlier banking crises evoked the same pattern in debt pricing (Bae and Goyal, 2009). In these crisis and post-crisis periods, we expect state ownership to alleviate debtholder fears of default and help lower credit spreads.

Similarly, government guarantees should be relatively more valuable for firms that are more likely to experience distress (such as those that are under financing constraints) and for firms issuing riskier debt (such as bonds rated below investment grade). As the probability of default increases, whether because of macroeconomic or firm-level distress, the costs of political interference from government owners could be overshadowed by the safety net provided by these state owners. We therefore expect government ownership to help lower the cost of debt of investment targets during periods of financial distress or for riskier borrowers.

2.3. Domestic and foreign government ownership

Government guarantees should be most relevant when governments invest in a local target, since domestic state investors are more likely to pursue social goals, such as steady employment, or to support strategically important industries. These goals, along with political concerns about market failures, will strengthen the implicit debt guarantees offered by government shareholders to their domestic holdings, which should be particularly valuable to lenders during economic downturns. Ongena and Penas (2009), for example, find higher bondholder returns in domestic, rather than cross-border, bank mergers and attribute this result to an increased likelihood of domestic government bailouts in times of distress. We therefore expect a lower cost of debt capital during periods of distress to be linked to domestic government ownership.

A possible alternative explanation for a reduction in the cost of debt being associated with government ownership lies in governments being deep-pocketed investors, capable of providing preferential access to state-owned banks or other financing. This rationale applies, however, to both domestic and foreign holdings—Karolyi and Liao (2015) find that, in cross-border acquisitions, targets of government acquirers display higher announcement returns than targets of private-sector acquirers. Therefore, a reduction in the cost of debt for both foreign and domestic state ownership would indicate that bond pricing effects are due to stable ownership positions or access to the extensive resources of government owners, rather than to implicit debt guarantees.

Similarly, the pursuit of local social and political objectives could have harmful consequences on a firm's cost of debt that are specific to domestic government owners. Alternative explanations for an increase in the cost of debt, such as governments lacking the skills or incentives to monitor managerial behavior, apply to both domestic and foreign governments—and, if anything, are strengthened by the information asymmetry generally associated with foreign shareholding. We accordingly classify state shareholdings as domestic or foreign to better understand the channels through which government ownership affects the cost of debt.

3. Sample

We collect a sample of government investments from the Thomson Reuters SDC Platinum M&A database. Since we examine the link between government involvement and the cost of debt, we focus on government investment in publicly traded firms because such firms are likely to issue bonds and to disclose accounting data. As an initial screen, we include all investments in publicly traded targets by entities whose ultimate parent is flagged as “government” over the years 1980–2010. This initial search yields 2,517 transactions worth $749 billion in 1,953 unique public target firms. We further rely on SDC to collect additional information about the deals, such as completion dates, the proportion of shares acquired in each deal, the proportion of shares held by the acquirer after the deal, the nation of the acquirer, macro industry of the acquirer, the nation and primary Standard Industrial Classification (SIC) code of the target, and the deal synopsis, which often indicates the transaction's purpose (i.e., a bailout) or conditions surrounding it.

We use the SDC New Issues and Datastream databases to identify target firms with publicly traded bonds outstanding over the period 1991–2010.[7] We use straight and callable

[7] Our main sample period starts in 1991, as bond credit spreads are not widely available before this time. However, we track government

bonds with fixed coupons and control for the call option in our analysis. Based on the 1,953 unique CUSIPs from the sample of government investment targets, we find 7,346 bonds from 471 issuers. In untabulated robustness checks, we show that these bond-issuing public targets of government investment are not significantly different from the remaining public targets of government investment in terms of leverage, return-on-equity (ROE), and market-to-book ratio (M/B), but are larger, as expected.

Data for these bonds are obtained from Datastream. We retrieve the bond credit spread as the difference between the yield of the corporate bond and the yield of a benchmark government bond that is matched by currency and maturity, as defined by Datastream.[8] We also use this database to retrieve time-varying Standard and Poor's (S&P) ratings for the bond issues. Bond credit spread data and historical credit ratings are recorded as of the Wednesday closest to November 15 of each year (the third Wednesday of each November). We use data as of Wednesday to avoid end-of-week or beginning-of-week distortions in market data. For similar reasons, we use a target date of November 15 to avoid end-of-year effects. We retrieve 14,250 bond-year spreads for our sample, and 8,646 of these (from 2,318 bonds and 249 firms) are found with accompanying yearly S&P ratings.[9] Next, we collect accounting data for our target firms from Worldscope and track acquired/merged firms through the new entity, as in Bortolotti and Faccio (2009) and Borisova and Megginson (2011). This search yields 6,807 bond-years (from 1,734 bonds and 229 firms). To eliminate outliers and possible errors in the credit spread data, we truncate the top and bottom 1% of spreads, resulting in a final sample of 6,670 yearly credit spreads from 1,723 bonds and 226 firms.[10]

Crucial to our sample are accurate, time-varying values of government ownership. We create a new time-series data set of government equity involvement in our sample firms by collecting annual government ownership for every firm-year between 1991 and 2010 in our sample. SDC provides the starting point for this collection via the initial investments that form our sample, as well as sales by the same acquirer-target pair in order to capture decreases in stakes. We then locate our sample firms in the Thomson ONE Banker (T1B) ownership module, track holdings of all institutional shareholders across our sample period as of the end of the calendar year, and classify each reported shareholder into various categories of investors. When not available in this database, ownership amounts and investor identifications are found using company annual reports, filings, and business descriptions. These data are provided by T1B; entities' websites; press releases; the Securities and Exchange Commission's Electronic Data Gathering, Analysis, and Retrieval system (EDGAR); the Canadian Securities Administrators' System for Electronic Document Analysis and Retrieval (SEDAR); Privatization Barometer; the World Bank privatization database; and Lexis-Nexis. Consequently, we are able to find ownership information for all sample firms with credit spread, bond rating, and accounting data.

Table 1 presents a description for the final sample of 6,670 bond-years over a 20-year time span (1991–2010), including 3,868 (58%) with and 2,802 (42%) without the presence of state ownership. These latter observations represent bond-years of the government investment targets where no state ownership exists (i.e., before the government investment or after the government divests its ownership completely). These observations allow us to test the effect of state ownership amongst firms that are all targets of government investment and help control for unobserved factors that could be common to these firms.

Table 1, Panel A, shows that about 38% of bond-year observations (2,554) span the crisis years 2008–2010, allowing for a balanced comparison between the 2008 financial crisis and previous years. Also, 8.4% of our bond-year observations occurred in the 1990s, while 91.6% occurred in the 2000s. This growth reflects the overall increase in bond issuance during our period, with the average annual number of all new bonds in SDC after 2000 being over three times greater than the average up to that year, and the expanded coverage of government benchmark issues in Datastream after the introduction of the euro in 1999, which substantially increased our success in finding bond spreads. Panel B of Table 1 shows that government owners are spread across North America, Europe, and Asia, and a total of 43 countries are represented in the sample. The largest amount of bond-year observations (16.3%) are from firms that are targets of Canadian government investment, with French state investment being second-largest (14.3%).[11] Panel C shows that bond-issuing targets with government ownership are headquartered in Canada (17.2%), the United States (15.7%), the United Kingdom (15.4%), and France (13.3%).[12] While the majority (75%) of these investments are domestic,

(*footnote continued*)
investments starting in 1980, as the earlier starting date allows us to capture a greater number of state investments and helps verify government shareholding during the 1991–2010 period of bond-year observations.

[8] Datastream uses linear interpolation to estimate the yield of the government benchmark when a government benchmark bond with the exact maturity of the corporate bond is not available. Specifically, an intermediate point on the benchmark yield curve that corresponds to the maturity of the corporate bond is used to calculate the spread.

[9] In untabulated checks we document that in the sample of retrieved bond-year spreads, bonds with S&P ratings are not significantly different from bonds without ratings in terms of credit spreads, coupon rates, and issue price but have more time to maturity, larger issue amounts, and are less likely to be issued by banks.

[10] This truncation eliminates the few extreme outlier spreads, so that the largest (smallest) three spread values following truncation are within 12 bp (4 bp) of each other. Our main results are qualitatively the same if we winsorize rather than truncate spread values.

[11] Helping drive their countries to the top of Panel B are the Canadian *Caisse de Dépôt et Placement du Québec* and French *Caisse des Dépôts et Consignations*, state investment entities holding relatively small stakes (though at least 1%) but diverse portfolios. In untabulated analyses, we find Pakistan, the UAE, and Malaysia to have the largest average government stakes per bond-year in domestic targets. To consider both forms of state involvement, our tests make use of the presence and amount of government ownership.

[12] Panel C reflects the pattern of government investment in firms that issue bonds. Although government involvement is prevalent in China, for example, Chinese firms are less likely to issue publicly traded bonds due to a scarcity of rating agencies and onerous state regulation (Ayyagari, Demirgüç-Kunt, and Maksimovic, 2010).

Table 1
Description of sample.

The sample consists of 6,670 yearly observations from 1,723 bonds issued by 226 firms from 43 countries over 1991–2010; 3,868 observations relate to firm-years with government ownership. Panel A includes observation counts for the entire sample and for the subsample including only observations with state ownership. Panel B shows observation counts grouped by the nation of the government owner with the largest stake for each firm-year. Panels C and D include observation counts by the headquarter nation of sample firms and industrial sectors based on one-digit SIC codes, respectively.

Panel A: Credit spread observations by year

Year	Total		With government ownership	
	N	Proportion	*N*	Proportion
1991	2	< 0.1%	0	–
1992	5	0.1%	0	–
1993	17	0.3%	10	0.3%
1994	20	0.3%	10	0.3%
1995	29	0.4%	15	0.4%
1996	38	0.6%	21	0.5%
1997	45	0.7%	19	0.5%
1998	67	1.0%	34	0.9%
1999	148	2.2%	89	2.3%
2000	192	2.9%	121	3.1%
2001	343	5.1%	189	4.9%
2002	330	5.0%	179	4.6%
2003	435	6.5%	216	5.6%
2004	507	7.6%	261	6.8%
2005	581	8.7%	300	7.8%
2006	660	9.9%	365	9.4%
2007	697	10.5%	353	9.1%
2008	716	10.7%	376	9.7%
2009	895	13.4%	455	11.8%
2010	943	14.1%	855	22.1%
Totals	6,670	100%	3,868	100%

Panel B: Nationalities of government owners

Rank	Nation	*N*	Proportion
1	Canada	630	16.3%
2	France	551	14.3%
3	United States	385	10.0%
4	United Kingdom	335	8.7%
5	Spain	215	5.6%
6	Singapore	182	4.7%
7	Norway	146	3.8%
8	Belgium	133	3.4%
9	Germany	130	3.4%
10	China	120	3.1%
	OTHER	1,041	26.9%
	Totals	3,868	100%

Panel C: Nationalities of sample firms

Rank	Target nation	Total		With government ownership	
		N	Proportion	*N*	Proportion
1	United States	2,506	37.6%	609	15.7%
2	Canada	991	14.9%	664	17.2%
3	United Kingdom	810	12.1%	596	15.4%
4	France	516	7.7%	513	13.3%
5	Spain	160	2.4%	160	4.1%
6	Australia	135	2.0%	110	2.8%
7	Netherlands	133	2.0%	69	1.8%
8	Germany	132	2.0%	118	3.1%
9	Austria	100	1.5%	71	1.8%
10	Malaysia	100	1.5%	100	2.6%
	OTHER	1,087	16.3%	858	22.2%
	Totals	6,670	100%	3,868	100%

Table 1 (*continued*)

Panel D: Industries of sample firms

Target SIC	Description of target SIC	Total		With government ownership	
		N	Proportion	*N*	Proportion
0	Agriculture, forestry, and fishery	6	0.1%	4	0.1%
1	Mining and construction	292	4.4%	258	6.7%
2	Manufacturing (food, chemical)	414	6.2%	322	8.3%
3	Manufacturing (plastic, electronics)	250	3.8%	225	5.8%
4	Transportation and utilities	1,926	28.9%	1,392	36.0%
5	Trade (wholesale, retail)	205	3.1%	123	3.2%
6	Finance, insurance, and real estate	3,521	52.8%	1,504	38.9%
7	Services (hotel, recreation)	47	0.7%	31	0.8%
8	Services (health, legal)	9	0.1%	9	0.2%
	Totals	6,670	100%	3,868	100%

foreign investments—such as those by the Chinese government in U.S. or Canadian firms—are also represented. Finally, Panel D shows the general trend of heavier government ownership in the financial (SIC 6, 38.9%) and utility (SIC 4, 36.0%) sectors.

In most tests, we employ the sample of government investment targets described above which, over the length of our period, includes yearly observations with and without state ownership. To determine whether the results extend to a broader set of firms and to address endogeneity concerns of government investment, we form a control sample of bond-years from publicly traded firms which, during the sample period, were subject to stake acquisitions by non-government acquirers. After obtaining credit spreads and ratings for these bonds, as well as financial data for the firms, we are left with 9,070 potential bond-years from 2,066 unique bonds issued by 643 firms in the non-government benchmark sample. This full benchmark sample is incorporated in Heckman treatment models and two-stage least squares (2SLS) instrumental variable models discussed further in Section 5.2.

4. Variables

Table 2 reports descriptive statistics for binary variables in Panel A and for continuous variables in Panel B. Variable definitions follow and are also tabulated in Appendix A.

4.1. Government ownership, owner classification, and ownership structure

Govt ownership (Presence), a binary variable taking a value of one if there is any government ownership in the firm during a specific calendar year, and zero otherwise, appears in 58% (3,868) of observations. This binary firm-level indicator of government ownership is similarly used by Benmelech and Bergman (2011), who find significant financial stabilization effects related to it. For greater precision, however, we use levels of state ownership, represented as the percentage held of a firm's shares, as the primary explanatory variable in our investigation. *Govt ownership (Stake %)* mean (median) is approximately 12% (2%) for the full sample, out of which 8.73% (1.35%) represents new, non-legacy government ownership not attributable to residual shareholdings remaining after privatizations, as shown in Panel B of Table 2. The mean (median) of *Govt ownership (Stake %)* is 21% (10.23%) for the sample of bond-years in which the government is a shareholder.

We identify domestic and foreign government owners and examine their effects on the cost of debt of firms, given the likely variation in their social/political objectives. Panel A of Table 2 shows that foreign government ownership is present in 1,601 observations, which is 24% of the overall sample and 41% of the sample with state ownership. But foreign government ownership is usually present together with domestic government stakes, and only in 692 observations (10% of the overall sample) does foreign government ownership occur independently of the domestic government. In order to further account for the ownership structure of the targets of government investment, we identify years where blocks of ownership (at least 5%) are held by non-government institutional owners (*Institutional blockholder*; 5,534 observations; 83% of the sample). To complete our account of the ownership structure, we also identify a variable *Individual owner*, when stakes (of at least 1%) are held by individuals or families, as indicated by the T1B ownership module (795 observations; 12% of the sample).

Finally, we account for the difference between control and cash-flow rights (*Wedge*), since Lin, Ma, Malatesta, and Xuan (2011) find higher levels of the control-ownership wedge to be associated with a higher cost of debt using a sample of loans.[13] Accordingly, we expect the control-ownership wedge to be positively associated with bond spreads. We track the ultimate ownership of government investment targets for each firm-year in our sample, determining wedge values based on cascading levels of ownership (pyramids and multiple control chains) and differences in share ownership and voting rights due to multiple share classes. Following Faccio and Lang (2002) and Lin, Ma, Malatesta, and Xuan (2011, 2012), *Wedge* is the proportion of direct ownership

[13] We thank the referee for suggesting this line of inquiry.

Table 2
Descriptive statistics.

Panel A lists the distributions of binary variables, while Panel B lists the count, mean, median, standard deviation, 25th, and 75th percentiles of continuous variables. Sample characteristics are described in Table 1. Variable definitions are provided in Appendix A. *Foreign govt* (*exclusively*), for example, indicates observations where foreign government ownership stakes are the only government stakes present (i.e., no domestic government ownership exists).

Panel A: Binary variables

	Count	Yes (1)	No (0)
Ownership variables			
Govt ownership (Presence)	6,670	3,868	2,802
Foreign govt	6,670	1,601	5,069
Foreign govt (exclusively)	6,670	692	5,978
Domestic govt	6,670	3,176	3,494
Domestic govt (exclusively)	6,670	2,267	4,403
Individual ownership	6,670	795	5,875
Institutional blockholder	6,670	5,534	1,136
Bond variables			
Secured bond	6,670	1,130	5,540
Callable bond	6,670	1,287	5,383
Non-investment-grade	6,670	865	5,805
Macroeconomic variables			
Fin. crisis	6,670	2,554	4,116
Crises (LV)	6,670	2,261	4,409
Crises (RR)	6,571	2,156	4,415
Firm variables			
Bailed out	6,670	925	5,745

Panel B: Continuous variables

	Count	Mean	Median	Std. dev.	25th perc.	75th perc.
Ownership variables						
Govt ownership (Stake %)	6,670	12.18%	2.08%	21.02%	0.00%	12.44%
Non-legacy govt stake	6,670	8.73%	1.35%	16.58%	0.00%	9.00%
Govt ownership > 0	3,868	21.00%	10.23%	24.02%	4.03%	30.65%
Wedge	6,670	1.99%	0.00%	7.98%	0.00%	0.00%
Bond variables						
Credit spread (bp)	6,670	227	143.2	251.7	71.5	287
Rating (ordinal scale)	6,670	16	17	3	14	18
Maturity (days)	6,670	2,732	1,870	3,000	945	3,227
Macroeconomic variables						
ΔLevel of term structure	6,670	−0.23	−0.25	0.49	−0.49	0.15
ΔSlope of term structure	6,670	0.13	0.12	0.80	−0.38	0.52
GDP growth	6,670	1.92	2.50	2.78	0.93	3.15
Firm variables						
Leverage	6,670	11.87	9.28	12.74	1.82	19.80
M/B	6,670	1.85	1.60	1.88	0.89	2.23
Size	6,670	11.50	11.57	2.34	9.80	13.64
ROE	6,670	8.09%	11.02%	30.44%	3.57%	16.76%

subtracted from the proportion of voting rights of the largest shareholder, who is ultimately determined to be a state entity, a family/individual, or widely held where no single entity owns more than 10%.[14] Panel B of Table 2 shows that the mean value for *Wedge* is 1.99%, with means of 1.25%, 13.82%, and 0.07% for state, family, and widely held ultimate owners, respectively.

[14] When the largest shareholder's ownership of a firm is channeled through other entities, direct ownership is calculated as the product of stakes held at all ownership levels, while the amount of voting rights is set equal to the smallest stake held at any point along the ownership chain. Faccio and Lang (2002) explain calculation of ultimate ownership in detail.

4.2. Distress

We investigate whether the impact of government ownership on the cost of firms' debt differs during times of distress. Our tests make use of the recent financial crisis spanning the years 2008, 2009, and 2010. Panel A of Table 2 shows that the recent financial crisis contributes 2,554 observations or 38% of the overall sample. This event, engulfing virtually the entire global economy, is an appropriate testing ground as it constitutes an exogenous shock for most domestic economies. For robustness, we also employ a broader set of financial crises—the country-level banking crises described by Laeven and Valencia (2013) (2,261 observations; 34% of the overall sample) and Reinhart and Rogoff (2011) (2,156

observations; 32% of the overall sample).[15] We create separate binary variables that indicate when an observation falls within a country-year enduring a banking crisis according to the data used by the above studies [*Banking crisis (LV)* and *Banking crisis (RR)*].

We further investigate whether government guarantees would similarly be more valuable during firm-specific distress. We proxy for firm-specific distress by examining the cost of non-investment-grade bonds, defined as bonds with ratings below "BBB−" (865 observations; 13% of the overall sample), as well as financially constrained and small firms. Financially constrained firms are identified on a country-year basis using the Hadlock and Pierce (2010) size-age index for detecting financial constraints, as modified by Liao (2014) for an international sample.[16] Since Hadlock and Pierce (2010) discuss how smaller firms are more likely to be financially constrained and that firm size is the most important factor in various constraint measures (Whited and Wu, 2006), we also test the importance of state ownership on debt pricing using an interaction with firm size.

4.3. Bond, firm, and macroeconomic variables

Our proxy for the cost of debt is *Credit spread,* calculated as the difference between the corporate bond's current yield to maturity and that of the government bond most closely matched by maturity. Panel B of Table 2 reports that *Credit spread* has an average value of 227 bp and a median value of 143.2 bp, and as we highlight further in our analysis, these large values are driven by the financial crisis period beginning in 2008. As a bond-level control variable, we include S&P credit ratings obtained from Datastream. We form an ordinal scale with the best credit quality assigned the highest number and then use the natural logarithm of this numeric credit rating to account for possible nonlinearity. We expect higher ratings to be associated with lower spreads. Table 2, Panel B, shows that the median credit rating in our sample corresponds to an S&P rating of "A-" (17 on our ordinal scale). The log of the number of days to maturity is also included in our models, as in Baghai, Servaes, and Tamayo (2014) and Houston, Jiang, Lin, and Ma (2014). Average time to maturity in our sample is 2,732 days, or 7.5 years. We expect a positive relation between bond maturity and credit spreads, since there is less uncertainty associated with its coupon and par value payments as the bond's maturity date approaches. We also account for the bond structure in our empirical analysis and identify 1,130 (17%) bonds secured with collateral and 1,287 (19%) callable bonds.

At the firm level, we control for firm leverage (computed as total assets minus book equity, divided by book equity) to serve as a proxy for the probability of default. Including firm leverage as a control variable also allows us to account for the impact of deleveraging associated with capital injections. On average, we expect firms with higher leverage to have a higher cost of debt, as in Collin-Dufresne, Goldstein, and Martin (2001) and Krishnan, Ritchken, and Thomson (2005). We also include *M/B* (with an average of 1.85) and size (proxied by the natural logarithm of total assets, with a mean of 11.5), as Fama and French (1993) show these factors explain variation in bond returns. *M/B* is generally viewed as a proxy for the growth prospects of the company, so we expect higher growth opportunities to be associated with a higher probability of debt repayment, and, hence, a lower cost of debt. Larger firms are generally considered safer, at least partially due to increased asset diversification, and we expect a negative relation between firm size and cost of debt. We include *ROE* (with a mean of 8.09%), which is associated with the ability to meet debt obligations and should be negatively associated with the cost of debt. It is also worth noting that our sample includes transactions related to government bailouts, and we account for these rescues in an attempt to isolate their effect on bond spreads. All of the aforementioned continuous firm variables are winsorized at the 1% and 99% levels. Bailouts are identified using the synopsis of the government investment deal provided by SDC, as well as reports from the press and company financial statements. Table 2, Panel A, shows that we identify 925 bond-year observations (14% of our sample) from 32 firms related to bailouts for the full sample, with almost all of these occurring during the 2008–2010 period (864 bond-years of 30 firms).

Finally, we control for macroeconomic factors that could influence credit spreads in our analysis. Specifically, on a country level, we take into account the effect of changes in the level and slope of the term structure on credit spreads, as in Collin-Dufresne, Goldstein, and Martin (2001). The target nation's real gross domestic product (GDP) growth is also included in our models as a general measure of economic conditions, which should be associated with lower credit spreads (Fama and French, 1989; Tang and Yan, 2010).

4.4. Credit spread differences in means

We offer a first look at the data through tests for differences in bond credit spread means in Table 3. Bond-clustered standard error estimates are used to compute two-sided *t*-tests for mean differences between data subsets.[17]

Over the full sample period, we find significantly higher spreads for bonds issued by firms with state shareholders (238 bp) than for bonds issued by firms without such

[15] Laeven and Valencia (2013) identify country-years in which banking crises occur across the world based on two significant conditions: banking system distress and banking policy intervention. Banking crises from Reinhart and Rogoff (2011) are marked by either bank runs or, in absence of such runs, by the closure, takeover, or large-scale government assistance of important financial institutions.

[16] Liao's (2014) calculation of the size-age index of Hadlock and Pierce (2010) is as follows: $-0.386*\log(\text{total assets})-0.022*\textit{firm age}$. We further split the sample on a country-year basis since Hadlock and Pierce's (2010) original size-age index is calculated specifically for U.S. firms over 1995–2004, while our period is longer (1991–2010) and includes the 2008 financial crisis, suggesting a greater temporal variation.

[17] Univariate results are robust to clustering standard errors at the firm level.

Table 3
Credit spread mean difference tests.

The following table presents *Credit spread* means and two-sided *t*-tests for differences in means based on bond-year observations. *Credit spread* is the difference between the corporate bond's current yield to maturity and that of the government bond most closely matched by maturity; it is expressed in basis points (bp). The sample covers the period 1991–2010, and tests based on banking crises as defined by Laeven and Valencia (2013, LV) and Reinhart and Rogoff (2011, RR) are included. The main sample is described in Table 1 and consists of firms that have been government investment targets, while the benchmark sample consists of target firms never owned by the government. Credit spreads are truncated at the top and bottom 1% for the main sample and for the sample that includes the benchmark observations. The *p*-value shows the significance level of the two-sided difference in means tests. Standard errors are clustered at the bond level. Variable definitions are provided in Appendix A.

	Govt presence (mean spreads in bp)	No govt presence (mean spreads in bp)	Mean diff. (Govt – No govt) (spread diff. in bp)	*p*-Value	Count (bond-years)
Main sample					
Full period	238	212	26	0.002	6,670
1991–2007	170	119	51	0.000	4,116
2008–2010	326	419	−93	0.000	2,554
Crises (LV)					
Non-crisis years	213	136	77	0.000	4,409
Crisis years	283	377	−94	0.000	2,261
Crises (RR)					
Non-crisis years	210	130	80	0.000	4,415
Crisis years	292	370	−78	0.000	2,156
Main sample + benchmark					
Full period	235	251	−16	0.036	15,082
1991–2007	173	164	9	0.310	8,977
2008–2010	321	383	−62	0.000	6,105

owners (212 bp). Similarly, for the earlier years of the sample period (1991–2007), bond spreads of firms with government ownership are significantly higher than those without government ownership (170 bp and 119 bp, respectively). However, during the 2008–2010 financial crisis we find significantly lower spreads in bond-years with government presence (with a mean spread of 326 bp) than in those without government presence (419 bp). We also find these results using alternative definitions of crises. During banking crises as defined by Laeven and Valencia (2013), spreads are significantly lower on bonds of firms with government ownership (283 bp) than on those without (377 bp). However, the opposite is true for periods outside of these banking crises—bond spreads of firms with government ownership (213 bp) are then significantly *higher* than those without (136 bp). Results from mean difference tests using the Reinhart and Rogoff (2011) measure of banking crises echo those using the Laeven and Valencia (2013) definition. Tests using our main sample in combination with the full benchmark sample of non-government investments confirm the significantly lower bond spreads for firms with government ownership during the 2008–2010 financial crisis.

The univariate analysis suggests that government ownership, while generally associated with a higher cost of debt, leads to a reduction in the cost of debt during times of economic distress, such as during the recent financial crisis and various banking crises. These results are consistent with the increased value of an implicit government debt guarantee when default is unconditionally more likely. Our panel regressions in the next section allow us to further examine the association between government ownership and debt pricing and to clarify which economic conditions and state entities have the strongest effect on the cost of debt.

5. Panel regressions

We employ regression analysis to test the effect of government ownership on a target company's cost of debt, measured by credit spreads.

5.1. Methodology

To control for heteroskedasticity and account for time-series dependence, we use a standard error estimation methodology adjusted for double clustering on our panel dimensions at the bond and year levels, as suggested by Petersen (2009) and Thompson (2011).[18] Firm and year fixed effects are also used in the regression analysis. Firm fixed effects account for time-invariant characteristics, allowing us to explore within-firm differences, while year fixed effects capture macro-level factors. Similar to Borisova and Megginson (2011), the preliminary model is as follows:

$$y_{it} = \beta X_{it} + \gamma r_{it} + \boldsymbol{z}_j + \boldsymbol{\nu}_t + \varepsilon_{it}, \quad (1)$$

where y_{it} represents the credit spread, β is a set of coefficients, and X_{it} is a matrix of variables of interest (related to government ownership) and control variables (*Maturity, Callable bond, Secured bond, Leverage, M/B, ROE, Size, ΔLevel of term structure, ΔSlope of term structure, GDP growth, Individual ownership, Institutional blockholder*). γ is a scalar coefficient, r_{it} is the credit rating, z_j represents firm fixed effects, ν_t represents the year fixed effects, and ε_{it} is a classic error term. The indices *i, t,* and *j* refer, respectively,

[18] Results are similar if we cluster standard errors at the bond level only, and if we double cluster at the country and year levels, or at the firm and year levels.

to bonds, years, and firms. All models in the analysis use an orthogonalized value of credit rating to account for the effect that other independent variables could have on its assigned value. Liu and Thakor (1984) discuss the residual transformation procedure in depth, and it is used in more recent work (Datta, Iskandar-Datta, and Patel, 1999; Klock, Mansi, and Maxwell, 2005; Borisova and Megginson, 2011).

5.2. Endogeneity

In our main sample, we evaluate the cost of debt for state investment targets in years with and without government ownership, the latter drawn from years prior to a government investment or following an eventual government divestment. We also employ firm fixed effects and lagged government ownership values (e.g., December 2006 ownership is matched with bond spreads in November 2007), as in Borisova, Brockman, Salas, and Zagorchev (2012). Nevertheless, a potential concern with our key regressions is that government ownership may not be exogenous and some unobserved firm characteristics could link bond spreads and government ownership, leading ordinary least squares (OLS) coefficients to be biased. To address endogeneity concerns of government investment, we use a control sample of bond-years from publicly traded firms that were subject to stake acquisitions only by non-government acquirers, as initially described in Section 3. We make use of this benchmark sample to account for endogeneity in multiple ways.

5.2.1. Treatment-regression model

First, we employ a Heckman treatment effect (Heckman, 1979; Heckman and Robb, 1986) two-stage model, where the initial selection equation is fit using probit models describing the characteristics associated with the presence of government owners. The probit models include firm-specific variables present in the second-stage outcome equation, as well as variables that predict the presence of government ownership and are exogenous to the credit spread outcome we intend to model. Specifically, we use the annual country-level measures *Total investment* and *Unemployment rate* from the nation of the government owner with the largest stake in each firm-year (and from the firm's home nation when there is no state ownership present). These values are collected from the International Monetary Fund (IMF) and defined in Appendix A. From the nation of the target firm, we also employ two binary variables: *Civil law* (from Djankov, Hart, McLiesh, and Shleifer, 2008) and *Left-wing* (from Beck, Clarke, Groff, Keefer, and Walsh, 2001), which describe the legal system and the political party of the nation's chief executive in a given year, respectively.

Higher national values of *Total investment* indicate higher availability of funding to the government for investment purposes, and greater state holdings are predicted in these cases. Also, a larger *Unemployment rate* suggests a higher likelihood of government investment with a goal of job preservation. We anticipate a positive relation between government ownership and *Civil law*, as state owners could more easily divert resources towards social and political goals in a legal environment providing less protection to minority shareholders. Bortolotti and Faccio (2009) find higher government control in nations governed by left-wing political parties, who are more likely to pursue social goals via economic intervention, and a positive relation is predicted between *Left-wing* and state presence. While we expect these country-level factors to predict government ownership, they are not likely to directly influence a firm's cost of debt. Because the suspected endogenous government investment variables include *Govt ownership* and the related interaction *Govt ownership∗Fin. crisis*, we employ two selection equations with these measures as binary dependent variables.

Results from the selection equations are presented in Table B1 of Appendix B. As predicted, all four instruments described above are positively and significantly (at the 1% level) associated with the presence of government owners in Model 1, as is firm size. Also, a χ^2 joint significance test rejects the null that the excluded instruments are weak, and a likelihood ratio (LR) χ^2 test confirms the relevance of the predictors. We calculate the selectivity corrections from these first-stage models: λ, for the model with *Govt ownership* as the dependent variable; and λ_{FC}, for the model with *Govt ownership∗Fin. crisis* as the dependent variable. These inverse Mills' ratios are then included in our credit spread models (presented in the next section) to account for unobserved factors related to government presence in a firm and, potentially, to the cost of debt.

5.2.2. Instrumental variables regression model

Second, we use 2SLS instrumental variable models which employ the same exogenous factors as the treatment effects model to instrument the amount, rather than the presence, of government ownership. Following Wooldridge (2010), we include interactions of these exogenous variables with the financial crisis to instrument our interaction term of interest, *Govt ownership∗Fin. crisis*. In the same way, we instrument our measure of government ownership that excludes the legacy state ownership remaining from privatizations (*Non-legacy govt stake*).

First-stage OLS results (including firm and year dummy variables) for these instrumental variable models are included as Models 1 and 2 of Table C1 from Appendix C.[19] The results confirm that most of the chosen instruments are good predictors of state ownership stakes, following the directions of our predictions above. *Total investment* and *Unemployment rate* both enter positively and are significant at the 1% level, suggesting that governments invest more when funding availability is higher and when job preservation is important. *Civil law* is also significantly and positively associated with the size of state ownership stakes, as it was for the presence of government owners in the previous section. Considering factors in the first-stage model that are also included in the second-stage debt pricing model, government ownership is more prevalent for firms with higher leverage,

[19] First-stage results of models where interactions between our government ownership variables and *Fin. crisis* serve as dependent variables are untabulated in the interest of brevity.

smaller total assets, and unsecured bonds. Diagnostics also support the use of the excluded instruments, as Angrist and Pischke (2009) underidentification tests indicate their relevance to the suspected endogenous government stake measures. Further, the same authors' *F*-statistics (25.99 and 9.23) allow us to reject the null of weak identification. Second-stage results for these instrumental variable models are discussed in the next section.

Lastly, we also instrument domestic and foreign government ownership and present the results in Table C1 of Appendix C, as Models 3 and 4, respectively. *Total investment*, *Unemployment rate*, *Civil law*, and *Left-wing* are again used as excluded instruments for government ownership. *Total investment* should still indicate higher availability of funding to both types of government owners, but the job preservation sought by state owners should be specific to domestic government investment. While civil law systems are linked to higher aggregate state ownership in Appendix B and Model 1 of Table C1, foreign governments would be more likely to invest in common law countries due to better investor protection. Nations ruled by left-wing political parties have a significant positive relation to government presence in Appendix B, but this relation should be specific to a domestic setting, where local resources can be controlled and used by the government owner. To help us further identify foreign and domestic government ownership, we include an additional instrumental variable: *Political system*.[20] We expect more authoritarian governments (as indicated by lower values of *Political system*) to be more interested in domestic investments and less receptive to foreign government acquirers. We again include interactions of these variables with the financial crisis to instrument for foreign and domestic government ownership during the crisis.

First-stage regression results in Models 3 and 4 of Table C1 from Appendix C show that the excluded instruments are typically associated with state ownership. Four instruments are significant (at the 5% level or better) in explaining the amount of domestic government ownership following the directions of our predictions above, with *Total investment*, *Unemployment rate*, and *Civil law* being positively linked to local government holdings and *Political system* showing a negative relation. *Total investment* and *Civil law* are also significantly associated with the amount of foreign government ownership in the expected ways; *Total investment* yields a positive and significant link at the 1% level, while *Civil law* is negative and significant at the 5% level. Additionally, the underidentification tests for both models indicate that the instruments are correlated with domestic and foreign government ownership, and *F*-statistics for weak identification, 14.41 for domestic and 12.77 for foreign government ownership, reject the null that the suspected endogenous variables are weakly identified.

[20] *Political system* is from the 2012 World Bank Database of Political Institutions (Beck, Clarke, Groff, Keefer, and Walsh, 2001) and is also used by Boubakri, Cosset, and Saffar (2013) to instrument government ownership.

5.3. Government ownership and the cost of debt during and prior to the 2008 financial crisis

We apply the model described in the previous section and present results regarding the effect of government ownership on the cost of debt in Table 4. We evaluate the data over the full 1991–2010 period and add a variable identifying the 2008–2010 financial crisis period (*Fin. crisis*). Interactions between this crisis binary variable and government ownership enhance the evaluation of the relation between government ownership and spreads across diverse economic periods. By focusing on the years 2008–2010, during which most worldwide markets were affected by a global financial crisis, we make use of this exogenous shock to firms, allowing us to measure the differential impact of government ownership with limited concerns of endogeneity. In Model 1, our main explanatory variable of interest, government ownership, is expressed as a binary variable equal to one if a firm has a government or government-owned entity as a shareholder in that year. We find government presence is associated with a 37.9 bp increase in the cost of debt during non-crisis years and a 9 bp *decrease* during the financial crisis.

As outlined in the previous section, one concern for our base-case regressions is that government ownership is not exogenous. To address this concern, we employ a larger sample where the benchmark also includes non-government investment targets and report second-stage results from a treatment effects model in Model 2. We confirm that government presence is associated with higher spreads during non-crisis years (57.8 bp) and with lower spreads during the crisis (88.2 bp). Model 2 also shows that the private information contained in λ and λ_{FC} is significantly tied to bond spreads. The negative sign on λ shows that the private information that guides government investment outside of crises is associated with lower spreads, suggesting that governments invest in more attractive targets with lower costs of debt. The positive sign on λ_{FC}, however, indicates that the unobserved information guiding government owners during the 2008–2010 financial crisis is linked to higher spreads. This result is sensible given the number of state rescues during the crisis period, where many governments took (or maintained) positions in distressed firms with correspondingly higher costs of debt.

In Model 3, our main explanatory variable of interest, government ownership, is a continuous variable expressed as the percentage owned. Model 3 shows that government ownership stake (%) also has an economically significant effect—for each extra percentage point of government ownership, the spreads increase by about 1 bp, but each extra percentage point of government ownership is related to a 0.21 bp decrease in the cost of debt during the financial crisis.[21] These results indicate that government

[21] To test for a nonlinear relation between the size of the government stake and the cost of debt, we add a squared term of *Govt ownership* (and its interaction with *Fin. crisis*) to Model 3 of Table 4 in untabulated results. The coefficients on *Govt ownership*^{2} and *Govt ownership*^{2}**Fin. crisis* are not statistically significant in these models, while the coefficients on the original terms remain significant and with the same signs as reported in

owners increase the cost of debt of their holdings during regular, non-crisis years but decrease this cost during the recent financial crisis. Further, these findings are consistent with our first two hypotheses and with governments introducing inefficiencies via share ownership through moral hazard, poor monitoring, and social/political goals but offering, at the same time, implicit debt guarantees that become extremely valuable during times of distress. We present results in the following tables using the more precise measure of government stake ownership (as a percentage of firm shares) for brevity, but government presence regressions echo the tabulated results.

We further address endogeneity concerns in Model 4 by using a 2SLS instrumental variables approach. Similar to the treatment effects regression (Model 2), this model uses a larger sample where the benchmark includes the pool of non-government investment targets. The results show that each additional percentage point increase in government shareholdings outside of the financial crisis is associated with about a 3 bp increase in the cost of debt. However, during the 2008 crisis, each additional percentage point of government ownership is associated with a 0.67 bp reduction in the cost of debt. The overidentification test, based on Hansen's *J*-statistic, fails to reject the null (*p*-value of 0.474) that the instruments are valid and properly excluded from the second-stage model. In sum, the results in Table 4 obtain when analyzing state ownership in a sample exclusively comprised of government investment targets, which helps control for firm differences, and when including a more heterogeneous sample of non-government targets, which suggests our results extend to a larger population of firms.[22]

Another concern for our base-case regressions is that results could be driven by government post-privatization stake holdings, as in Borisova and Megginson (2011), and not by their new equity investments. Accordingly, we subtract the residual state ownership amounts related to partial privatizations from our government ownership stakes to examine non-legacy government ownership in Models 5 and 6. The coefficient estimates in Model 5 show that each additional percentage point increase in new government ownership is associated with a 0.56 bp increase in the cost of debt outside of the financial crisis, and with a 0.65 bp decrease in the cost of debt during the crisis. In Model 6, we further examine our non-legacy stake results using 2SLS and including the non-government benchmark sample. Each additional percentage point increase in government ownership is associated with about a 4.48 bp increase in the cost of debt outside of the financial crisis and with a 1.17 bp decrease in the cost of debt during the crisis. As in Model 4, a test of the Hansen *J*-statistic in Model 6 attests to the validity of the instruments. Accordingly, the relation between government ownership and the cost of debt remains when considering only the ownership resulting from new state equity investments and not post-privatization stake holdings.

Lastly, our results could reflect the divergence between control and cash-flow rights, as examined by Lin, Ma, Malatesta, and Xuan (2011) for a sample of loans, and not be specific to government ownership. In Model 7 we control for this divergence through the control-ownership *Wedge* and find results similar to those of the base-case regressions in Model 3. The divergence between control and cash-flow rights does not significantly influence the effect of government ownership on bond credit spreads during our full period. We note that our mean value of *Wedge* (approximately 2%) is lower than the roughly 6% mean reported by Lin, Ma, Malatesta, and Xuan (2011) and attribute this smaller value to our sample of government-owned firms, where fewer levels of ownership likely exist due to state owners representing the end of ownership chains. These authors also find a weaker impact of *Wedge* for firms ultimately owned by the state. Further, Lin, Ma, Malatesta, and Xuan (2013) show that firms with a larger control-ownership wedge use a relatively greater proportion of bonds than loans, suggesting the related debt pricing penalties might not be as severe for public debt. We consider additional tests with *Wedge* and its interaction with government ownership in the next section and find significant effects specific to the 2008 financial crisis.

5.4. Additional tests for government ownership and cost of debt

We now present an additional battery of tests addressing potential concerns about our findings. First, in Table 5 we evaluate our crisis results in the presence of the ownership-control wedge, government bailouts, and alternative crises definitions, including the national banking crises defined by Laeven and Valencia (2013) and Reinhart and Rogoff (2011). In Table 6 we ensure that our findings are generalizable to other forms of financing, besides publicly traded bonds, by examining the influence of government ownership on the cost of loans.

5.4.1. Other crisis effects

In Table 5 we examine factors related to government ownership and the cost of debt during the 2008 financial crisis and employ alternative definitions of economy-wide distress. Models 1 and 2 use subsamples from the recent 2008–2010 financial crisis, while Models 3 and 4 use subsamples based on country-years affected by banking crises as defined by Laeven and Valencia (2013) and Reinhart and Rogoff (2011), respectively. We also control for bailouts in all regression models in Table 5, given their prevalence during crisis periods.

In Model 1 we present results for government stake ownership and *Wedge*. We also follow Lin, Ma, Malatesta, and Xuan (2011) by interacting the *Wedge* with government ownership over the 2008–2010 period. After controlling for

(*footnote continued*)
Table 4. We suspect this monotonic relation emanates from bondholders viewing larger government ownership stakes as corresponding to stronger commitments to protecting firms from default during the crisis period.

[22] Our results also obtain if we use a procedure that combines categorical matching based on year and currency with propensity-score matching using firm and country factors. Results are available from the authors upon request.

Table 4
Government ownership, financial crisis, and the cost of debt.

Firm (z_j) and year (ν_t) fixed effects regression analysis with heteroskedasticity-robust standard errors double clustered by bond and year is performed on the following model: $y_{it} = \theta X_{it} + \gamma \hat{\zeta}_{it} + z_j + \nu_t + \eta_{it}$. The dependent variable, *Credit spread* (y_{it}), is the difference between the corporate bond's current yield to maturity and that of the government bond most closely matched by maturity, and η_{it} is the error term. Orthogonalized values of the log of the bond's rating after conversion to an ordinal scale, *Rating* ($\hat{\zeta}_{it}$), are used. The variables included in X_{it} are described in Appendix A. The data are annual and cover the period 1991–2010. *Govt ownership* represents the presence of a state owner expressed as a binary variable in Models 1 and 2; it represents the percentage owned by the state in Models 3, 4, and 7; and Models 5 and 6 present the non-legacy percentage owned by the state. Model 2 shows second-stage results of the treatment model regression, where first-stage probit models are in Appendix B, and the λ terms represent inverse Mills' ratios. Models 4 and 6 show second-stage results of 2SLS instrumental variable regressions where *Govt ownership* and *Govt ownership*∗*Fin. crisis* are instrumented, and the first-stage models of *Govt ownership* are Models 1 and 2, respectively, in Appendix C. The sample is described in Table 1, and Models 2, 4, and 6 include a control sample of targets of non-government acquirers. Model 7 controls for the divergence in control-ownership rights of the ultimate owner of the firm (*Wedge*). Coefficients are listed below, with *z*-statistics in parentheses. *** Denotes significance at the 1% level, ** at the 5% level, and * at the 10% level.

Govt ownership measure	(1) Presence	(2) Presence	(3) Stake (%)	(4) Stake (%)	(5) Non-legacy govt stake (%)	(6) Non-legacy govt stake (%)	(7) Stake (%)
Govt ownership	37.9***	57.8***	1.04***	2.94**	0.56*	4.48**	1.04***
	(3.11)	(2.69)	(3.89)	(2.41)	(1.73)	(2.37)	(3.84)
Govt ownership∗Fin. crisis	−46.9**	−146***	−1.25***	−3.61***	−1.21***	−5.65***	−1.25***
	(−2.27)	(−4.34)	(−2.68)	(−3.73)	(−2.84)	(−4.09)	(−2.69)
Fin. crisis	220***	232***	224***	218***	232***	217***	224***
	(3.96)	(6.61)	(4.74)	(6.39)	(4.49)	(6.08)	(4.74)
Wedge (%)							−0.75
							(−0.47)
Rating	−345***	−263***	−341***	−265***	−344***	−265***	−341***
	(−5.11)	(−11.0)	(−5.01)	(−11.3)	(−5.01)	(−11.3)	(−4.99)
Maturity	20.6***	19.4***	20.6***	19.4***	20.8***	19.8***	20.7***
	(4.32)	(3.33)	(4.31)	(3.22)	(4.40)	(3.34)	(4.32)
Callable bond	63.8***	37.5***	64.1***	38.0***	64.1***	38.5***	64.1***
	(6.53)	(5.45)	(6.67)	(5.46)	(6.63)	(5.53)	(6.67)
Secured bond	−13.9	8.92	−15.2	9.79	−16.3	7.67	−15.2
	(−0.97)	(0.58)	(−1.02)	(0.67)	(−1.10)	(0.51)	(−1.02)
Leverage	−0.83	0.53	−0.76	0.64	−0.68	0.69	−0.76
	(−0.68)	(0.53)	(−0.62)	(0.69)	(−0.57)	(0.74)	(−0.62)
M/B	−5.03	−3.91	−5.23	−3.89*	−5.30	−3.93∗	−5.22
	(−1.35)	(−1.63)	(−1.43)	(−1.85)	(−1.48)	(−1.94)	(−1.43)
ROE	−50.9*	−54.1**	−53.4**	−50.9***	−54.5**	−51.4***	−53.5**
	(−1.79)	(−2.56)	(−2.05)	(−2.67)	(−2.08)	(−2.71)	(−2.05)
Size	−26.0***	−28.3***	−26.6***	−27.5***	−28.5***	−24.7***	−26.7***
	(−4.81)	(−4.34)	(−4.73)	(−3.57)	(−4.10)	(−3.35)	(−4.71)
ΔLevel of term structure	−22.7	−23.6	−22.8	−20.9	−22.2	−22.4	−22.9
	(−0.79)	(−1.06)	(−0.78)	(−0.83)	(−0.77)	(−0.89)	(−0.78)
ΔSlope of term structure	7.69	2.56	7.73	3.39	8.83	3.77	7.78
	(1.19)	(0.33)	(1.12)	(0.48)	(1.28)	(0.53)	(1.13)
GDP growth	−8.80**	−8.87***	−8.30**	−9.45***	−8.60**	−10.1***	−8.33**
	(−2.25)	(−2.74)	(−2.07)	(−2.86)	(−2.23)	(−2.84)	(−2.10)
Individual ownership	25.3		24.0		21.4		24.0
	(1.00)		(0.96)		(0.84)		(0.96)
Institutional blockholder	−21.9*		−17.8		−22.9*		−17.7
	(−1.71)		(−1.54)		(−1.89)		(−1.54)
λ		−28.5**					
		(−2.13)					
λ_{FC}		101***					
		(5.03)					
Observations	6,670	15,082	6,670	15,082	6,670	15,082	6,670
Firms	226	839	226	839	226	839	226
p-Value of Hansen *J*-statistic				0.474		0.462	
R-squared	0.669	0.696	0.668	0.691	0.668	0.686	0.668

firm bailouts, Model 1 shows that, once we account for the control-ownership wedge, each additional percentage point increase in government ownership is associated with approximately a 1.36 bp reduction in bond spreads during 2008–2010. Although *Wedge* is insignificant in our models covering the full 1991–2010 period in Table 4, Model 1 of Table 5 shows that firms with a higher divergence between control and cash-flow rights have a significantly higher cost of debt (about 11 bp), confirming the findings of Lin, Ma, Malatesta, and Xuan (2011) that the effect of *Wedge* is stronger during crises. Also in line with these authors' results, we find this relation to be weaker for firms with state ownership, as indicated by the negative interaction term between *Govt ownership* and *Wedge*.

The relation between government ownership due to bailouts and the cost of debt during the 2008–2010 financial crisis is examined in Model 2. The reduction in the cost of debt due to the implicit government guarantee

Table 5
Government ownership, crises, and the cost of debt.

Firm (z_j) and year (ν_t) fixed effects regression analysis with heteroskedasticity-robust standard errors double clustered by bond and year is performed on the following model: $y_{it}=\theta X_{it}+\gamma\hat{\zeta}_{it}+z_j+\nu_t+\eta_{it}$. The dependent variable, *Credit spread* (y_{it}), is the difference between the corporate bond's current yield to maturity and that of the government bond most closely matched by maturity, and η_{it} is the error term. Orthogonalized values of the log of the bond's rating after conversion to an ordinal scale, *Rating* ($\hat{\zeta}_{it}$), are used. The variables included in X_{it} are described in Appendix A. The data are annual, and the sample is described in Table 1. Models 1 and 2 cover the 2008–2010 financial crisis; Model 3 covers countries and years with banking crises defined by Laeven and Valencia (2013) and Model 4 those defined by Reinhart and Rogoff (2011). *Govt ownership (Stake %)* represents the percentage owned by the state in all models. Model 1 examines the divergence in control-ownership rights of the ultimate owner of the firm (*Wedge*). Bailed-out firms are controlled for in all models. Coefficients are listed below, with *z*-statistics in parentheses. *** Denotes significance at the 1% level, ** at the 5% level, and * at the 10% level.

	(1)	(2)	(3)	(4)
	2008–2010	2008–2010	Crises (LV)	Crises (RR)
Govt ownership (Stake %)	−1.36***	−4.69**	−1.33***	−1.47***
	(−3.11)	(−2.46)	(−3.16)	(−3.25)
Wedge (%)	11.2***			
	(2.59)			
Govt ownership (Stake %)∗*Wedge (%)*	−0.19***			
	(−3.99)			
Govt ownership (Stake %)∗*Bailed out*		3.41**		
		(2.02)		
Bailed out	132***	124***	108***	92.7***
	(5.85)	(5.88)	(4.81)	(4.85)
Rating	−342**	−350**	−334***	−356***
	(−2.29)	(−2.50)	(−5.81)	(−6.58)
Maturity	10.7	10.6	4.13	2.10
	(0.89)	(0.88)	(0.33)	(0.16)
Callable bond	59.1***	59.0***	64.5***	65.9***
	(7.01)	(6.97)	(4.95)	(5.43)
Secured bond	−67.2***	−67.7***	−102***	−93.5***
	(−7.74)	(−7.45)	(−4.62)	(−3.99)
Leverage	−6.64***	−6.41***	−5.29**	−4.75**
	(−3.93)	(−3.87)	(−2.39)	(−2.22)
M/B	17.3**	17.1**	−24.8*	−22.1*
	(2.43)	(2.42)	(−1.85)	(−1.68)
ROE	−111***	−115***	−114**	−111**
	(−4.01)	(−3.89)	(−2.35)	(−2.22)
Size	−129***	−146***	−115***	−62.6**
	(−3.18)	(−3.91)	(−6.53)	(−2.18)
ΔLevel of term structure	−148	−147	−76.5	−104
	(−1.38)	(−1.38)	(−0.94)	(−1.28)
ΔSlope of term structure	−14.4	−15.4	−6.31	−29.4
	(−0.83)	(−0.88)	(−0.37)	(−1.27)
GDP growth	10.5	10.2	27.0	28.2*
	(0.78)	(0.76)	(1.59)	(1.81)
Individual ownership	34.3	40.3	−51.6*	−98.1**
	(1.29)	(1.33)	(−1.68)	(−2.57)
Institutional blockholder	−16.2	−20.6	−38.6	−34.6
	(−1.02)	(−1.37)	(−1.05)	(−0.74)
Observations	2,554	2,554	2,261	2,156
Firms	176	176	108	107
R-squared	0.679	0.679	0.667	0.668

is even larger when we consider government involvement independent of rescues—each additional percentage point increase in government ownership is associated with a 4.69 bp reduction in bond spreads. Model 2 also shows that this beneficial effect is mitigated for bailed-out firms as indicated by the positive interaction between *Govt ownership* and *Bailed out*. This model confirms that our findings are not specific to bailouts and, as a matter of fact, when we control for government ownership in bailed-out firms we observe an even greater reduction in bond spreads for other firms with government ownership during the financial crisis.

Results in Models 3 and 4 confirm that government ownership stakes are associated with a lower cost of debt during economy-wide distress represented by various banking crises. Specifically, a percentage point increase in government ownership is significantly associated (at the 1% level) with approximately a 1.3 bp (1.5 bp) reduction in bond spreads during the banking crises defined by Laeven and Valencia (2013) (Reinhart and Rogoff, 2011). These results show that the negative relation between government ownership and the cost of debt during periods of economy-wide distress is robust to alternative crises definitions.

5.4.2. Syndicated loans

Next, we evaluate the generalizability of our findings to other sources of financing and replicate our main analysis, as

Table 6
Government ownership and the cost of debt: Syndicated loans.

Firm (z_j) and year (ν_t) fixed effects regression analysis with heteroskedasticity-robust standard errors double clustered by loan package and year is performed on the following model: $y_{it} = \theta X_{it} + \gamma \hat{\zeta}_{it} + z_j + \nu_t + \eta_{it}$. The dependent variable, *Loan spread* (y_{it}), is the difference between the corporate loan's current yield to maturity and LIBOR after adjusting for loan origination fees, and η_{it} is the error term. Orthogonalized values of the log of the firm's highest bond rating during the year of loan initiation after conversion to an ordinal scale, *Rating* ($\hat{\zeta}_{it}$), are used. The variables in X_{it} are described in Appendix A and include the following unreported controls: *Secured loan*, *Loan size*, *Senior loan*, *Number of lenders*, and *Covenant*. The data are annual and cover the period 1991–2010. Observations consist of the loan data available for the main sample of government investment targets. *Govt ownership* represents the presence of a state owner expressed as a binary variable in Models 1 and 3; it represents the percentage owned by the state in Models 2, 4, 6, and 7; and in Model 5 it represents the non-legacy percentage owned by the state. Models 3 and 4 control for the divergence in control-ownership rights of the ultimate owner of the firm (*Wedge*). The models also include loan currency, loan type (revolver, term, etc.), and loan purpose fixed effects. Coefficients are listed below, with *z*-statistics in parentheses. *** Denotes significance at the 1% level, ** at the 5% level, and * at the 10% level.

Govt ownership measure	(1) Presence	(2) Stake (%)	(3) Presence	(4) Stake (%)	(5) Non-legacy stake (%)	(6) Stake (%)	(7) Stake (%)
Govt ownership	17.4	−0.050	33.6*	−0.16	−0.14	0.19	0.20
	(1.10)	(−0.26)	(1.74)	(−0.28)	(−0.46)	(0.95)	(0.95)
Govt ownership∗Fin. crisis	−66.2***	−1.44***	−46.3***	−1.42***	−0.85**		
	(−2.69)	(−3.39)	(−2.59)	(−3.38)	(−2.24)		
Fin. crisis	268***	251***	221***	256***	248***		
	(5.42)	(4.44)	(4.26)	(4.55)	(4.46)		
Wedge (%)			4.41**	−0.51			
			(2.09)	(−0.21)			
Govt ownership∗Wedge (%)			−4.52**	0.26			
			(−2.51)	(1.14)			
Govt ownership∗Crises (LV)						−1.71**	
						(−2.48)	
Crises (LV)						11.0	
						(0.38)	
Govt ownership ∗Crises (RR)							−1.78***
							(−2.74)
Crises (RR)							9.01
							(0.31)
Rating	−62.3**	−57.2**	−60.7**	−57.2**	−61.6**	−63.2**	−64.3**
	(−2.20)	(−2.02)	(−2.16)	(−2.01)	(−2.00)	(−2.34)	(−2.38)
Maturity	8.73	7.08	7.62	7.33	9.10	7.76	7.34
	(1.06)	(0.85)	(0.90)	(0.91)	(1.11)	(0.93)	(0.85)
Secured loan	−37.4***	−37.3***	−37.4***	−37.5***	−36.7***	−36.1***	−36.3***
	(−3.08)	(−3.17)	(−3.13)	(−3.34)	(−3.02)	(−2.97)	(−2.96)
Leverage	3.35**	3.23***	3.35**	3.54***	3.32**	2.89**	2.85**
	(2.56)	(2.58)	(2.43)	(2.63)	(2.51)	(2.29)	(2.17)
M/B	−15.2***	−15.2***	−14.6***	−16.1***	−15.5***	−14.3***	−14.2***
	(−2.99)	(−2.82)	(−2.83)	(−2.79)	(−2.72)	(−2.66)	(−2.58)
ROE	−20.3*	−19.4*	−19.8*	−19.0*	−22.2*	−3.54	−1.83
	(−1.88)	(−1.72)	(−1.75)	(−1.65)	(−1.73)	(−0.30)	(−0.15)
Size	63.2**	64.3**	63.1**	65.6*	61.1*	63.1*	64.2*
	(2.00)	(1.98)	(2.06)	(1.96)	(1.85)	(1.91)	(1.93)
ΔLevel of term structure	−24.2	−22.0	−27.8	−23.0	−23.4	−5.57	−3.81
	(−1.26)	(−1.08)	(−1.37)	(−1.15)	(−1.08)	(−0.29)	(−0.20)
ΔSlope of term structure	5.33	6.20	−0.46	6.05	4.02	20.5	20.2
	(0.29)	(0.35)	(−0.023)	(0.34)	(0.22)	(1.20)	(1.19)
GDP growth	−1.66	−2.80	−3.18	−2.73	−2.14	−3.24	−3.77
	(−0.66)	(−1.20)	(−1.12)	(−1.19)	(−0.81)	(−1.25)	(−1.35)
Individual ownership	44.7**	49.7***	45.9***	48.6***	46.4***	46.5**	46.6***
	(2.38)	(2.78)	(2.77)	(2.59)	(2.77)	(2.54)	(2.62)
Institutional blockholder	15.1	14.5	15.0	14.4	9.97	11.4	10.0
	(1.16)	(1.19)	(1.08)	(1.12)	(0.79)	(0.93)	(0.77)
Observations	693	693	693	693	693	693	673
Firms	104	104	104	104	104	104	98
R-squared	0.794	0.793	0.795	0.794	0.792	0.792	0.791

closely as data permit, on a sample of syndicated loans. These tests can determine if the impact of government ownership on the cost of firm debt is specific to publicly traded debt (bonds) or whether it similarly affects syndicated loans. To perform this analysis, we collect additional data from the Thomson Reuters Loan Pricing Corporation DealScan database over 1991–2010. We limit our analysis to loans identified as *364-Day Facility*, *Bridge Loan*, *Term Loan* of all types, *Revolver/Line* of all maturities, and *Other Loan*, thus excluding bonds, private placements, letters of credit, and guarantees. We further exclude loans whose status is *Cancelled* or *Rumor*. We include loans to the same firms covered by the main, bond-based analysis, or to any of their fully owned subsidiaries. After applying all of the above filters, the final sample includes 693 loans with complete data.

In Table 6, we replicate the regressions used with bonds (presented in Table 4). We employ *Loan spread*—defined as the amount the borrower pays in basis points over the

London Interbank Offered Rate (LIBOR) for each dollar drawn down, including both the spread of the loan and any annual or facility fee paid—as the main metric for the cost of loans (Qian and Strahan, 2007; Sufi, 2009; Bae and Goyal, 2009). We utilize the highest bond rating available for the borrower during the year of loan inception, as loan ratings are not available for most of our data set. Further, we exclude the variable identifying callable securities, as no such provision is found with syndicated loans. We add control variables typically utilized in loan-pricing studies: the number of lenders, the size of the loan (in USD), and dummy variables controlling for the primary purpose, seniority level, usage of financial covenants, and base currency of the loan. Models 1 and 2 include our base specification, where government ownership is measured with a binary variable in Model 1 and as a percentage in Model 2. Models 3 and 4 follow the format of Models 1 and 2 but also examine the divergence between cash-flow and ownership rights through the *Wedge*. Model 5 considers only non-legacy government ownership stakes, while Models 6 and 7 use different proxies for financial crises, respectively, from Laeven and Valencia (2013) and Reinhart and Rogoff (2011).

Consistent with the bond-based analysis, all estimates indicate that government ownership during financial or banking crises is associated with a lower cost of loans. Model 1 indicates that the presence of government ownership is associated with approximately a 66 bp reduction in loan spreads during the 2008–2010 financial crisis. The relation between government ownership and the cost of debt is economically significant, and Model 2 shows each additional percentage point of government ownership lowers loan spreads by 1.44 bp during the crisis. This relation exists after controlling for the divergence between cash-flow and ownership rights, as shown in Models 3 and 4. We find higher loan spreads for firms with greater divergence between voting and cash-flow rights (*Wedge*) in Model 3 and confirm that this effect diminishes when state owners exist, consistent with Lin, Ma, Malatesta, and Xuan (2011). These authors attribute the latter effect to a lower probability of firm default and less resource tunneling in the presence of government shareholders.

While Lin, Ma, Malatesta, and Xuan (2011) only include a binary variable for government ownership in their analysis, which we replicate in Model 3, we also include stake percentage government ownership in Model 4. However, Model 4 reports no significant relation between loan spreads and *Wedge* once we account for the size of the state holding, rather than simply its presence. This result is likely due to a higher responsiveness of the cost of debt to government ownership relative to *Wedge* in our loan sample, which, compared to Lin, Ma, Malatesta, and Xuan (2011), includes firms with larger government stakes, on average. Further, *Wedge* is uncorrelated with the binary measure of government presence but negatively correlated with government ownership stakes, suggesting that the effect of *Wedge* will be mitigated when accounting for the *size* of government holdings.

We also find the relation between government ownership and the cost of borrowing is not specific to our crisis definition, as the results remain using alternative crises definitions in Models 6 and 7. Finally, we find some evidence in Model 3 that government ownership during non-crisis periods is associated with an increase in the cost of loans, but this effect is not as prevalent as it is for our bond sample. We suspect that the ineffective monitoring of most state investors is not similarly linked to higher debt pricing when considering loans because borrowers—as discussed by Lin, Ma, Malatesta, and Xuan (2013)—are inherently subject to the greater scrutiny of lending banks. However, government owners uniquely provide implicit guarantees of firm viability, particularly valuable during crises, which we find to similarly reduce the cost of both public and private debt.

5.5. Firm-level distress

We further investigate the influence of government ownership on the cost of debt for riskier firms. Noting that the value of debt guarantees should increase as default becomes more likely, we have so far focused on testing whether government ownership affects the cost of debt differently during economy-wide events, such as the 2008 financial crisis in Section 5.3 and the various banking crises in Section 5.4.1. We now turn to analyzing the effect of government shareholding on the cost of debt around firm-specific distress.

In Table 7, we focus on firms that issue non-investment-grade (junk) bonds in Models 1 and 2, financially constrained firms defined using Liao's (2014) modification of the size-age index from Hadlock and Pierce (2010) in Models 3 and 4, and small firms in Models 5 and 6.[23] Given the importance of financial crises to debt pricing, as shown previously, we investigate whether the influence of government ownership on the cost of debt of high-risk firms differs during the 2008 financial crisis. Therefore, we split our examination into the pre-crisis period of 1991–2007 (Models 1, 3, and 5) and the 2008–2010 financial crisis period (Models 2, 4, and 6). This allows us to evaluate how the implicit government guarantee influences the cost of debt for high-risk firms and also when combined with economy-wide distress. Because bailout transactions are significantly more prevalent starting in 2008, we control for these observations whenever performing regression analyses for the crisis period.

Table 7 shows that the effect of government involvement on the cost of debt during the financial crisis is particularly strong for more distressed firms, as indicated by the significant interaction terms (all at the 1% levels) between various measures of distress and government ownership in Models 2, 4, and 6. Model 2 indicates that each additional percentage point of government ownership during the financial crisis is associated with a lower cost of debt of 7.37 bp (i.e., -6.4 bp$+(-0.97$ bp)) for firms that issue non-investment-grade bonds. Model 4 shows that state ownership similarly reduces the cost of debt for constrained firms, in the magnitude of 2.85 bp for each percentage point of

[23] Although financial constraints can be differentiated from financial distress (Whited and Wu, 2006), Agarwal and Taffler (2008) discuss that financially constrained firms are more prone to facing financial distress.

Table 7
Government ownership, financial crisis, firm distress, and the cost of debt.

Firm (z_j) and year (ν_t) fixed effects regression analysis with heteroskedasticity-robust standard errors double clustered by bond and year is performed on the following model: $y_{it} = \theta X_{it} + \gamma \hat{\zeta}_{it} + z_j + \nu_t + \eta_{it}$. The dependent variable, *Credit spread* (y_{it}), is the difference between the corporate bond's current yield to maturity and that of the government bond most closely matched by maturity, and η_{it} is the error term. Orthogonalized values of the log of the bond's rating after conversion to an ordinal scale, *Rating* ($\hat{\zeta}_{it}$), are used. The variables included in X_{it} are described in Appendix A. The data are annual and cover the years 1991–2007 in Models 1, 3, and 5 and 2008–2010 in Models 2, 4, and 6. Sample characteristics are described in Table 1. *Govt ownership (Stake %)* represents the percentage owned by the state in all models. Bailed-out firms are controlled for in 2008–2010 financial crisis models. Coefficients are listed below, with *z*-statistics in parentheses. *** Denotes significance at the 1% level, ** at the 5% level, and * at the 10% level.

	(1) 1991–2007	(2) 2008–2010	(3) 1991–2007	(4) 2008–2010	(5) 1991–2007	(6) 2008–2010
Govt ownership (Stake %)	0.22*	−0.97***	0.27	−0.20	1.42	−21.7***
	(1.76)	(−2.77)	(1.44)	(−1.17)	(0.63)	(−3.43)
Junk bonds∗Govt ownership (Stake %)	−0.21	−6.40***				
	(−0.16)	(−3.82)				
Junk bonds	177***	195**				
	(4.76)	(2.45)				
Constrained∗Govt ownership (Stake %)			−0.47*	−2.85***		
			(−1.68)	(−3.18)		
Constrained			15.1*	47.0		
			(1.89)	(1.06)		
Size∗Govt ownership (Stake %)					−0.13	1.47***
					(−0.63)	(3.38)
Size	−8.63**	−99.1***	−13.2**	−126***	−11.7**	−153***
	(−2.02)	(−2.60)	(−2.49)	(−2.72)	(−2.21)	(−4.46)
Rating	−179**	−267***	−238***	−364**	−238***	−342**
	(−2.14)	(−3.77)	(−2.87)	(−2.55)	(−2.89)	(−2.49)
Maturity	26.8***	10.1	27.3***	10.7	27.3***	10.4
	(8.68)	(0.82)	(9.49)	(0.88)	(9.52)	(0.86)
Leverage	1.41**	−6.50***	1.42***	−5.29***	1.46***	−5.76***
	(2.54)	(−3.72)	(2.61)	(−3.83)	(2.61)	(−3.54)
M/B	−1.24	17.1**	−1.83	13.7**	−1.62	14.4**
	(−0.53)	(2.35)	(−0.76)	(2.21)	(−0.69)	(2.23)
ROE	−76.2***	−114***	−74.4***	−98.7***	−76.1***	−105***
	(−2.89)	(−3.69)	(−2.62)	(−3.62)	(−2.73)	(−4.19)
ΔLevel of term structure	1.78	−160	2.83	−148	2.70	−146
	(0.21)	(−1.44)	(0.34)	(−1.38)	(0.32)	(−1.39)
ΔSlope of term structure	17.5***	−15.8	15.9**	−16.2	15.8**	−16.1
	(2.61)	(−0.87)	(2.51)	(−0.92)	(2.40)	(−0.92)
GDP growth	−13.0**	10.0	−15.1***	10.1	−15.4***	12.0
	(−2.28)	(0.77)	(−2.72)	(0.77)	(−2.81)	(0.91)
Individual ownership	76.2***	49.3	81.5***	25.9	81.5***	34.2
	(2.75)	(1.60)	(2.83)	(1.10)	(2.80)	(1.29)
Institutional blockholder	−20.9*	−21.9	−15.4	0.10	−15.8	1.55
	(−1.65)	(−1.35)	(−1.30)	(0.0066)	(−1.36)	(0.13)
Secured bond	8.75	−68.3***	11.7	−67.6***	11.7	−66.6***
	(0.52)	(−7.72)	(0.69)	(−7.89)	(0.69)	(−7.64)
Callable bond	55.5***	56.5***	54.6***	59.1***	54.6***	58.8***
	(4.19)	(6.29)	(4.11)	(7.36)	(4.09)	(7.08)
Bailed out		122***		139***		136***
		(6.12)		(6.53)		(6.21)
Observations	4,116	2,554	4,116	2,554	4,116	2,554
Firms	197	176	197	176	197	176
R-squared	0.672	0.683	0.669	0.681	0.669	0.681

government ownership. Additionally, Model 6 indicates a positive relation between government ownership and the cost of debt for larger firms, meaning that the benefits of implicit government guarantees during the crisis accrue more to smaller firms. These results are consistent with the implicit government guarantee being more important for high-risk firms during economy-wide crises.

Models 1, 3, and 5 show that government ownership in riskier firms outside of economy-wide distress is associated with a lower cost of debt, but it is only significant for firms classified as constrained using the modified Hadlock and Pierce (2010) index in Model 3. This result shows that for financially constrained firms, government ownership is associated with a lower cost of debt even outside of the crisis, as each additional percentage point increase in government ownership is associated with approximately one-half of a bp reduction in the cost of debt. This last result suggests that the reduction in spreads tied to state backing can predominate outside of crises for certain types of firms where debt repayment is less assured. Additionally, we find significantly higher spreads associated with non-investment-grade bonds in Models 1 (177 bp) and 2 (195 bp), as expected. Models 3 and 4 also show positive coefficients on firms classified as constrained based on the modified Hadlock and Pierce (2010) index, but statistical significance is only present during the pre-crisis period. Since financially

constrained firms often suffer from a lack of pledgeable assets or bond ratings, their lower debt levels could keep their spread increases comparable to those of other, more-levered firms during the crisis.

Table 7 emphasizes the importance of government guarantees for riskier firms. The results above support our previous findings, as well as our hypothesis in Section 2.2 pertaining to government ownership's influence on the cost of debt during firm-specific distress. Our interpretation of these results is that the implicit government guarantee is important for the cost of debt during a variety of distress periods—both macroeconomic and idiosyncratic.

5.6. Domestic/foreign government ownership and the cost of debt

We attribute the impact of government ownership on the cost of debt to the different priorities of government investors, such as employment maximization or the support of strategically important industries. These goals can lead to deviations from shareholder wealth maximization (and a higher consequent cost of debt) but also to implicit guarantees against default (with the opposite effect on the cost of debt). Yet, such social and political goals should be most relevant when governments invest in a local target. To further investigate the channels by which government ownership relates to debt pricing, we conclude our analyses by studying distinctions between domestic and foreign government ownership.

In Model 1 of Table 8 we employ a continuous measure of domestic and foreign percentage ownership (based on minimum ownership stakes of 1%). In Model 2 of Table 8 we present regression results where these domestic and foreign government ownership measures are instrumented. Government investors are exclusively categorized, but a bond-year observation can have ownership from multiple categories (e.g., in a certain year, a firm could have shares owned by both domestic and foreign state entities). Models 1 and 2 of Table 8 allow us to compare observations with ownership by either domestic or foreign governments to those without any government ownership.

Model 1 shows that each additional percentage point of domestic government ownership is associated with a 0.25 bp reduction in bond spreads during the crisis and 1.20 bp increase in bond spreads outside of the crisis, while no significant relation is documented between foreign government ownership and the cost of debt. The instrumental variable approach employed in Model 2 confirms the finding that the reduction (increase) in the cost of debt during the crisis (pre-crisis) period is specific to domestic government ownership. The overidentification test, based on Hansen's J-statistic, fails to reject the null (p-value of 0.474) that the instruments are valid and properly excluded from the second-stage model. In line with our predictions, times of distress reveal the dominance of an implicit debt guarantee, especially valuable when default is more likely and specifically when the investor is a domestic government. These results suggest that the impact of state ownership on the cost of debt is due to the imposition of governmental priorities on firms, which are plausibly more marked in domestic settings.

Table 8
Ownership by domestic and foreign governments and the cost of debt.

Firm (z_j) and year (v_t) fixed effects regression analysis with heteroskedasticity-robust standard errors double clustered by bond and year is performed on the following model: $y_{it}=\theta X_{it}+\gamma\hat{\zeta}_{it}+z_j+v_t+\eta_{it}$. The dependent variable, *Credit spread* (y_{it}), is the difference between the corporate bond's current yield to maturity and that of the government bond most closely matched by maturity. η_{it} is the error term. Orthogonalized values of the log of the bond's rating after conversion to an ordinal scale, *Rating* ($\hat{\zeta}_{it}$), are used. The variables included in X_{it} are described in Appendix A. The data are annual and cover 1991–2010. Model 2 shows the second-stage results of a 2SLS instrumental variable regression where *Domestic govt ownership*, *Foreign govt ownership*, and their interactions with the crisis are instrumented, and first-stage models for the non-interacted variables are Models 3–4 in Table C1 of Appendix C. The sample is described in Table 1, and Model 2 includes a control sample of targets of non-government acquirers. Coefficients are listed below, with z-statistics in parentheses. *** Denotes significance at the 1% level, ** at the 5% level, and * at the 10% level.

	(1)	(2)
Domestic govt (Stake %)	1.20***	3.52***
	(3.84)	(4.61)
Foreign govt (Stake %)	0.29	2.81
	(0.30)	(0.43)
Domestic govt (Stake %)∗*Fin. crisis*	−1.45**	−5.35**
	(−2.51)	(−2.30)
Foreign govt (Stake %)∗*Fin. crisis*	−0.47	0.33
	(−1.09)	(0.078)
Fin. crisis	222***	216***
	(4.53)	(6.99)
Rating	−341***	−262***
	(−5.01)	(−11.5)
Maturity	20.7***	19.5***
	(4.33)	(3.29)
Callable	64.1***	38.2***
	(6.68)	(5.56)
Secured	−14.7	10.2
	(−1.01)	(0.66)
Leverage	−0.75	0.45
	(−0.61)	(0.43)
M/B	−5.18	−4.31**
	(−1.39)	(−2.03)
ROE	−52.9*	−48.4**
	(−1.93)	(−2.41)
Size	−26.0***	−26.2***
	(−4.85)	(−3.86)
ΔLevel of term structure	−22.4	−20.5
	(−0.77)	(−0.87)
ΔSlope of term structure	7.56	3.53
	(1.10)	(0.49)
GDP growth	−8.34**	−8.78***
	(−2.10)	(−2.68)
Individual ownership	23.6	
	(0.92)	
Institutional blockholder	−17.8	
	(−1.54)	
Observations	6,670	14,962
Firms	226	824
p-Value of Hansen J-statistic		0.474
R-squared	0.668	0.684

6. Conclusions

Government ownership of corporate equity could carry an implicit debt guarantee reducing the chance of default and leading to a lower cost of debt, which should be especially valuable during periods of distress. On the other hand, state ownership could lead to a higher cost of debt if government owners increase moral hazard for managers, provide

inefficient monitoring, or impose social and political goals that reduce corporate profitability. Our research shows that government ownership of corporate equity significantly influences the cost of debt of investment targets and that the net effect of state ownership on bond credit spreads is systematically different during crisis and non-crisis years.

Using a sample of 6,670 bond credit spreads from 43 countries over 1991–2010, we find that government ownership is associated with a higher cost of debt in non-crisis years (approximately 38 bp) which is consistent with investment distortion fostered by state influence. However, in times of economic or firm distress, the dominant effect is a reduction in perceived default risk due to implicit government guarantees. State ownership is associated with a lower cost of debt during the recent financial crisis (9 bp) and during various banking crises, as identified by Laeven and Valencia (2013) and Reinhart and Rogoff (2011). This effect is stronger in the presence of firm-specific distress, particularly for firms that issue non-investment-grade bonds, firms more likely to be financially constrained, and smaller firms. We also find that the implicit guarantee extended during the recent financial crisis is specific to domestic government ownership. Our results persist after adding a proxy for the wedge between ownership and control, as described by Lin, Ma, Malatesta, and Xuan (2011), and when controlling for government bailouts. These results also remain after we address endogeneity concerns by adding targets of non-government acquisitions to our benchmark sample and using 2SLS instrumental variable and treatment effects models.

We find that the impact of government ownership is nuanced, depending on economic conditions, firm characteristics, and the identity of the investing government entity. We do not address the question of whether these effects represent a desirable outcome or a market distortion, which is better explored within a macroeconomic perspective, as our focus is on the corporate finance issues. For instance, lower debt pricing driven by government stakes in high-risk firms can come at the expense of other stakeholders, such as taxpayers. Our study highlights the importance of fully investigating the largely unexplored impact of government ownership on the pricing of corporate debt, as we find that the effect is both statistically and economically significant. In broader terms, we contribute to the literature on bond pricing and indicate that the identity of shareholders is an important factor.

Appendix A

See Table A1.

Appendix B

See Table B1.

Appendix C

See Table C1.

Table A1
Variable definitions.

Ownership data are from the following sources: SDC Platinum; Thomson ONE Banker (T1B); entities' websites; press releases; the Securities and Exchange Commission's Electronic Data Gathering, Analysis, and Retrieval system (EDGAR); the Canadian Securities Administrators' System for Electronic Document Analysis and Retrieval (SEDAR); Privatization Barometer; the World Bank privatization database; and Lexis-Nexis. All share ownership is based on ownership stakes of at least 1%. Bond data are obtained from Bloomberg and Datastream. Financial data are obtained from Worldscope.

Variable	Definition	Source
Ownership variables		
Govt ownership (Presence)	Takes a value of one if the company has government shareholders and zero otherwise	Various sources
Govt ownership (Stake %)	% of the company owned by the government	Various sources
Non-legacy govt stake (%)	% of the company owned by the government minus any post-privatization state holdings	Various sources
Domestic govt (Stake %)	% of company owned by domestic government shareholders	T1B
Foreign govt (Stake %)	% of company owned by foreign government shareholders	T1B
Wedge (%)	% of shares owned by the largest shareholder of a firm (holding at least 10%) subtracted from the % of voting rights held by this largest shareholder. If multiple control chains or pyramid ownership structures exist, shares owned are determined by multiplying % of ownership stakes, while voting rights are calculated by taking the minimum % of ownership stakes	T1B, calculated
Individual ownership	Takes a value of one if the target company has individual or family shareholders and zero otherwise	T1B

Table A1 (*continued*)

Variable	Definition	Source
Institutional blockholder	Takes a value of one if the target company has institutional ownership > 5% and zero otherwise	T1B
Bond variables		
Credit spread	The difference between the corporate bond's current yield to maturity and that of the benchmark government bond most closely matched by maturity. Expressed in basis points (bp)	Datastream
Rating	The natural log of Standard and Poor's (S&P) bond rating, after conversion to an ordinal scale (AAA=22, AA+=21, etc.)	Datastream
Maturity	The natural log of the time till maturity, in days	SDC, calculated
Secured bond	Takes a value of one if the bond is secured through collateral and zero otherwise	Bloomberg
Callable bond	Takes a value of one if the bond is callable and zero otherwise	SDC
Non-investment-grade	Takes a value of one if the bond has an S&P rating of BB+ or lower and zero otherwise	SDC
Loan variables		
Loan spread	All-in-drawn spread: the difference between the corporate loan's current yield to maturity and that of LIBOR after adjusting for associated loan origination fees. Expressed in basis points (bp)	DealScan
Secured loan	Takes a value of one if the loan is secured through collateral and zero otherwise	DealScan
Loan size	The natural log of total value of the facility (in USD)	DealScan
Senior loan	Takes a value of one if the loan is senior and zero otherwise	DealScan
Number of lenders	Number of lenders participating in the loan syndicate	DealScan
Covenant	Take a value of one if the loan contract includes financial covenants and zero otherwise	DealScan
Macroeconomic variables		
Fin. crisis	Takes a value of one for the years 2008, 2009, and 2010 and zero otherwise	Calculated
Crises (LV)	Takes a value of one for the country-years defined as a banking crisis and zero otherwise	Laeven and Valencia (2013)
Crises (RR)	Takes a value of one for the country-years defined as a banking crisis and zero otherwise	Reinhart and Rogoff (2011)
Political system	Index of national political systems: Presidential (0), Assembly-elected President (1), Parliamentary (2)	World Bank Database of Political Institutions 2012 (Beck, Clarke, Groff, Keefer, and Walsh, 2001)
Civil law	Takes a value of one if the target nation is a civil law country and zero otherwise	Djankov, Hart, McLiesh, and Shleifer (2008)
Total investment	IMF reported ratio of total investment and GDP. IMF defines investment as the total value of the gross fixed capital formation and changes in inventories and acquisitions less disposals of valuables for a unit or sector	IMF World Economic Outlook (WEO) Database
Unemployment rate	IMF reported number of unemployed persons as a % of the labor force	IMF WEO Database
Left-wing	Takes a value of one if the political party of a nation's chief executive is left-wing and zero otherwise	World Bank Database of Political Institutions 2012 (Beck, Clarke, Groff, Keefer, and Walsh, 2001)
GDP growth	Annual % growth rate of real GDP at market prices	World Bank
Level of term structure	Yield from country-specific 10-year government bond indices	Bloomberg
Slope of term structure	Difference between the yields from country-specific 10-year and 2-year government bond indices	Bloomberg
Firm variables		
Leverage	(Total assets – Stockholders equity) / Stockholders equity	Worldscope
M/B	(Total shares*Closing share price) / Stockholders equity	Worldscope
Size	The natural log of total assets (in USD millions)	Worldscope
ROE	Net income / Stockholders equity	Worldscope
Bailed out	Takes a value of one once a company has been publicly rescued by the government and zero otherwise	SDC

Table B1
Factors associated with government presence: first-stage models for treatment effects regressions.

The following table shows probit regression results from models describing factors associated with the presence of government ownership in a given year. The firm-year observations consist of the main sample of government targets (6,670) and a control sample that includes targets of non-government acquirers. The dependent variable is *Govt presence*. In column 1 we model government presence during the full period, while in column 2, we model its interaction with the crisis period of 2008–2010. The probit models shown serve as the first-stage regression for the treatment effects model (Model 2) in Table 4. *Total investment*, *Unemployment rate*, *Civil law*, and *Left-wing* are the excluded instruments, and their joint significance is reported for each model. Variables are described in Appendix A. The firm- and country-level variables pertain to the target firms in our sample. The data are annual and cover the period 1991–2010. Coefficients are listed below, with *z*-statistics in parentheses. *** Denotes significance at the 1% level, ** at the 5% level, and * at the 10% level.

	(1)	(2)
Total investment	0.14***	0.089***
	(32.1)	(18.6)
Unemployment rate	0.076***	0.0026
	(10.6)	(0.28)
Civil law	1.19***	1.01***
	(34.4)	(19.1)
Left-wing	0.92***	0.26***
	(30.6)	(5.20)
Fin. crisis	−0.18***	7.29
	(−5.99)	(0.053)
Leverage	0.0023	0.0025
	(1.60)	(1.15)
Size	0.026***	0.11***
	(3.31)	(10.1)
Constant	−4.82***	−11.4
	(−35.1)	(−0.082)
Observations	15,082	15,082
Firms	839	839
p-Value of LR χ^2	0.000	0.000
p-Value for joint test of excluded instruments = 0	0.000	0.000

Table C1
Factors associated with government ownership: first-stage models for instrumental variable regressions.

The following table shows firm and year fixed effect regression results with heteroskedasticity-robust standard errors double clustered by bond and year from models describing factors associated with shares owned by the government in a given year. The firm-year observations consist of the main sample of government targets (6,670) and a control sample that includes targets of non-government acquirers. Columns 1 and 2 serve as the first-stage regression for the 2SLS instrumental variable models in columns 4 and 6 of Table 4, respectively. Columns 3 and 4 serve as the first-stage regressions for the 2SLS instrumental variable model in column 2 of Table 8. The dependent variable is the stake (%) of *Govt ownership* for Model 1, *Non-legacy govt stake (%)* for Model 2, *Domestic govt stake (%)* for Model 3, and *Foreign govt stake (%)* for Model 4. Variables are defined in Appendix A. The firm- and country-level variables pertain to the target firms in our sample. The data are annual and cover the period 1991–2010. Coefficients are listed below, with *z*-statistics in parentheses. *** Denotes significance at the 1% level, ** at the 5% level, and * at the 10% level.

	(1)	(2)	(3)	(4)
Total investment	0.44	0.25***	0.33**	0.18***
	(5.53)	(3.20)	(2.26)	(2.89)
Total investment∗Fin. crisis	−0.30**	−0.12	−0.47***	0.063
	(−2.62)	(−1.19)	(−2.87)	(0.89)
Unemployment rate	0.98***	0.77***	0.71**	0.32
	(3.87)	(3.53)	(2.33)	(1.54)
Unemployment rate∗Fin. crisis	−1.14***	−1.04***	−0.86***	−0.32***
	(−4.65)	(−4.75)	(−2.88)	(−3.88)
Civil law	8.25**	5.75	10.6***	−2.15**
	(2.15)	(1.69)	(3.22)	(−2.49)
Civil law∗Fin. crisis	1.60	1.82*	1.44	0.36
	(1.53)	(2.06)	(1.50)	(0.97)
Left-wing	0.16	0.68	0.37	0.44
	(0.19)	(0.94)	(0.63)	(1.29)
Left-wing∗ Fin. crisis	0.42	−0.41	0.74	−1.01*
	(0.39)	(−0.56)	(0.78)	(−2.04)
Political system			−5.60***	−0.18
			(−4.10)	(−0.94)
Political system∗Fin. crisis			0.54	−0.067
			(0.62)	(−0.18)
Fin. crisis	20.9***	16.8***	18.8***	2.62*
	(6.19)	(4.66)	(4.34)	(1.74)
Rating	−0.63	−0.54	−1.01	−0.22
	(−0.82)	(−0.79)	(−1.20)	(−1.64)

Table C1 (*continued*)

	(1)	(2)	(3)	(4)
Maturity	0.00020	−0.029	0.015	−0.0059
	(0.0034)	(−0.50)	(0.25)	(−0.36)
Callable	0.095	0.046	0.069	0.0040
	(0.45)	(0.21)	(0.35)	(0.12)
Secured	−0.99***	−0.29	−1.02***	0.053
	(−3.12)	(−1.40)	(−3.33)	(0.95)
Leverage	0.15**	0.14**	0.14	0.045**
	(2.26)	(2.17)	(1.55)	(2.20)
M/B	−0.20	−0.20	−0.26	−0.031
	(−1.23)	(−1.29)	(−1.68)	(−1.43)
Size	−1.32**	−1.72***	−0.38	−0.16*
	(−2.47)	(−3.49)	(−0.80)	(−1.98)
ROE	0.024	0.016	1.05	−0.83**
	(0.040)	(0.026)	(1.19)	(−2.35)
Δ*Level of term structure*	−0.22	0.52	−0.42	0.23
	(−0.32)	(1.16)	(−0.72)	(1.24)
Δ*Slope of term structure*	0.92	0.80	1.01	−0.11
	(1.31)	(1.52)	(1.61)	(−0.65)
GDP growth	0.033	0.15	−0.062	−0.016
	(0.15)	(0.75)	(−0.31)	(−0.65)
Observations	15,082	15,082	14,962	14,962
Firms	839	839	824	824
R-squared	0.873	0.821	0.855	0.918
Angrist-Pischke underidentification *p*-value	0.000	0.000	0.000	0.000
Angrist-Pischke *F*-statistic	25.99	9.23	14.41	12.77

References

Acharya, V.V., Anginer, D., Warburton, A.J., 2014. The end of market discipline? Investor expectations of implicit state guarantees Unpublished working paper. New York University, Virginia Tech, and Syracuse University.

Agarwal, V., Taffler, R., 2008. Does financial distress risk drive the momentum anomaly? Financial Management 37, 461–484.

Anderson, R.C., Mansi, S.A., Reeb, D.M., 2003. Founding family ownership and the agency cost of debt. Journal of Financial Economics 68, 263–285.

Angrist, J.D., Pischke, J.-S., 2009. Mostly Harmless Econometrics: An Empiricist's Companion. Princeton University Press, Princeton, NJ.

Ayyagari, M., Demirgüç-Kunt, A., Maksimovic, V., 2010. Formal versus informal finance: evidence from China. Review of Financial Studies 23, 3048–3097.

Bae, K., Goyal, V., 2009. Creditor rights, enforcement, and bank loans. Journal of Finance 64, 823–860.

Baghai, R.P., Servaes, H., Tamayo, A., 2014. Have rating agencies become more conservative? Implications for capital structure and debt pricing. Journal of Finance 69, 1961–2005.

Beck, T., Clarke, G., Groff, A., Keefer, P., Walsh, P., 2001. New tools in comparative political economy: the database of political institutions. World Bank Economic Review 15, 165–176.

Benmelech, E., Bergman, N.K., 2011. Vintage capital and creditor protection. Journal of Financial Economics 99, 308–332.

Ben-Nasr, H., Boubakri, N., Cosset, J., 2012. The political determinants of the cost of equity: evidence from newly privatized firms. Journal of Accounting Research 50, 605–646.

Blundell-Wignall, A., Wehinger, G., 2011. Open capital markets and sovereign wealth funds, pension funds, and state-owned enterprises. In: Fry, R.A., McKibbin, W.J., O'Brien, J. (Eds.), Sovereign Wealth: The Role of State Capital in the New Financial Order, Imperial College Press, London, pp. 105–146.

Borisova, G., Brockman, P., Salas, J., Zagorchev, A., 2012. Government ownership and corporate governance: evidence from the EU. Journal of Banking and Finance 36, 2917–2934.

Borisova, G., Megginson, W., 2011. Does government ownership affect the cost of debt? Evidence from privatization. Review of Financial Studies 24, 2693–2737.

Bortolotti, B., Faccio, M., 2009. Government control of privatized firms. Review of Financial Studies 22, 2907–2939.

Bortolotti, B., Fotak, V., Megginson, W., 2015. The sovereign wealth fund discount: evidence from public equity investments. Review of Financial Studies http://dx.doi.org/10.1093/rfs/hhv036.

Boubakri, N., Cosset, J., Guedhami, O., 2005. Postprivatization corporate governance: the role of ownership structure and investor protection. Journal of Financial Economics 76, 369–399.

Boubakri, N., Cosset, J., Saffar, W., 2013. The role of state and foreign owners in corporate risk-taking: evidence from privatization. Journal of Financial Economics 108, 641–658.

Chen, G., Firth, M., Xu, L., 2009. Does the type of ownership control matter? Evidence from China's listed companies. Journal of Banking and Finance 33, 171–181.

Collin-Dufresne, P., Goldstein, R., Martin, J., 2001. The determinants of credit spread changes. Journal of Finance 56, 2177–2207.

Datta, S., Iskandar-Datta, M., Patel, A., 1999. Bank monitoring and the pricing of corporate public debt. Journal of Financial Economics 51, 435–449.

Demirgüç-Kunt, A., Huizinga, H., 2013. Are banks too big to fail or too big to save? International evidence from equity prices and CDS spreads. Journal of Banking & Finance 37, 875–894.

Dick-Nielsen, J., Feldhütter, P., Lando, D., 2012. Corporate bond liquidity before and after the onset of the subprime crisis. Journal of Financial Economics 103, 471–492.

Djankov, S., Hart, O., McLiesh, C., Shleifer, A., 2008. Debt enforcement around the world. Journal of Political Economy 116, 1105–1149.

Eckel, C., Vermaelen, T., 1986. Internal regulation: the effects of government ownership on the value of the firm. Journal of Law and Economics 29, 381–403.

Estrin, E., Hanousek, J., Kočenda, E., Svejnar, J., 2009. The effects of privatization and ownership in transition economies. Journal of Economic Literature 47, 699–728.

Faccio, M., Lang, L.H.P., 2002. The ultimate ownership of Western European corporations. Journal of Financial Economics 65, 365–395.

Faccio, M., Masulis, R., McConnell, J., 2006. Political connections and corporate bailouts. Journal of Finance 61, 2597–2635.

Fama, E., French, K., 1989. Business conditions and expected returns on stocks and bonds. Journal of Financial Economics 25, 23–49.

Fama, E., French, K., 1993. Common risk factors in the returns on stocks and bonds. Journal of Financial Economics 33, 3–56.

Flannery, M.J., Sorescu, S.M., 1996. Evidence of bank market discipline in subordinated debenture yields: 1983–1991. Journal of Finance 51, 1347–1377.

Giannetti, M., Laeven, L., 2009. Pension reform, ownership structure, and corporate governance: evidence from a natural experiment. Review of Financial Studies 22, 4092–4127.
Gropp, R., Gruendl, C., Guettler, A., 2014. The impact of public guarantees on bank risk-taking: evidence from a natural experiment. Review of Finance 18, 457–488.
Gupta, N., 2005. Partial privatization and firm performance. Journal of Finance 60, 987–1015.
Hadlock, C.J., Pierce, J.R., 2010. New evidence on measuring financial constraints: moving beyond the KZ index. Review of Financial Studies 23, 1909–1940.
Heckman, J., 1979. Sample selection bias as a specification error. Econometrica 47, 153–161.
Heckman, J., Robb, R., 1986. Alternative methods for solving the problem of selection bias in evaluating the impact of treatments on outcomes. In: Wainer, H. (Ed.), Drawing Inferences from Self-Selected Samples, Springer-Verlag, New York, pp. 63–107.
Houston, J.F., Jiang, L., Lin, C., Ma, Y., 2014. Political connections and the cost of bank loans. Journal of Accounting Research 52, 193–243.
Iannotta, G., Nocera, G., Sironi, A., 2013. The impact of government ownership on bank risk. Journal of Financial Intermediation 22, 152–176.
Ivashina, V., Scharfstein, D., 2010. Bank lending during the financial crisis of 2008. Journal of Financial Economics 97, 319–338.
Kahan, M., Rock, E., 2010. When the government is the controlling shareholder. Delaware Journal of Corporate Law 35, 409–437.
Karolyi, A., Liao, R., 2015. State capitalism's global reach: evidence from foreign acquisitions by state-owned companies. Journal of Corporate Finance. accepted for publication.
Klock, M., Mansi, S., Maxwell, W., 2005. Does corporate governance matter to bondholders? Journal of Financial and Quantitative Analysis 40, 693–719.
Krishnan, C., Ritchken, P., Thomson, J., 2005. Monitoring and controlling bank risk: does risky debt help? Journal of Finance 60, 343–378.
Laeven, L., Valencia, F., 2013. Systemic banking crises database. IMF Economic Review 61, 225–270.
Liao, R.C., 2014. What drives corporate minority acquisitions around the world? The case for financial constraints. Journal of Corporate Finance 26, 78–95.
Lin, C., Ma, Y., Malatesta, P., Xuan, Y., 2011. Ownership structure and the cost of corporate borrowing. Journal of Financial Economics 100, 1–23.
Lin, C., Ma, Y., Malatesta, P., Xuan, Y., 2012. Corporate ownership structure and bank loan syndicate structure. Journal of Financial Economics 104, 1–22.
Lin, C., Ma, Y., Malatesta, P., Xuan, Y., 2013. Corporate ownership structure and the choice between bank debt and public debt. Journal of Financial Economics 109, 517–534.
Lin, C., Su, D., 2008. Industrial diversification, partial privatization and firm valuation: evidence from publicly listed firms in China. Journal of Corporate Finance 14, 405–417.
Liu, P., Thakor, A., 1984. Interest yields, credit ratings, and economic characteristics of state bonds: an empirical analysis. Journal of Money, Credit and Banking 16, 344–351.
Megginson, W., Netter, J., 2001. From state to market: a survey of empirical studies on privatization. Journal of Economic Literature 39, 321–389.
OECD, 1998. Corporate governance, state-owned enterprises and privatization OECD Proceedings. OECD Publishing.
O'Hara, M., Wayne, S., 1990. Deposit insurance and wealth effects: the value of being “too big to fail”. Journal of Finance 45, 1587–1600.
Ongena, S., Penas, M.F., 2009. Bondholders' wealth effects in domestic and cross-border bank mergers. Journal of Financial Stability 5, 256–271.
Petersen, M., 2009. Estimating standard errors in finance panel data sets: comparing approaches. Review of Financial Studies 22, 435–480.
Qian, J., Strahan, P., 2007. How laws and institutions shape financial contracts: the case of bank loans. Journal of Finance 62, 2803–2834.
Qiu, J., Yu, F., 2009. The market for corporate control and the cost of debt. Journal of Financial Economics 93, 505–524.
Reinhart, C.M., Rogoff, K.S., 2011. From financial crash to debt crisis. American Economic Review 101, 1676–1706.
Santos, J., 2011. Bank corporate loan pricing following the subprime crisis. Review of Financial Studies 24, 1916–1943.
Shleifer, A., 1998. State versus private ownership. The Journal of Economic Perspectives 12, 133–150.
Stiglitz, J., Jaramillo-Vallejo, J., Park, Y., 1993. The role of the state in financial markets. World Bank Research Observer Annual Conference on Development Economics Supplement, pp. 19–61.
Stulz, R., 2005. The limits of financial globalization. Journal of Finance 60, 1595–1638.
Sufi, A., 2009. Bank lines of credit in corporate finance: an empirical analysis. Review of Financial Studies 22, 1057–1088.
Tang, D.Y., Yan, H., 2010. Market conditions, default risk and credit spreads. Journal of Banking and Finance 34, 743–753.
Thompson, S.B., 2011. Simple formulas for standard errors that cluster by both firm and time. Journal of Financial Economics 99, 1–10.
Truman, E.M., 2010. Sovereign Wealth Funds: Threat or Salvation?. Peterson Institute for International Economics, Washington D.C.
Veronesi, P., Zingales, L., 2010. Paulson's gift. Journal of Financial Economics 97, 339–368.
Whited, T.M., Wu, G., 2006. Financial constraints risk. Review of Financial Studies 19, 531–559.
Woidtke, T., 2002. Agents watching agents? Evidence from pension fund ownership and firm value. Journal of Financial Economics 63, 99–131.
Wooldridge, J., 2010. Econometric Analysis of Cross Section and Panel Data, second ed. The MIT Press, Cambridge, MA.