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The government as a large shareholder: Impact on corporate governance

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Abstract

What is the role that governments play as large shareholders of mixed-owned firms? By solving a bargaining model over investment decisions, we unveil two corporate governance effects of the government's activism as a large shareholder: a *voting effect* that always lowers the value of minority votes and an *interventionism effect* that, depending on the government's political interests, either raises or lowers diversion of firm value by controlling shareholders. We apply our model to Brazilian data on voting premia and find that the activism of the Brazilian government from 2008 to 2012 harmed minority shareholders by making their votes less important for business decisions.

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Corporations establish political connections in a variety of ways: they attract politicians to the board of directors, finance political campaigns, and hire lobbyists to defend their interests in Congress. Firms seek political connections because they tend to make it easier to win procurement contracts in the US (Goldman, Rocholl, and Son, 2013), to give easier access to subsidized financing in emerging market countries (Khwaja and Mian, 2005; Leuz and Oberholzer-Gee, 2006; Claessens, Feijen, and Laeven, 2008), and to increase the likelihood of bail out in financial distress (Faccio, Masulis, and McConnell, 2006). Political connection is a two-way road, though.

Government officials may ask connected firms to distort their business decisions in exchange for future considerations that, in the end, may not arrive. For instance, Sapienza (2004) finds that politics distorts the lending strategy of state-owned banks in Italy, whereas Carvalho (2014) shows that, from 1995 to 2006, the Brazilian government asked privately-owned firms to shift employment and investment to states and cities where pro-government candidates faced tough opponents in incoming elections. Political connections, therefore, also entail costs: governments may intervene in business decisions of connected firms for political reasons.

Faccio (2006) estimates a cumulative abnormal return (CAR) of 1.43% for establishing political connections, in a sample of over 20,000 listed companies worldwide.¹ Such a gain partly explains why political connections exist in 35 of the 47 countries in her sample. The evidence leans toward the cost of political connections, however, if we restrict attention to mixed-owned firms, that is, public firms in which private investors share control with the government.² Fan, Wong, and Zhang (2007) report that, in China, mixed-owned firms with politically connected CEOs fare worse than their counterparts without politically connected CEOs. Apparently, establishing political connections in mixed-owned firms turns the government into an active shareholder that harms firm value.

The main contribution of this paper is to shed some light on the role that governments play as large shareholders of mixed-owned firms. By solving a bargaining game over investment decisions, we unveil two corporate governance effects of the government's activism as a large shareholder: a *voting effect* associated with the entry in the control group of a shareholder as powerful as the government and an *interventionism effect* that reflects the government's costs and benefits

¹ Faccio's CAR is for a two-day window around the announcement day of the established political connection.

² Mixed-owned firms are prevalent throughout the world. La Porta, Lopez-de-Silanes, and Shleifer (1999) show that, as of 1996, a government was a controlling shareholder in 18.8% of the firms in their sample of large corporations in 27 wealthy economies. See also Aminadav and Papaioannou (2016) for a more recent take.

of protecting the rights of the mixed-owned firm's minority shareholders. The characterization of the equilibrium shows that the *voting effect* always lowers the value of minority votes, while the *interventionism effect* depends on the government's equity stake and on its political gains of protecting minority shareholders. We apply the implications of the model to Brazilian data, finding that the activism of the Brazilian government from 2008 to 2012 harmed minority shareholders by making their votes less important for business decisions. These findings suggest negative returns for establishing political connections in Brazil's mixed-owned firms.

To understand the corporate governance effects of the activism of the government as a large shareholder, consider an investment decision in a mixed-owned firm with dispersed investors and three large shareholders: two private investors and the government. The large private investors form the firm's control group, which also includes the government if it chooses to behave as an active large shareholder.

The firm's controlling shareholders choose between two projects, whose returns comprise verifiable and nonverifiable cash flows. The verifiable cash flows are distributed to all shareholders according to their equity holdings, whereas the nonverifiable ones are captured only by controlling shareholders. In our model, conflicts of interests on the project selection arise when one of the controlling shareholders captures an uneven share of the nonverifiable cash flows.

As Grossman and Hart (1988) point out, conflicts among controlling shareholders may induce a bidding war for minority votes that transfers, through the winning bid, nonverifiable cash flows to minority investors with voting shares. These bidding wars suggest that frictions exist in the way that controlling shareholders try to solve their conflicts of interests. Rather than starting a bidding war for minority votes, the controlling shareholders would be better off with a set of side payments that shares the firm's nonverifiable cash flows more evenly among themselves.

Regardless of the bargaining frictions that haunt the controlling shareholders, we argue that the government has an effective instrument to impose its agenda on the other controlling shareholders of a mixed-owned firm. It can threaten to monitor more intensively the firm on behalf of the minority shareholders, unless the other controlling shareholders agree with its terms. Typically, controlling shareholders should not take seriously a peer's threat of monitoring the firm on behalf of the minority shareholders. After all, monitoring also reduces the threatener's leeway to divert

cash flow from the firm. A monitoring threat from the government is credible, though, for it also internalizes political gains of protecting minority shareholders.

Political connections in a mixed-owned firm therefore signal that the government is an active large shareholder that might impose its will on other controlling shareholders, with no need to seek minority votes. Without bidding wars, voting shares do not capture part of the firms' nonverifiable cash flows, giving rise to a *voting effect* of the government's activism that weakens one corporate governance instrument – the vote – that aims to protect the rights of minority shareholders.

And yet, the *voting effect* does not suffice to establish that the government's activism harms the minority shareholders of mixed-owned firms. The overall effect depends on the workings of the government's representatives in the control group. The representatives reinforce the *voting effect* if they help the controlling shareholders divert value from minority shareholders. On the contrary, the *voting effect* is mitigated if, for instance, government's bureaucracy forces the firm to verify cash flows. In one way or the other, this is the *interventionism effect* of the government's activism.

To empirically disentangle the *voting effect* from the *interventionism effect*, we entertain in our model a mixed-owned firm that issues two classes of stocks: voting and nonvoting shares. Rydqvist (1988) and Zingales (1994, 1995) show that the percentage difference between the prices of these two stocks (i.e., the firm's voting premium) increases with the likelihood of a bidding war for minority votes. Nenova (2003) confirms their findings in a broader sample, showing that the highest voting premia are typically in countries that offer weaker legal protection to minority shareholders. In these countries, controlling shareholders bid more aggressively in control battles because the value of control is higher. Consistent with this evidence, our model predicts that the *voting effect* lowers the voting premium by reducing the likelihood of a bidding war for minority votes. In turn, the *interventionism effect* increases (decreases) the premium if the government's activism as a large shareholder is expected to raise (lower) the nonverifiable cash flows.

Bearing in mind how the voting premium responds to the *voting effect* and the *interventionism effect*, consider a regression of the voting premium on a proxy for the probability that the government behaves as an active large shareholder and on the interaction of this proxy with the equity stake of the government. Our model shows that the regression coefficient for the probability of activism captures the impact of the *voting effect* on the voting premium. In turn, the coefficient of

the interaction of the probability of the government’s activism with its equity stake captures the *interventionism effect*. Intuitively, the voting premium regression disentangles the two governance effects of the government’s activism because our model predicts that the *interventionism effect* gets stronger (in absolute terms) with the government’s equity stake, whereas the *voting effect* does not.³

We apply the testable implications of our model to investigate the governance impact of a recent wave of government’s activism in Brazil. The sample comprises voting premia of 163 Brazilian firms with dual-class shares trading on the São Paulo Stock Exchange (BM&FBovespa), between 2008 and 2012. This is an interesting sample for several reasons. First, the government held at least 20% of the votes in 39 of the 163 firms in the sample. Second, Brazil’s poor legal protection of the rights of minority shareholders and the size of its stock exchange ensure that stock prices internalize changes in governance practices associated with the activism of the government as a large shareholder.⁴ Third, the sample period covers a period of highly visible attempts from the Brazilian government to intervene in business decisions of public firms. Finally, Carvalho (2014) shows evidence that the share of loans from government-controlled banks is a good proxy for the probability that the Brazilian government intervenes in business decisions of private firms by behaving as an active large shareholder in mixed-owned companies. This proxy is crucial for assessing corporate governance effects of the activism of the government as a large shareholder.

When we restrict attention to firms that the Brazilian government controlled less than 20% of the votes, the median voting premium fell from 9.36% in 2008 to 0.82% in 2012. In this sample, fixed-effects regressions in Section 3 do not find a statistically significant effect of the share of loans from government-controlled banks (our proxy of the probability that the government behaves as an active large shareholder) on the voting premium. We interpret this result as evidence that government interventions in the private sector have on average no governance effects on firms that the government isn’t a large shareholder. They might even affect the values of these firms, but not through their governance structures.

In contrast, the probability of the government’s activism is an important determinant of the

³ Boardman and Vining (1989), Barberis, Boycko, Shleifer, and Tsukanova (1996), La Porta, Lopez-de-Silanes, and Shleifer (2002), and Sapienza (2004) find that government ownership harms firm value, suggesting that governments have more leeway to distort business decisions in firms they own a larger fraction of shares.

⁴ The volume of trading at BM&FBovespa is among the largest in the world.

voting premium of firms in which the Brazilian government controls at least 20% of the votes. In particular, the median voting premium in the firms that the government owns more than 20% and less than 50% fell from 29.4% in the third quarter of 2008 to 4.0% in the last quarter of 2012. Fixed-effect regressions suggest that the share of loans from government-controlled banks explains 62.9% of the 25.4% drop of the median voting premium of these firms.

Last but not least, we find that, as long as the government controls at least 20% of the votes, additional voting shares do not alter the extent to which the probability of the government's activism lowers the voting premium. This result is consistent with the *voting effect*, but contrary to the *interventionism effect*. Apparently, the Brazilian government's activism as a large shareholder does not lead to better or worse protection of the minority shareholders's rights. Still, it harms minority shareholders by making it less likely that the controlling shareholders engage in a bidding battle for minority votes.

The rest of the paper is organized as follows. Section 1 models the corporate governance effects of the activism of the government as a large shareholder, whereas Section 2 describes the data we use in the empirical application of the paper. Section 3 shows our main empirical result, namely, a higher probability that the Brazilian government behaves as an active large shareholder makes minority votes less important for business decisions. Section 4 conducts some robustness checks (alternative thresholds for control and criteria for aggregating votes as well as quantile regressions). Section 5 concludes. We collect all technical proofs in the Appendix.

1 Corporate governance in mixed-owned firms

The separation between ownership and control is a cornerstone of modern corporations. In well-functioning capital markets, investors diversify their wealth by supplying capital to several public companies, without spending resources monitoring them. The separation between ownership and control does not always work perfectly, though. La Porta, Lopez-de-Silanes, and Shleifer (1999, 2000) show that large shareholders often participate in the management of public companies, taking advantage of their control positions to influence business decisions in ways that benefit them and harm minority shareholders. The corporate governance literature essentially classifies as *private benefit of control* any undue diversion of firm value by shareholders and managers in control

positions.

To be sure, there exist market forces that limit the private benefits of control. In particular, Grossman and Hart (1988) argue that shareholders in control positions may fail to solve conflicts of their own, giving rise to bidding wars for minority votes that transfer part of these private benefits of control to minority shareholders. We nonetheless demonstrate in this section that minority shareholders of mixed-owned firms should not expect bidding wars for their votes if the government behaves as an active large shareholder. As a result, government's activism has negative consequences to corporate governance in mixed-owned firms.

We unveil the corporate governance effects of the government's activism by modelling an investment decision in a mixed-owned firm with three large shareholders: the government and two private investors. In the first part of this section, we assume that the government is a passive shareholder. With this assumption, we show how conflicts of interest between the two large private investors give rise to a bidding war for minority votes. The second part of the section, in turn, considers that there is a positive probability that the government will become an active large shareholder, drawing implications that unveil the governance effects of the government's activism as a large shareholder.

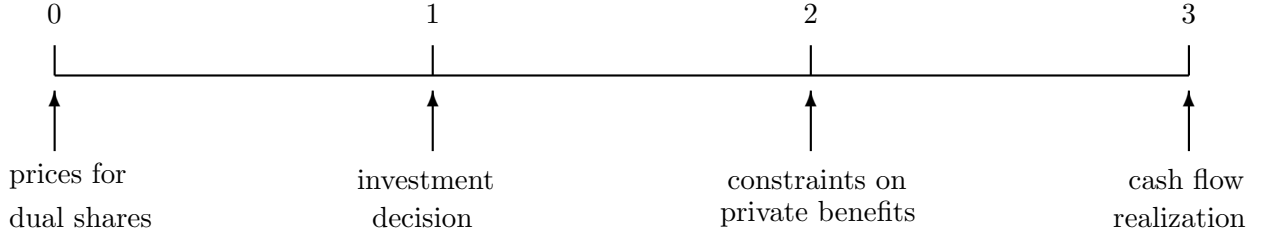
1.1 The benchmark: The government as a passive large shareholder

Consider a risk-neutral economy with four dates ($t = 0, 1, 2, 3$), zero risk-free rate, and a mixed-owned firm with voting shares (one share one vote) and nonvoting ones. Three large investors own the majority of the firm's voting shares: the government holds a fraction α_0 , and two private investors own $\alpha/2$ each, with $\alpha_0 + \alpha \geq 0.5$. Dispersed investors hold all nonvoting shares and a minority fraction of the voting ones. In our model, private investors can change their equity holdings in the mixed-owned firm, but the government can't. With this assumption, we rule out solutions of corporate governance problems that require the mixed owned firm's privatization or nationalization.⁵

Figure 1 depicts the timing and main events of the model. At $t = 0$, the risk-neutral stock market sets the prices for the voting and nonvoting shares of the mixed-owned firm. In doing so, it

⁵ In our sample, the equity stakes of the Brazilian government actually changed over time in some firms, even if only marginally. However, allowing for changes in the government's equity stake would only reinforce the model implications given that it would create another channel through which the government could affect mixed-owned firms while making it harder for bidding wars for minority votes to arise.

Figure 1: Timeline with sequence of events



takes into account that the firm's cash-flow generation stems from assets in place at $t = 0$ and from one of two mutually exclusive projects, A and B , available at $t = 1$. Both projects are zero-cost investments. In this section, the government behaves as a passive investor, despite its large equity stake. This means that the two large private investors form the control group that selects the project at $t = 1$.

To focus on corporate governance issues, we assume that the projects and assets in place at $t = 0$ generate the same cash flows at $t = 3$. Investors' equity holdings do not necessarily determine their shares of the cash flows, though. At $t = 2$, the firm's governance structure sets the fraction of the cash-flow generation that outsiders can verify at $t = 3$. Aware of the governance structure, the controlling shareholders unduly divert nonverifiable cash flows. In our model, the diverted cash flow is the firm's private benefit of control. From the perspective of the controlling shareholders, an efficient investment decision selects the project that maximizes their collective gains, specifying in a contract the allocation of private benefits from the selected project.⁶ These contracts are ruled out by the shady nature of private benefits. This means that private benefits of control are the source of conflicts of interest in the control group.

More formally, the firm's verifiable cash flow is $2y$ if the government is a passive investor: y from the assets in place at $t = 0$ and y from whichever project the firm selects at $t = 1$. By assumption, voting and non voting shares split the verifiable cash flow $2y$ equally. The private investors in the control group are paid their due share of the verifiable cash flows and, in addition, divert $2b$ from the firm's cash-flow generation: $b/2$ each from the assets in place at $t = 0$ and a total of b from the

⁶ Without further assumptions, it is not obvious that the controlling shareholders will always split evenly the private benefits of control. Consider, for instance, that a division of the firm undertakes a project that generates private benefits. The controlling shareholder in charge of the division is probably better positioned to capture the project's private benefits.

project selected at $t = 1$. While the total private benefits from either project always amount to b , the division is uncertain. Let b_j^p be the private benefit from project $p \in \{A, B\}$ that goes to the private investor $j \in \{1, 2\}$. The probability distribution of the private investors' private benefits from the projects is

$$\{(b_1^A, b_2^A), (b_1^B, b_2^B)\} = \begin{cases} \{(b/2, b/2), (b/2, b/2)\} & \text{with probability } 1/2 \\ \{(b, 0), (0, b)\} & \text{with probability } 1/4 \\ \{(0, b), (b, 0)\} & \text{with probability } 1/4. \end{cases} \quad (1)$$

The private investors in the control group know $\{(b_1^A, b_2^A), (b_1^B, b_2^B)\}$ at the time they decide which project to undertake. Differences of opinion on the investment decision therefore arise whenever each project's private benefits go entirely to one of the controlling shareholders. From equation (1), the probability that the controlling shareholders disagree on the investment decision is $1/2$.

As in Grossman and Hart (1988), we rule out side payments between controlling shareholders. This implies that conflicts of interest in the control group lead to a bidding war for the votes of the minority shareholders. In such a war, the two controlling shareholders simultaneously submit bids for voting shares at $t = 1$, taking into account that the government will never tender its shares. The highest bid wins and the winner selects the project at $t = 1$, after buying every voting share of the minority investors.⁷ Cash flows then realize at $t = 3$.

The model is a multi-stage game with observed actions that we solve for the subgame-perfect Nash equilibrium. We characterize the equilibrium of the game by backward induction, starting at the investment decision.⁸

The two controlling shareholders randomly select one of the projects if they split the private benefits evenly between them. More interestingly, they simultaneously bid for the minority votes whenever the projects concentrate all private benefits in a single controlling shareholder. In this case, the equilibrium bids are identical, amounting to the private benefit of each controlling shareholder's preferred project plus the cash flows paid to the voting shares.⁹ The tie is randomly broken and the winner acquires all minority votes by paying in advance its favorite project's private benefit

⁷ In case of a tie, one of the bidders is randomly declared the winner.

⁸ In the second part of this section, the government may intervene at $t = 2$ in the corporate governance structure that determines the size of the firm's private benefits. Accordingly, we then start the characterization of the equilibrium at $t = 2$.

⁹ The equilibrium of the bidding war is analogous to the unique Nash equilibrium of a Bertrand game in which two symmetric firms compete in prices for the sale of a product.

to the minority investors. After selecting the project, the winner gets its private benefits $-b$ from the assets in place at $t = 0$ and b from the selected project – and its share of the verifiable cash flows. The loser keeps its share b of the private benefits from the assets in place at $t = 0$ and its fraction of the verifiable cash flows.

Regardless of the investment decision at $t = 1$, half of the firm’s verifiable cash flow goes to nonvoting shares, implying that their total value at $t = 0$ is

$$P^{NV} = y. \quad (2)$$

Consistent with the evidence in Rydqvist (1988) and Zingales (1994, 1995), we assume that the stock market anticipates at $t = 0$ that, with probability $1/2$, there will be a bidding war for minority votes at $t = 1$. Taking into account that the winning bid transfers the selected project’s private benefits to the minority shareholders, the total value of the voting shares at $t = 0$ is

$$P^V = y + b/2. \quad (3)$$

From equations (2) and (3), the firm’s value from the minority shareholders’ perspective is

$$P^{NV} + P^V = 2y + b/2. \quad (4)$$

Equations (2) to (4) summarize our benchmark case. If the government behaves as a passive investor, the control group then diverts part of the firm’s cash flows: b from the assets in place at $t = 0$ and b from the selected project. However, the private benefits from the project go back to the minority shareholders if conflicts of interests in the control group give rise to a bidding war for minority votes. This illustrates the role that the vote plays as a corporate governance mechanism to protect minority shareholders. Next, we study the corporate governance effects of the activism of the government as a large shareholder.

1.2 The government as an active large shareholder

How do governments intervene in mixed-owned firms? According to OECD’s (2015) Guidelines on Corporate Governance of State-Owned Enterprise (Section IV, page 22): “the state and the enterprise should recognise the rights of all shareholders and ensure shareholders’ equitable treatment and equal access to corporate information.” In this view, the government should help protect the

rights of the minority shareholders of mixed-owned firms. And yet, Shleifer and Vishny (1993) point out that government interventions in corporate decisions often result in bribes. If so, a more active role of the government may lower verifiable cash flows and harm minority shareholders, as happened at Brazil’s mixed-owned oil giant, Petrobras, from 2003 to 2014. In this highly publicized corruption scandal, the government allegedly appointed some members of Petrobras’s board with the explicit purpose of grating favorable procurement contracts to companies that agreed to fund campaign donations to the incumbent political party and its allies.¹⁰

It is not obvious whether governments actually increase or decrease private benefits, when they become active large shareholders of mixed-owned firms. To allow for both alternatives, we modify the benchmark model of Section 1.1 by assuming that, upon becoming an active large shareholder, the government intervenes at $t = 2$ in the corporate governance structure that constrains the controlling shareholders’ ability to divert cash flows at $t = 3$. More precisely, the government changes the firm’s private benefits from $2b$ (namely, b from the assets in place at $t = 0$ and b from the project selected at $t = 1$) to $2b(1 - e)$. As a result, the firm’s verifiable cash flows go from $2y$ (y from the assets in place and y from the selected project) to $2y + 2be$, with $e \in [-1, 1]$.

Intuitively, private benefits go down if the government stiffens bureaucratic rules in the mixed-owned firm, making it more difficult for controlling shareholders to engage in transactions that do not show up in the firm’s books. This is the case of $e > 0$. In contrast, $e < 0$ models an increase in private benefits if the government uses for instance its political capital to soften regulators and tax authorities that constrain the controlling shareholders’ diversion of corporate’s assets (see Desai, Dyck, and Zingales, 2007).

Conceivably, it is costly for the government to intervene in the firm’s private benefits. We parameterize these costs by the function $(1 - \alpha_0)\Psi(e)$, where α_0 is the government’s equity stake in the firm. By assumption, $\Psi(\cdot)$ is twice differentiable, strictly convex, $\Psi(0) = \Psi'(0) = 0$, $\Psi'(e) > 0$ with $\lim_{e \rightarrow 1} \Psi'(e) = \infty$ for $e > 0$, and $\Psi'(e) < 0$ with $\lim_{e \rightarrow -1} \Psi'(e) = -\infty$ for $e < 0$. The cost of intervention therefore increases with the fraction of private benefits that the government wants to change. In turn, it falls with the government’s equity stake in line with Sappington and Stiglitz’s

¹⁰ For further information on Petrobras’ corruption scandal, see Joe Leahy’s article at the Financial Times of March 21, 2016, available at <https://www.ft.com/content/6e8b0e28-f728-11e5-803c-d27c7117d132>.

(1987) argument that governments are more prone to intervene in firms that they own stocks.¹¹

Although it is costly for the government to intervene, there are benefits as well. In Shleifer and Vishny (1986), an investor's benefit from monitoring a controlling group follows from its capital gains on the firm's stock price. Likewise, capital gains on stock prices could well provide the incentives for the government for lowering private benefits, whereas its share of the private benefits would amount to its gains in enhancing them. Nonetheless, we believe that monetary gains are second-order determinants of the government's decision to intervene in the private benefits of mixed-owned firms. Rather, we postulate that politics shapes the government's gains in such interventions.

We summarize the "political economy" of the government's intervention in the private benefits in a parameter η , lying in the interval $[\underline{\eta}, \bar{\eta}]$, with $\bar{\eta} > 0 > \underline{\eta}$. If $\eta < 0$, then setting $e \in [-1, 0)$ to increase private benefits of control in the mixed-owned firm yields political gains to the government. In contrast, $\eta = 0$ implies that the government's political supporters view any intervention in the private sector as undue. Finally, $\eta > 0$ means that the government's political supporters want fewer private benefits and better protection to minority shareholders. In any case, the government's political gains amount to $2be\eta$ at a cost of $(1 - \alpha_0)\Psi(e)$.

The government's optimal intervention in the firm's private benefits then solves

$$\max_{e \in [-1, 1]} 2be\eta - (1 - \alpha_0)\Psi(e). \quad (5)$$

The necessary and sufficient condition that characterizes the unique solution of program (5) is

$$(1 - \alpha_0)\Psi'(e^*) = 2b\eta \implies e^* = \begin{cases} \Psi'^{-1}\left(\frac{2b\eta}{1 - \alpha_0}\right) & \text{if } \eta \neq 0, \\ 0 & \text{if } \eta = 0. \end{cases} \quad (6)$$

From equation (6), it follows from the assumptions on $\Psi(\cdot)$ that e^* increases with η . In particular, it is negative if $\eta < 0$, zero if $\eta = 0$, and positive if $\eta > 0$. For any positive value, e^* is the fraction of private benefits that the government optimally destroys at $t = 2$. In turn, a negative value means that e^* is the fraction of private benefits that the government optimally increases. One way or the other, the positive relation between e^* and η lets us interpret the political parameter η as a measure of how much protection the government extends to minority shareholders in mixed-owned firms.

¹¹ Ownership makes it easier for the government to demand information that lowers the monitoring cost in the event that monitoring is indeed the government's goal. Alternatively, it facilitates requests for less strict monitoring from tax authorities and other regulators if the goal is to increase the firm's private benefits of control.

While the optimal intervention e^* in the private benefits always increases with η , sensitivity with respect to the equity stake α_0 depends on whether the government is better off increasing or decreasing private benefits. Provided that it is optimal to decrease private benefits (i.e., $0 < e^* \leq 1$), the extent of the optimal reduction increases with the government's equity stake α_0 . Likewise, the government's incentive to increase the private benefits gets stronger with α_0 as long as it is better off increasing them. Intuitively, a larger equity stake lowers the cost of intervention, making the government eager to intervene, regardless of whether in the minority shareholders' favor ($e^* > 0$) or against them ($e^* < 0$). Proposition 1 summarizes the comparative statics on the optimal intervention in the private benefits.

Proposition 1 *The government's intervention in the governance structure implies lower (higher) private benefits, if the political parameter η is positive (negative). If $\eta = 0$, then there is no change in the private benefits. In the optimal intervention, private benefits always decrease with η . In contrast, a higher equity stake α_0 of the government implies lower (higher) private benefits if η is positive (negative). A higher α_0 has no effect on the firm's private benefits if $\eta = 0$.*

So far, we have focused on a single dimension of the government's activism as a large shareholder, namely, its impact on the firm's private benefits of control. One might wonder, however, whether the government's activism also affects the control group's bargaining over the investment decision.

With a passive government, the firm's verifiable cash flows amounts to $2y$ (y from the assets in place at $t = 0$ and y from the selected project), whilst the total private benefit is $2b$ (b from the assets in place at $t = 0$ and b from the selected project). As an active large shareholder, the government changes the verifiable cash flows to $2y + 2be^*$, the private benefits from the assets in place at $t = 0$ to $b[1 - e^*]$, and the private benefits from projects A and B to

$$\{(b_1^A, b_2^A), (b_1^B, b_2^B)\} = \begin{cases} \left\{ \left(\frac{b[1-e^*]}{2}, \frac{b[1-e^*]}{2} \right), \left(\frac{b[1-e^*]}{2}, \frac{b[1-e^*]}{2} \right) \right\} & \text{with probability } 1/2 \\ \{(b[1 - e^*], 0), (0, b[1 - e^*])\} & \text{with probability } 1/4 \\ \{(0, b[1 - e^*]), (b[1 - e^*], 0)\} & \text{with probability } 1/4. \end{cases} \quad (7)$$

Equation (7) shows that the activism of the government as a large shareholder does not alter the probability that the private investors in the control group disagree on the investment decision, but changes their willingness to bid for minority votes. From Section 1.1, the equilibrium bids transfer to minority shareholders all of the selected project's private benefits. So, the government's

activism strengthens the private investors' willingness to bid if the private benefits increase ($e^* < 0$) and weakens it if the private benefits go down ($e^* > 0$).

And yet, the size of the private benefits of control is not the main reason for the activism of the government to change the controlling shareholders' willingness to bid for minority votes. As we argue below, a second and more important force follows from direct interventions of the government in the bargaining process underlying the mixed-owned firm's investment decision.

Assume that the government prefers project A over B , for reasons unrelated to their private benefits of control. One way for the government to pressure the private investors in the control group to vote for project A at $t = 1$ is to threaten them to lower the private benefits of control, if they fight for project B . Does such a threat ensure the firm's investment in project A ?

A first condition for the threat to be effective is that the private investors in the control group take it seriously. As it turns out, Proposition 2 shows that the threat is credible if the political ties of the private investors in the control group get weaker, whenever they challenge the government's agenda. This mild assumption suffices for all private investors in the control group to vote for project A , even if the threatened reduction in private benefits is minor. Bidding wars for minority votes thus disappear if the government intervenes in the mixed-owned firm's investment decision.

Proposition 2 *For ϵ positive and arbitrarily small, assume that the political parameter η raises to $\hat{\eta} = \eta + \epsilon$ whenever one of the private investors in the control group votes for Project B . In the unique subgame-perfect equilibrium of the game, there are no bidding wars for minority votes at $t = 1$. The two private investors in the control group vote for project A , and so does the government. At $t = 2$, the government sets the firm's private benefits at $2b[1 - e^*(\alpha_0, \eta)]$ if the private investors in the control group vote for project A . Otherwise, private benefits are $2b[1 - e^*(\alpha_0, \hat{\eta})] < 2b[1 - e^*(\alpha_0, \eta)]$, with $e^*(\alpha_0, \hat{\eta})$ and $e^*(\alpha_0, \eta)$ arbitrarily close to each other, as $\hat{\eta}$ converges to η .*

In our model, private investors in the control group challenge the government by voting for Project B . By assumption, such a challenge triggers an increase in the political parameter from η to $\hat{\eta}$. From Proposition 1, such an increase in the political parameter strengthens the government's incentives to lower the private benefits of control in the mixed-owned firm. The government's threat of lowering the private benefits of control is thus credible.

Is there any indication that governments use retaliatory threats to advance their agenda in mixed-owned firms? In the end of 2008, a major mining company partially owned by the Brazilian government, Vale, laid off 1,300 employees in the South of Brazil. At the time, the Brazilian government viewed the layoffs as an obstacle to its efforts to insulate the country from the subprime crisis. Accordingly, it started a control battle at Vale that did not reverse the layoffs but led to the CEO's replacement in 2010, without a bidding war for minority votes. Vale's problems with the government did not end with the CEO turnover, though. Shortly after, Brazil's tax authorities demanded the company to pay federal income taxes on revenues overseas. In November 2013, Vale agreed to pay US\$ 9.1 billion in past due taxes. Although we cannot be certain that Vale's layoff of 1,300 employees in 2008 triggered the CEO turnover and the levied taxes, it is likely that it weakened the controlling shareholders' political ties with the government, as in Proposition 2.

Weaker political ties give credibility to the government's threat of lowering the firm's private benefits of control. The credibility of the threat does not explain however why private investors give up challenging the government, if any eventual reduction in private benefits is small. Proposition 2 demonstrates that the answer for this question lies on the nature of the conflicts of interest involving government and private investors in the control group. The latter have no fundamental reason to challenge the government if they are indifferent between the two projects. A reason to challenge arises only if the projects' private benefits are unevenly split between the two private investors. In this case, one of the private investors supports the government while the other opposes. Challenging the government therefore places the two private investors in opposite sides, implying a competitive bidding war for votes that transfers to minority investors the selected project's private benefits. Anticipating no net gains from challenging the government, the dissenting controlling shareholder is better off acquiescing with the government's preferred project.

Proposition 2 is all we need to characterize the corporate governance effects of the activism of the government as a large shareholder. Assuming a probability $\pi \in (0, 1)$ that the government will become an active large shareholder at $t = 1$, the total value at $t = 0$ of the nonvoting shares is

$$P^{NV} = y + \pi b e^*(\alpha_0, \eta). \quad (8)$$

To understand equation (8), assume first that the probability that the government behaves as an active large shareholder is zero. In this case, the analysis in Section 1.1 shows that the firm's

verifiable cash flows amount to $2y$, with half going to nonvoting shares. From Proposition 2, intervention from the government changes the private benefits of control by $-2be^*(\alpha_0, \eta)$ and the verifiable cash flows by $2be^*(\alpha_0, \eta)$. Nonvoting shares get half of the change in the verifiable cash flows, establishing the value of the nonvoting shares in equation (8).

The simplest way to price voting shares also starts ruling out the government's activism. From equation (3), this benchmark value is the amount of the verifiable cash flows that goes to the voting shares plus the voting premium that arises from a bidding war for minority votes (i.e., $y + b/2$). An intervention of the government changes the benchmark value in two ways. First, the voting shares internalize half of the government's intervention in the private benefits. Second they lose the voting premium, because the private investors in the control group refrain from challenging the government in a bidding war for minority votes. Taking into account the probability π that the government behaves as an active large shareholder, the total value of the voting shares at $t = 0$ is

$$P^V = y + b/2 + \pi be^*(\alpha_0, \eta) - \pi b/2. \quad (9)$$

Adding up equations (8) and (9) yields the value of the mixed-owned firm, from the minority shareholders' perspective:

$$P^{NV} + P^V = (2y + b/2) + \pi 2be^*(\alpha_0, \eta) - \pi b/2. \quad (10)$$

The right-hand side of equation (10) decomposes the value of the firm in three parts. The first is the firm's value in the absence of government's interventions. It amounts to the verifiable cash flows plus the voting premium. The other two terms are the expected effects of the activism of the government as a large shareholder. If the government does indeed become an active large shareholder, then the *interventionism effect* on firm value is $2be^*(\alpha_0, \eta)$, capturing how the government's intervention in the governance structure constrains the extraction of private benefits. The *voting effect* is $-b/2$, corresponding to the loss of the value of the minority shareholders' votes due to the controlling shareholders' fear of challenging the government in a bidding war for minority votes.

To determine how the *interventionism effect* and the *voting effect* interact, we differentiate the value of the firm in equation (10) with respect to the probability π that the government becomes an active large shareholder, taking into account that the sign of $e^*(\alpha_0, \eta)$ varies with the political

parameter η :

$$\frac{\partial\{P^{NV} + P^V\}}{\partial\pi} = \begin{cases} -2b|e^*(\alpha_0, \eta)| - b/2 & \text{if } \eta \in [\eta, 0], \\ -b/2 & \text{if } \eta = 0, \\ 2b|e^*(\alpha_0, \eta)| - b/2 & \text{if } \eta \in (0, \tilde{\eta}]. \end{cases} \quad (11)$$

The key to understand equation (11) is a simple observation: an increase in the probability π that the government will become an active large shareholder makes the *interventionism* and *voting effects* more important for firm value, even before the government's activism takes place. Accordingly, increasing π unambiguously harms minority shareholders in two cases.

In the first, the government's political supporters see any intervention in mixed-owned firms as undue ($\eta = 0$), and hence there is no *interventionism effect*. Left alone, the *voting effect* lowers the firm's value by weakening corporate governance because private investors in the control group fear to openly challenge the government in business decisions. Such a fear rules out bidding wars for minority votes, lowering the value of a vote by $-\pi b/2$. As such, a marginal increase in the probability π unambiguously reduces the firm's value by $-b/2$.

In the second case, the *interventionism effect* lowers verifiable cash flows by $2be^*(\alpha_0, \eta) < 0$, if the government's political supporters favor private benefits of control ($\eta < 0$). The expected *interventionism effect* is $2be^*(\alpha_0, \eta)\pi = -2b|e^*(\alpha_0, \eta)|\pi$, which adds up to the expected *voting effect*, $-\pi b/2$, implying an unambiguous reduction of firm value by $-2b|e^*(\alpha_0, \eta)| - b/2$ upon a marginal increase in the probability π that the government will become an active large shareholder.

The *interventionism* and *voting effects* go in opposite directions if the government's political interests coincide with the interests of the minority shareholders ($\eta > 0$). The expected *voting effect* then lowers the value of the minority shareholders, whereas the expected *interventionism effect* increases it. Accordingly, the sensitivity of the firm's value with respect to π is ambiguous. Still, Proposition 3 demonstrates that, from the minority shareholders' perspective, the firm's value lowers with π provided that the government is sufficiently aligned with the controlling shareholders' interest, as measured by the political parameter η .

Proposition 3 *There is a positive cut-off value $\tilde{\eta}$ such that, from the minority shareholders' perspective, the value of the mixed-owned firm reduces with the probability π that the government will become an active large shareholder, for any $\eta \leq \tilde{\eta}$.*

The influence on the value of a mixed-owned firm of the probability π that the government will intervene does not depend exclusively on the political parameter η . It also relates to the government's equity stake α_0 . Differentiating equation (11) with respect to α_0 yields

$$\frac{\partial^2 \{P^{NV} + P^V\}}{\partial \pi \partial \alpha_0} = \begin{cases} -2b \left| \frac{\partial e^*(\alpha_0, \eta)}{\partial \alpha_0} \right| & \text{if } \eta \in [\underline{\eta}, 0), \\ 0 & \text{if } \eta = 0, \\ 2b \left| \frac{\partial e^*(\alpha_0, \eta)}{\partial \alpha_0} \right| & \text{if } \eta \in (0, \bar{\eta}]. \end{cases} \quad (12)$$

The government's equity stake α_0 is relevant for the sensitivity of the firm's value with respect to π only if it changes the *interventionism effect* and/or the *voting effect*. From Proposition 1, the *voting effect* does not vary with α_0 and neither does the *interventionism effect* if political supporters do not favor government interventions ($\eta = 0$). An increase in the government's equity stake α_0 magnifies (in absolute value) the *interventionism effect* if its political supporters either want better protection for the rights of the minority shareholders ($\eta > 0$) or favor enhancing private benefits of control. In both cases, an increase in the government's equity stake α_0 increases (in absolute value) the sensitivity of the firm's value with respect to π , as equation (12) shows.

Equations (10) to (12) suggest a regression-based test of whether government interventions in mixed-owned firms harm minority shareholders. Given a sample of mixed-owned firms indexed by i , regress their values V_i on a proxy of the probability π that the government will behave as an active large shareholder and on the interaction of π with the government's equity stake α_{0i} :

$$V_i = \theta_1 + \theta_2 \pi + \theta_3 \pi \times \alpha_{0i} + \mu_i, \quad (13)$$

where θ_1 , θ_2 , and θ_3 are the regression coefficients and μ_i is the error term.

From equation (10), θ_1 is the expected value of a mixed-owned firm, assuming that the probability π that the government will behave as an active large shareholder is zero. In turn, equation (11) implies that θ_2 is the response of firm value to a change in the probability π , provided that it is not in the government's interest to modify the controlling shareholders' ability to extract private benefits ($\eta = 0$). In this case, the *voting effect* is the only mechanism through which π influences firm value. Unlike the *interventionism effect*, the magnitude of the *voting effect* does not depend on the government's equity stake α_{i0} . Since the *voting effect* always reduces firm value, our model predicts that $\theta_2 < 0$.

Equation (11) maps θ_3 into the effect of π on firm value that goes through the *interventionism effect* as it depends on the government's equity stake. From equation (12), θ_3 is negative if the optimal government intervention makes it easier for the controlling shareholders to extract private benefits ($\eta < 0$ implying $e^*(\alpha_0, \eta) < 0$), zero if the government does not intervene in the private benefits of the controlling shareholders ($\eta = 0$ implying $e^*(\alpha_0, \eta) = 0$), and positive if government interventions constrain the controlling shareholders' ability to extract private benefits by diverting firm value ($\eta > 0$ implying $e^*(\alpha_0, \eta) > 0$).

From the perspective of the minority shareholders, increasing the probability π of government's activism always reduces welfare if the *interventionism effect* is zero or negative. In the former case, $\theta_2 < 0$ and $\theta_3 = 0$, implying that an increase in π reduces firm value by lowering the value of minority votes. In the latter, $\theta_2 < 0$ and $\theta_3 < 0$ lead to a negative *interventionism effect* that lowers the value of verifiable cash flows, reinforcing the negative *voting effect*.

The welfare implication of an increase in π is ambiguous only if the *interventionism effect* is positive. If so, $\theta_2 < 0$ and $\theta_3 > 0$ give rise to two conflicting effects. A higher π increases the likelihood that the government's activism leads to a negative *voting effect* and to a positive *interventionism effect*. The value of minority votes decreases as a negative *voting effect* becomes more likely, whilst the larger probability of a positive *interventionism effect* lowers the expected diversion of verifiable cash flows. Still, we may determine which of the two effects prevails by testing the sign of the derivative of V_i with respect to π , evaluated at the average equity stake of the government: $\theta_1 + \theta_3 \bar{\alpha}_0$. This derivative combines the *voting effect* with the *interventionism effect* in a mixed-owned firm with the average equity-ownership of the government.

Taking to the data the implications of our model on regression (13) faces an obvious hurdle. To focus the analysis on the corporate governance effects of the government's activism, the model specifies the mixed-owned firm's investment alternatives in a conveniently narrow way. We allow government interventions to change the allocation of the mixed-owned firm's cash flows across different shareholders, but not to alter the ability to generate them. Accordingly, the model implications say more about comparative statics for governance structure than about firm value, which takes into account both corporate governance and cash-flow generation issues. We address this concern by changing the focus of the regression-based tests from firm value to a widely used proxy for the

effectiveness of corporate governance structure, namely, the firm's voting premium.

Denote the voting premium by $VP = \frac{P^V - P^{NV}}{P^{NV}}$ and then plug in the values of the voting and nonvoting shares to obtain

$$VP = \frac{P^V - P^{NV}}{P^{NV}} = \frac{(1 - \pi)b/2}{y + \pi b e^*(\alpha_0, \eta)}. \quad (14)$$

It is easy to see that the expected *voting effect*, $-\pi b/2$, lowers the numerator of the voting premium, while half of the expected *interventionism effect*, $\pi b e^*(\alpha_0, \eta)$, increases (decreases) the denominator if this effect raises (reduces) the firm's value. The impact of π through the *voting effect* therefore affects both the mixed-owned firm's value and voting premium in a negative manner. In stark contrast, the impact through the *interventionism effect* influences value and voting premium in opposite directions.

Consider the following voting-premium regression:

$$VP_i = \delta_1 + \delta_2 \pi + \delta_3 \pi \times \alpha_{0i} + \epsilon_i, \quad (15)$$

where δ_1 is the expected voting premium assuming probability zero of government's activism and ϵ_i is the error term due, among other things, to the log-linearization of equation (14).

If we assume initially that $\eta = 0$, Proposition 1 posits that there is no *interventionism effect* in view that $e^*(\alpha_0, 0) = 0$. In this case, the voting premium collapses to $\frac{1}{2}(1 - \pi)b/y$. Differentiating the latter with respect to π and twice with respect to π and α_{0i} yields a negative sign for δ_2 and a zero coefficient for δ_3 , respectively. These coefficient restrictions match those in regression (13): $\theta_2 < 0$ and $\theta_3 = 0$ if there is no *interventionism effect*. In this case, we have already argued that an increase in π harms the minority shareholders.

Suppose now that $\eta < 0$ and so the expected *interventionism effect* on the firm's value is negative. The coefficient δ_2 is still associated with the expected *voting effect* because the latter is the only source of variation in the voting premium that depends on π , but not on the government's equity stake. The model predicts a negative value for δ_2 because the expected *voting effect* reduces both firm value and voting premium. As for the sign of δ_3 , equation (12) shows that $\theta_3 < 0$ in regression (13), implying that $\delta_3 > 0$ in regression (15) because the expected *interventionism effect* influences value and voting premium in opposite directions (see equation (14)). We thus conclude that negative values of θ_2 and θ_3 in regression (13) map into $\delta_2 < 0$ and $\delta_3 > 0$ in regression (15).

In both regressions, the *voting* and *interventionism effects* weaken the firm’s corporate governance, thereby harming minority shareholders.

Last but not least, $\eta > 0$ implies a positive expected *interventionism effect* on the value of a mixed-owned firm. Still, θ_2 and δ_2 are negative because they capture only the expected *voting effect*, which does not vary with the government’s equity stake. While the expected *interventionism effect* is irrelevant for the signs of θ_2 and δ_2 , a positive value for it implies from equation (12) that $\theta_3 > 0$. This means that $\delta_3 < 0$ because the expected *interventionism effect* push firm value and voting premium to opposite directions. Altogether, the expected *voting* and *interventionism effects* combine to lower the voting premium, despite pushing firm value in opposite ways.

In the remainder of the paper, we shall exploit the restrictions that the model imposes on regression (15) to estimate the corporate governance consequence of the activism of the government as a large shareholder.

2 Economic background and data

To gather evidence on the corporate governance consequences of the activism of the government as a large shareholder, we collect data on ownership structure, voting premia, and financial characteristics of firms with dual-class shares trading at the BM&FBovespa. The sample period runs from January 2008 to December 2012.

There are four reasons why we focus on firms listed at BM&FBovespa. First, over last three decades, there is an extensive literature on Corporate Finance showing that governance practices are relevant for firm value in countries that, like Brazil, offer weak legal protection to minority shareholders.¹² Second, BM&FBovespa’s large volume of trading should ensure that stock prices internalize changes in governance practices associated with the activism of the government as a large shareholder.¹³ Third, from 2008 to 2012, the Brazilian Government engaged in highly visible attempts to intervene in business decisions of mixed-owned firms. Last but not least, Carvalho (2014) documents that the share of loans from government-controlled banks is a proxy for the willingness of the Brazilian government to intervene in business decisions of private and public

¹² La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) rank Brazil below the typical Common-Law country in terms of legal protection to shareholders, rule of law, and, especially, in the efficiency of the judicial system.

¹³ As of December 2012, BM&FBovespa was one of the largest stock exchanges in the world: 452 listed firms with a total market cap of US\$ 1.2 trillion.

companies, which, conceivably, is positively correlated with the probability that the government behaves as an active large shareholder. This probability is crucial for our estimates of the corporate governance effects the activeness of the government as a large shareholder.

In what follows, Section 2.1 provides some background on the Brazilian economy and explains why the share of loans from banks controlled by the Brazilian government is a proxy for the probability that it behaves as an active large shareholder. Section 2.2 discusses in more detail the sample selection criteria and data sources, whereas Section 2.3 documents the equity holdings of the Brazilian government in our sample period.

2.1 Economic background and the probability of government interventions

The Brazilian economy had been growing at more than 6% a year, when Lehman Brothers' bankruptcy in September 2008 triggered a worldwide economic crisis. The crisis did not immediately hit the Brazilian economy, which grew 5.17% in 2008. Still, Brazil did not escape the crisis unscathed, with GDP falling by 0.33% in 2009.

At first, the government's response to the slowdown of the Brazilian economy was standard, namely, it reduced interest rates and lowered taxes.¹⁴ Soon, however, the government resorted to less orthodox economic policies. In March 2010, the Minister of Finance announced that Brazil's development bank, BNDES, would play a major role in avoiding a credit crunch.¹⁵ Accordingly, the share of BNDES's loans in the outstanding loans of Brazil's banking sector jumped from 15.9% in August 2008 to 20% in less than two years.¹⁶

Brazil's expansionary policies paid off in 2010, with a GDP growth of 7.53%. The recovery of the economy helped elect in November 2010 the candidate of the incumbent Workers' Party, Ms. Dilma Rousseff, as Brazil's new President. President Rousseff took power in January 2011, keeping the flagship social program of former President Luiz Ignacio Lula da Silva, "Bolsa Familia," along with the basic tenets of his economic policy, namely, a loose fiscal policy and the expansion of subsidized credit to selective segments of the economy. And yet, the Brazilian economy performed

¹⁴ The expansionary fiscal policy led to a sharp reduction of Brazil's primary budget surplus (revenues less expenses, excluding interest payments), which fell from BRL 122.4 billion (US\$ 66.7 billion) in 2008 to BRL 29.4 billion (US\$ 14.7 billion) in 2009.

¹⁵ The March 2010 interview of Brazil's Finance Minister, Mr. Guido Mantega, is available online at www.brasileconomico.com.br/noticias/a-economia-segundo-o-ministro-guido-mantega.79034.html.

¹⁶ Annual disbursements of BNDES rose from US\$ 33.3 billion in 2007 to US\$ 95.7 billion in 2010. The data on annual disbursements (in Brazilian reais) are available at www.bndes.gov.br.

poorly in 2011 and 2012. GDP growth fell from 7.53% in 2010 to 2.73% in 2011 and 0.87% in 2012. In the meantime, inflation remained relatively high: 4.31% in 2009, 5.91% in 2010, 6.5% in 2011, and 5.84% in 2012.

Pressured by low growth and high inflation, President Rousseff intervened in the private sector in a variety of ways. Although she curbed the growth of BNDES loans after taking power in January 2011, other government-controlled banks persisted to concede cheap credit in order to boost consumption. In particular, President Rousseff ordered two government-controlled commercial banks, Banco do Brasil and Caixa Econômica Federal, to increase the supply of credit at reduced interest rates. As a result, the share of loans from government-controlled banks, including BNDES, jumped from 41.8% in January 2011 to 47.9% in December 2012. While Caixa Econômica Federal is privately held by the Brazilian government, Banco do Brasil is a mixed-owned financial institution listed on BM&FBovespa's New Market; a special segment of the São Paulo Stock Exchange that, in principle, is restricted to corporations committed to stricter governance rules.

Forcing a mixed-owned financial institution to increase the supply of credit at lower interest rates was not the only highly publicized intervention spurred by the subprime crisis. To help fight inflation, President Rousseff forced the government-controlled Petrobras to sell oil and gas in Brazil at prices lower than the prices at which it imported. And, for the same reason, the government pressured producers and distributors of energy to lower their prices. Finally, in May 2011, the government ousted the CEO of one of the largest mining companies in the world, Vale, after a two-year control battle that started when the company laid off about 1,300 employees at the end of 2008.

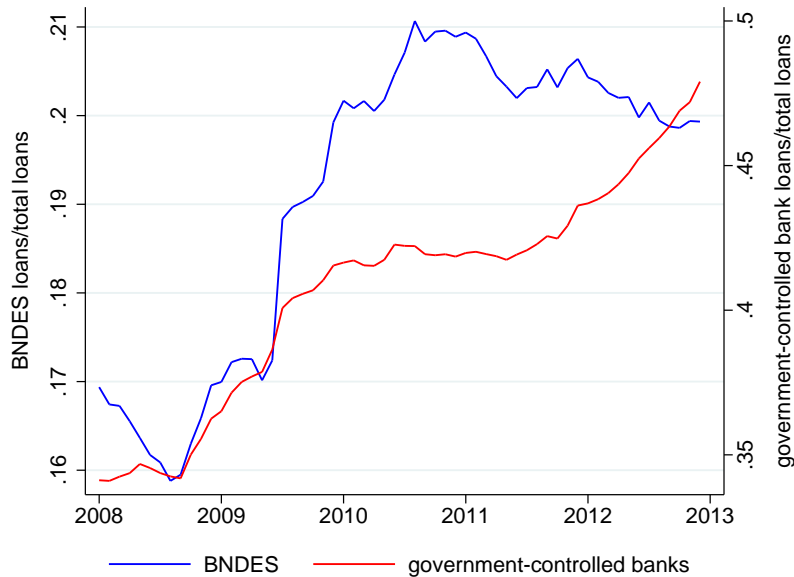
To be sure, there were government interventions in the private sector before President Rousseff took power in 2011. Carvalho (2014) shows evidence that, from 1995 to 2006, the Brazilian government used subsidized loans from BNDES to induce firms to shift investment and employment to cities and states where the government's preferred candidates faced tough opponents in incoming elections. Nonetheless, the 2008-2012 period is unparalleled in Brazil in terms of the magnitude of the rate of growth of subsidized loans from government-controlled banks.

To fund the expansion of subsidized loans, BNDES borrowed massively from the Federal Government. By the end of 2008, the loans from the Federal Government to the BNDES added up

to US\$ 43.2 billion. By December 2012, they amounted to US\$ 376 billion, responding for 52.6% of BNDES's liabilities.¹⁷ In 2011, the government's cost of expanding subsidized loans was partly transferred to the minority shareholders of Banco do Brasil, when the latter took the lead in the government's quest for growing the supply of subsidized credit in Brazil. The government still pays to this date for these loans in terms of foregone dividends.

The costs of the subsidized credit thus make the share of loans from government-controlled banks a (noisy) signal of the government's willingness to intervene in the private sector. As the government's desire to intervene increases, the more it will be willing to pay the cost of increasing the supply of subsidized credit and the higher is the probability that the government does intervene not only in mixed-owned firms but also in politically connected private firms. We thus employ the share of loans from government-controlled banks as a proxy for the probability that the government behaves in mixed-owned firms as an active large shareholder. Figure 2 shows that the share of loans from government-controlled banks steadily increased from the onset of the subprime crisis to the end of our sample period, moving from 34.5% in June 2008 to 47.9% in December 2012.

Figure 2: Shares of loans from the BNDES and government-controlled banks (% of total loans)



¹⁷ Data from the government's loans are from BNDES's annual reports. The interest rate on these loans was at the TJLP rate. The latter is a highly subsidized interest rate that governs virtually every loan from the Brazilian government to cities and states.

2.2 Sample selection and characteristics

The main implications of our model center around the mixed-owned firms' voting premia, which capture the corporate governance consequences of the activism of the government as a large shareholder. Accordingly, the starting point of our sample selection comprises firms with dual-class shares trading at BMF&FBovespa.¹⁸ From January 2008 to December 2012, there were 168 firms with both voting and nonvoting shares trading simultaneously at the BM&FBovespa in at least one day.¹⁹ We compute their voting premia by taking the percentage difference between the prices of voting and nonvoting shares in days with trades for both share classes.

Bloomberg and Economatica are the primary sources of data for our study.²⁰ In particular, we rely on Bloomberg to collect daily prices (adjusted for splits and ex-dividend days) of the voting and nonvoting shares of all firms with dual class-shares that traded at BM&FBovespa in any point of time between January 2008 and December 2012. In the days that both voting and nonvoting shares of a given firm traded, we computed the percentage differences of their prices, averaging them out to obtain quarterly voting premia.

The initial sample comprises 168 firms, with 2,214 quarterly observations of voting premia. The smallest voting premium is -85.5%, whereas we observe 114 voting premia of at least 180%. Differences in dividend rights explain most (if not all) of the negative voting premia. The bylaws of 67 of the 168 firms in the initial sample stipulate that nonvoting shares receive 110% of the dividends paid to the voting shares. In two firms, the nonvoting shares receive 120% of the dividends paid to the voting shares.²¹ Since we do not adjust the voting premia for differences in dividend rights, it is not surprising to find that, in some firms, prices of nonvoting shares may be higher than the prices of the voting shares.

While there are economic reasons for negative voting premia in our sample, failure of Bloomberg

¹⁸ In Brazil, common and preferred stocks trade at BM&FBovespa. With one exception, preferred shares listed on BM&FBovespa have no voting rights whatsoever. The exception is Vale S.A., whose preferred shares have voting rights in the shareholders' meetings, but, unlike Vale's common shares, have no voting rights in elections for board members. Vale is also the exception of the one-share-one-vote rule in Brazil. Golden shares in the hands of the Federal Government give veto power on decisions to change the location of Vale's headquarters.

¹⁹ Corporate Law in Brazil requires that voting shares of public firms account for at least 50% of the issued shares. Still, the trading volume of nonvoting shares at BM&FBovespa is typically larger than the volume of trading of the voting shares.

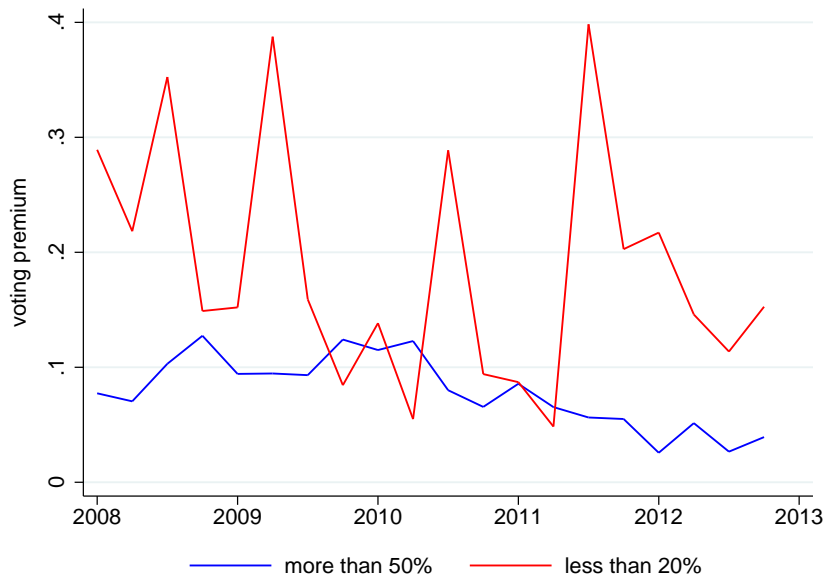
²⁰ Economatica is the main provider of financial and ownership information on firms listed on the BM&FBovespa.

²¹ A few firms have three classes of shares: voting shares, nonvoting shares that pay 110% of the dividends paid by the voting shares, and nonvoting shares that pay 120%. In these instances, we computed the voting premium between the voting shares and the nonvoting shares with the largest average volume of trading in the sample period.

to timely adjust stock prices for dividend payments and splits is one of the main reasons for observing voting premia larger than 1,000%. Another reason for extremely large voting premia in our sample is lack of liquidity of some low-priced voting shares. The voting premium is very sensitive to news on the firms' fundamentals. While the arrival of news should affect both classes of shares, we may not observe changes in the prices of the voting share for lack of trading in the day. In the final sample, we exclude all voting premia larger than or equal to 180%, ending with an unbalanced panel of 163 firms and 2,100 quarterly observations of voting premia.

Table 1 reports summary statistics for the final sample. The typical firm is large (median quarterly sales of US\$ 241.7 millions), profitable (median operating margin of 10.70%), and mildly leveraged (median debt over total assets equal to 24.26%). Although the median firm is profitable, the average operating margin is highly negative for every year in the sample period, reflecting the economic consequences to the Brazilian economy of the subprime crisis. As often happens in French-Civil law countries, the typical firm has a concentrated ownership structure. The median share of voting stocks in the hands of the largest shareholder is 61.4%.

Figure 3: Average voting premium as per the largest shareholder's equity share



Rydqvist (1988) and Zingales (1994) provide evidence that the likelihood of a control battle is an important determinant of a firm's voting premium. Presumably, control battles are less likely in firms with a majority shareholder. Consistent with this hypothesis, Figure 3 shows that

the average voting premium of firms with a majority shareholder is usually far below the average voting premium of firms whose largest shareholder holds less than 20% of the voting shares.

More to the point of our paper, Table 1 shows that the median voting premium declined from 7.02% in 2008 to 3.50% in 2009, going up to 7.00% when Brazil's GDP grew 7.53% in 2010. The hike of the voting premium proved to be as short-lived as the economy's recovery, though. The median voting premium shrunk to 4.14% in 2011 and then nearly vanished in 2012. Interestingly, relative liquidity of the voting and nonvoting shares do not seem to explain the trajectory of the voting premium. The median ratio of the number of traded voting shares over the number of traded nonvoting shares increases monotonically over the years, contrary to the idea that the voting premium goes up because transaction costs in the trading of voting shares fall. The trajectory of the average voting premium decreases monotonically over the sample period, with steeper declines in the first year of the crisis (2008 to 2009) and when President Dilma Rousseff took power (2011-2012).

The last column of Table 1 reports summary statistics for the 114 firm-quarter observations that we exclude from the sample because their voting premia exceeded 180%. These firms are smaller, more leveraged, much more profitable, and the gap between the mean and median relative liquidity of their voting shares is much wider. The huge average voting premium of the excluded firms (4,036.5%) partly explains why our average voting premium in 2008 is smaller than the values of 23.2% and 65% that Nenova (2003) and Dyck and Zingales (2004) respectively report in their cross-country analyses. In section 4, we will vary the threshold for excluding observations of voting premium from the sample, showing that including larger voting premia strengthens our results.

2.3 The Brazilian government as a large shareholder

Brazil is a Federation with 26 States and the Federal District of Brasilia. As such, there are three autonomous layers of government — federal, state and municipal levels — that share the responsibilities for running the country's public sector. In reality, an extremely centralized tax system gives a lot of power to the Federal Government, making it easy for the country's President to obtain support from state governors and mayors for interventions in the private sector that

seek to avoid layoffs, price increases or cuts in investment.²² We shall notwithstanding compute the government's voting shares as the sum of the voting shares of the three layers of government: federal, state, and municipal.²³

A more sensitive step in the documentation of the government's equity holdings is the aggregation of shares in firms with pyramidal ownership structures. Following La Porta, Lopez-de-Silanes, and Shleifer (1999), we say that a shareholder has a controlling stake in a firm if he/she owns at least 20% of the voting shares. Such a firm has a pyramidal ownership structure if the control stake is indirect through a chain of ownership relations, that is to say, if the shareholder controls 20% of the firm's voting shares by combining the shares in his/her name with the shares owned by another firm that is under his/her control. In our sample, the government has voting shares in 30 firms with pyramidal ownership structures.

An example may help understand how we compute the government's equity holdings in firms with pyramidal ownership structures. From January 1, 2007 to September 29, 2009, Brasil Telecom Participações held 99.1% of the voting shares of Oi, a major telecommunications company in Brazil. In that period, none of the three layers of the government held equity stakes at Oi, but the Federal Government owned some of Brasil Telecom's voting shares. These equity holdings did not meet the 20% threshold for control, and hence our aggregation criterion stipulates that, from January 1, 2007 to September 29, 2009, the government had no equity holdings at Oi, ignoring the Federal Government's shares at Brasil Telecom.

From September 30, 2009 to October 4, 2012, Telemar Norte Leste owned 99.9% of the voting shares of Coari Participações, which held 79.6% of Oi's voting shares. The government enjoyed indirect control over Oi because BNDESPAR (the subsidiary of BNDES for joint ventures with the private sector) and three pension funds sponsored by firms controlled by the Federal Government (Previ from Banco do Brasil, Funcef from Caixa Econômica, and Petros from Petrobras) had in hand 33.7% of the voting shares of Telemar Participações. The latter company owned 52.4% of

²² In January 2013, for example, the Federal Government convinced the mayors of Rio de Janeiro and São Paulo to postpone increases in the tariffs of municipal buses for six months. Brazil's Finance Minister apparently wanted to gain some time to reduce inflation before facing increases in the prices of transportation and other regulated businesses.

²³ Aggregating the three layers of government does not have any significant impact on the empirical analysis. At the municipal level, São Paulo is the only city in our sample with voting shares in a public firm (namely, São Paulo Turismo). In turn, there are just eight firms with shares in the hands of State Governments (five financial institutions and three public utilities).

the voting shares of Telemar Norte Leste Participações, which sat on 97.4% of the voting shares of Telemar Norte Leste. We thus count Coari Participações' equity holdings in Oi as the voting shares in the hands of the government given that every equity stake in the control chain exceeds our cutoff of 20%. In other words, we set the government's share at Oi's voting stock as 0% from January 1, 2008 to September 29, 2009, and then as 79.6% from September 30, 2009 to October 4, 2012.²⁴

In summary, the government controls a firm if it holds (directly or indirectly) at least 20% of its voting shares.²⁵ To implement this rule, we consider that the fraction of voting shares in the government's hands includes: i) voting shares owned by Federal, State and Municipal Governments, ii) voting shares in the hands of BNDESPAR (the subsidiary of BNDES for joint ventures with the private sector), iii) voting shares of firms controlled (directly or indirectly) by Federal, State or Municipal Governments, iv) voting shares of pension funds sponsored by companies controlled (directly or indirectly) by Federal, State or Municipal Governments.²⁶

Table 1 shows that the government's median equity stake is 0% in all years. And yet, the government's mean equity holding is relatively large, at 20.32% of the voting shares in the full sample, with a minimum value of 18.79% in 2008 and a maximum of 22.38% in 2012. More importantly, the government's equity holdings in some firms is high enough to make it a relevant shareholder, but not so large to rule out control battles.²⁷ Finally, the last column of Table 1 shows that the sample of excluded observations due to the 180% cap in the voting premium has mostly firms with a relatively small fraction of voting shares in the government's hands.

Table 2 shows summary statistics for government-controlled firms and firms controlled by private investors.²⁸ The government-controlled firms are larger and more profitable, exhibiting lower

²⁴ If the government's fraction of a firm's voting shares changes during a quarter, we take the simple average of the values to obtain the quarterly value of the government's participation.

²⁵ The 20% cutoff for control is certainly arbitrary. Section 4 shows, nonetheless, that our results do not alter significantly, if we change the cut-off for control to 10%. We don't find major changes either, if we use the weakest link criterion to determine the government's equity holdings. Under this criterion, the government's equity holdings in a firm is the smallest equity holdings under its control in any layer of the firm's pyramid.

²⁶ Economatica is the main source of information on the government's voting shares in public firms. In the event we find a private (unlisted) company in the control chain of a pyramid, we look for the firms' ownership structure at the firm's own website as well as at gatekeeping websites that provide such information about Brazilian firms. If we do not find any ownership information, we count the government's fraction of voting shares in the original public firm as missing.

²⁷ The criterion we use to aggregate shares in firms under pyramidal ownership structures explains why, in some quarters, three public firms arise as 100% owned by the government. These firms are Companhia Catarinense de Saneamento e Águas (CASAN), Banco do Nordeste do Brasil, and Telemar Norte Leste.

²⁸ The total number of firms in Table 2 is larger than the number of firms in Table 1 in 2008 and 2011 because, in

leverage. More interestingly, the voting premia of both groups of firms fell significantly from 2008 to 2012. This downward trend is consistent with theories of capital structure that suggest that, rather than extracting private benefits of control, controlling shareholders focus on the firm’s survival at times of financial crises.²⁹ These theories do not explain, however, why the average voting premium of the government-controlled firms fell more than the voting premium of the privately-controlled firms that, at the time, were typically less profitable.

Table 3 provides more detailed information on the cross-sectional variation in the government’s voting shares with corresponding changes in the voting premium. The first three columns show that the government has no voting shares in most firms in the sample (117 out of 181 firms and 1,356 out of 2,100 quarterly observations of voting premia). In these firms, the average voting premium in the third quarter of 2008 (i.e., shortly before the outbreak of the crisis) amounted to 21.05%. In 2012, the average voting premium of these firms fell to 6.32%. In turn, the government is a majority shareholder in 40 of the 64 firms that it owns a positive number of voting shares. There is notwithstanding a significant cross-sectional variation in the fraction of voting shares under the government’s control. In particular, the largest decrease of the average voting premium in the sample, 40.13%, happens in the firms that the government isn’t a majority shareholder but belongs to the controlling group (i.e., voting shares in the interval $[20, 50)$).

The next section explores the cross-sectional variation in the government’s voting shares to examine the corporate governance consequences of the activism of the government as a large shareholder.

3 Empirical Model and Main Findings

This section is divided in two parts. The first describes the empirical strategy we use to apply the model of Section 1 to the data. The second discusses the main empirical findings.

these years, the government’s voting shares of some firms are larger than 20% in a quarter and smaller than 20% in another. This happens for three firms, namely, Contax Participações, Coteminas and Brasken. In 2012, the number of firms in Table 2 is smaller than the number in Table 1 because the latter does not ignore firms with missing values in the government’s equity holdings.

²⁹ See, for instance, Grossman and Hart (1982), Jensen (1986), and Hart and Moore (1995).

3.1 The empirical model

What are the corporate governance consequences of the activism of the government as a large shareholder? The key for our answer to this question comes from the restrictions derived in Section 1 on regression (15). These restrictions comprise just a road map to our empirical study, though. After all, empirical tests based on reduced-form regressions are almost inevitably plagued by confounding effects that make the tests difficult to interpret. To address concerns on confounding effects, we add several controls to regression (15) and allow for placebo tests by considering a sample of public firms that is not limited to mixed-owned firms. Our baseline regression is thus

$$\begin{aligned} \frac{P_{it}^V - P_{it}^{NV}}{P_{it}^V} = & \delta_1 \frac{\text{gov loans}}{\text{total loans}_t} \text{GOV}[0,20]_{it} + \delta_2 \frac{\text{gov loans}}{\text{total loans}_t} \text{GOV}[20,50]_{it} + \delta_3 \frac{\text{gov loans}}{\text{total loans}_t} \text{GOV}[50,100]_{it} \\ & + \alpha_1 D2009_t + \alpha_2 D2010_t + \alpha_3 D2011_t + \alpha_4 D2012_t + \alpha_5 VIX_t \\ & + \beta_1 \text{First Shareholder}_{it} + \beta_2 \text{Second Shareholder}_{it} + \beta_3 \text{Third Shareholder}_{it} \\ & + \gamma_1 \frac{\text{fixed assets}}{\text{total assets}_{it}} + \gamma_2 \frac{\text{total volume}^V}{\text{total volume}^{NV}_{it}} + \gamma_3 \text{Operating Margin}_{it} + \gamma_4 \ln(\text{MarketCap})_{it} + \nu_i + \epsilon_{it}, \end{aligned} \quad (16)$$

where we measure the voting premium on the left-hand side by the average percentage difference of firm i 's prices of voting (V) and nonvoting (NV) shares at quarter t , ν_i corresponds to a firm-specific fixed effect, and ϵ_{it} is the error term.

Our main interest lies on the coefficients of the first set of controls, i.e., the interaction of our proxy of the probability π that the government will behave as an active large shareholder with the dummy variables relating to the size of the government's equity stake on the firm.³⁰ These indicators $\text{GOV}[a,b]_{it}$ of government ownership at quarter t take value one if the government controls between $a\%$ and $b\%$ of the votes in firm i . The piecewise specification allows for the marginal effect on the voting premium of our proxy for π to change as the government moves from a minority investor (up to 20%) to either a member of a control group (between 20% and 50%) or to a majority shareholder (over 50%). As the values of these indicator functions add to one for any firm i and quarter t , they prevent us from adding π as a stand-alone regressor. Excluding π from the independent variables

³⁰ Regressions that interact two independent variables often include them separately. We don't do that because multicollinearity between the government ownership dummies and their respective interactions with the share of government loans unravels the statistical significance of the regression coefficients. For any ownership interval $[a, b]$, the correlation of $\text{GOV}[a,b]_{it}$ with $\frac{\text{gov loans}}{\text{total loans}_t} \text{GOV}[a,b]_{it}$ is always close to 40%. Moreover, no dummy for government ownership is statistically significant at 10% if we include them in the regression along with the share for government loans, while omitting their interactions. In such a regression, the coefficient of the share of government loans is -0.83, with a t-statistic of -1.80.

implies that each of the coefficients δ_1 , δ_2 and δ_3 of regression (16) internalizes the *voting* and *interventionism effects* that shape the model's restrictions on regression (15). We explain below how to interpret the restrictions that the *voting* and *interventionism effects* jointly imply on the coefficients of regression (16).

There isn't much that a government can do to intervene in the governance structure of firms, if it doesn't control a fraction of voting shares that is sufficiently high to win a seat on the Board of Directors. Accordingly, changes in the probability π that the government behaves as an active large shareholder should have no effect on the governance of firms where the government controls less than 20% of the voting shares, which is a standard cutoff for control in the corporate governance literature (see, for instance, La Porta, Lopez-de-Silanes, and Shleifer, 1999). We thus expect a statistically insignificant coefficient for $\frac{\text{gov loans}}{\text{total loans}_t} \text{GOV}[0,20)_{it}$.

In contrast, the model in Section 1 allows for statistically significant effects of π on the voting premium in firms for which the government is a controlling shareholder. Two driving forces account for the effect of π on the voting premium. The *voting effect* weakens the minority shareholders' ability to benefit from their right to vote on business decisions, decreasing the voting premium accordingly. The *interventionism effect*, in turn, benefits the minority shareholders if the government protects the minority shareholders upon becoming an active large shareholder and harms them if an active government makes it easier for the controlling shareholders to divert value from the mixed-owned firm. The *interventionism effect* on the voting premium is therefore ambiguous.

If the *interventionism effect* is negligible, then the model predicts that the corporate governance consequences of an increase in π boils down to the *voting effect*, which unambiguously harms minority shareholders and lowers the voting premium. Moreover, the model predicts that the strength of the *voting effect* does not change with the government's equity, provided that it is large enough to make it a controlling shareholder. As such, evidence of $\delta_1 = 0$ and of $\delta_2 = \delta_3 < 0$ would indicate that the activism of the government harms the minority shareholders by lowering the value of their votes.

A second case for the activism of the government to unambiguously harm the minority shareholders obtains if the government makes it easier for the control group to divert firm value. Here, the *interventionism effect* reduces verifiable cash flows, increasing the voting premium. The *voting*

effect, in contrast, always reduces the dual-class premium, implying a mixed effect of π on the voting premium of firms that the government own a control stake. And yet, since the strength of the *interventionism effect* increases with the government's equity stake, we have that $\delta_3 > \delta_2$ regardless of their signs, apart from $\delta_1 = 0$.

Finally, the model allows for the activism of the government to benefit the minority shareholders if it constrains the controlling shareholders' ability to divert firm value. In this case, an increase in the probability π lowers the voting premium, implying that δ_2 and δ_3 are both negative. Moreover, apart from $\delta_1 = 0$, the model predicts $\delta_3 < \delta_2$ (larger in absolute value) because the *interventionism effect* increases with the government's equity stake.

We thus conclude that the estimates of δ_1 , δ_2 and δ_3 can pin down the three alternative corporate governance consequences of activism of the government as a large shareholder.

OLS estimates of δ_1 , δ_2 , and δ_3 are consistent, provided that the government randomly selects its equity holdings. However, there are many reasons to believe that the Brazilian government does not select its equity holdings randomly. In particular, the existing concentration of government-controlled firms in public utilities would imply a downward bias in the OLS estimation of δ_2 and δ_3 , if controlling groups have fewer opportunities to capture private benefits in regulated industries.³¹ If so, our tests may fail to reject the hypothesis that the effect of π on the voting premium differs between private and mixed-owned firms, as our model predicts.

Individual fixed effects control for differences in unobserved characteristics of firms, provided that these characteristics are time invariant, as it is likely the case of the concentration of government-controlled firms in public utilities. Accordingly, our benchmark model adds firm-specific fixed effects to equation (16). They control not only for differences in the industry concentration but also for differences in governance mechanisms, in the composition of the controlling groups, cross-listing in foreign firms, and statutory features of the nonvoting shares.

Firm-specific fixed effects do not control for unobserved changes in the firms' financing constraints and investment opportunities, though. Such changes would bias downwards the fixed-effects estimation of δ_2 and δ_3 if concerns with the fiscal deficit forced the government to lower investments in areas that are more important to the profitability of the firms that have the government as a

³¹ Inoue and Musacchio (2013) argue that Brazil's state-owned firms invested heavily on infrastructure and public utilities after the second world war to eliminate bottlenecks in the economy.

large shareholder.

To control for changes in investment opportunities and in other sources of cash-flow generation, we include in equation (16) the firms' operating margins (sales minus variable cost over sales).³² Jensen (1986) and Hart and Moore (1995) argue that the controlling groups of the most profitable firms presumably have more room to extract private benefits. This makes the voting premium higher and hence we expect a positive estimate for γ_3 .³³

In contrast, we have no prior about the year dummy coefficients $(\alpha_1, \alpha_2, \alpha_3, \alpha_4)$, given that they essentially capture the average effect of unobservable variables that depend only on time, such as changes in the economy's growth opportunities. Likewise, it is not obvious how the volatility of the market index interacts with the voting premium. On the one hand, the voting premium decreases with the index because uncertainty presumably increases the cost of raiders buying block positions in a control battle. On the other hand, uncertainty might increase the conflicts of interests among controlling shareholders, raising the voting premium. As a result, we have no prior about the VIX coefficient α_5 .

As in Zingales (1994), we use quarterly averages of the proportions of voting shares in the hands of the three largest shareholders to control for time-varying changes in the ownership structure that may alter the probability of a control battle. We expect a significantly negative estimate for β_1 given that vote disputes become less likely as the equity holdings of the largest shareholder increase. In contrast, the signs of β_2 and β_3 are ambiguous. An increase in the equity holdings of the second and third largest shareholders may improve their chances to confront the largest shareholder, but such an increase may also help the formation of a coalition in the controlling group against threats from external investors.

The empirical literature on capital structure (see Rajan and Zingales, 1995) suggests that firms with substantial fixed assets have a greater debt capacity, because they are less vulnerable to agency

³² It is known that accounting measures of profitability are imperfect proxies for the firms' economic profits and cash-flow generation (see, for example, Gomes, 2001). To address this concern, the Online Appendix A estimates the effect of π on the voting premium of Vale, a mixed-owned Brazilian mining giant, having the price of iron ore as a control. Vale's economic profitability and investment opportunities are closely linked to the price of iron ore, which, conceivably, may be considered an exogenous variable. As it turns out, the estimated effect of π on Vale's voting premium is quite close to the average effect of π on the voting premium of our sample.

³³ Large shareholders may also have stronger incentives to extract private benefits if they do not expect the company to survive. Consistent with this hypothesis, Lemmon and Lins (2003) show that the 1997-99 Asian crisis hit more severely the firms that are more prone to conflicts of interest between the controlling group and the minority shareholders.

costs of debt. Grossman and Hart (1982) and Jensen (1986) argue that financial slack gives more room for the conflicts of interests among shareholders that underly the voting premium. If so, an increase in the fixed asset ratio should increase the voting premium, implying a positive sign for γ_1 . We also expect a positive sign for the coefficient γ_2 of the relative liquidity of the common shares, given that investors require a compensation to hold less liquid assets. Our measure of relative liquidity is the ratio between the average numbers of voting and nonvoting shares traded at the BM&FBovespa and the New York Stock Exchange.

Finally, Zingales (1995) argues that it is more costly to carry out a hostile takeover if the target company is large. The voting premium should then decrease with the size of the firm. We employ the logarithm of the firm’s market capitalization to measure firm size and, as such, we expect a negative estimate for γ_4 . In the next section, we report the coefficient estimates of equation (16) and their heteroskedasticity-and-autocorrelation-robust standard errors.

3.2 Main findings

Model 1 in Table 4 focuses on the average effect on the voting premium of our proxy for the probability that the government becomes an active large shareholder in mixed-owned firms (the share of loans from government-controlled banks). The remaining independent variables are identical to the ones in equation (16). In the OLS regression, the share of loans from government-controlled banks does not have a statistically significant effect on the voting premium. The coefficient estimates of the log of the market cap and of the equity stake of the second largest shareholder are statistically significant at 1%, with negative signs. These effects are also economically relevant. The estimated coefficient of the relative liquidity of the voting shares is also significant, but, contrary to expected, with a negative sign. The results change considerably, once we control for time-invariant firm-specific characteristics. In the fixed-effects regression, the equity holdings of the second largest shareholder is the only variable that is statistically significant at the 10% level.

Model 2 in Table 4 breaks down the average effect of the share of loans from government-controlled banks across three groups: firms that the government isn’t in a control position (fraction of voting shares smaller than 20%), firms that the government is a large shareholder but not a majority one (fraction of voting shares at least 20% but less than 50%), and firms that the government is a majority shareholder (fraction of voting shares at least 50%). The average effect

of the share of loans from government-controlled banks should always be statistically insignificant in the group of privately-controlled firms, whilst statistically significant in the second and third groups of firms. Indeed, the OLS estimate of δ_1 is statistically insignificant at 10% but so are the estimates of δ_2 and δ_3 . A more interesting picture arises in the fixed-effects regression, though.

If we control for time-invariant unobserved firm-characteristics, the effect of the share of loans from government-controlled banks on the privately-controlled firms remains statistically insignificant at 10%. In contrast, the effects on firms that the government is in the controlling group are much larger and statistically significant at the 5% level, whether it is a majority shareholder or not. Accordingly, a Wald test rejects at the 10% level of significance the null hypothesis that the partial effect of the share of loans from government-controlled banks on the privately-controlled firms is smaller than the partial effect on the firms that the government is in the controlling group but it isn't a majority shareholder. Note that, as both coefficient estimates are negative, this implies that the latter effect is larger in magnitude.

The impact of the share of government loans on the voting premium of firms in which the government belongs to the control group are economically significant. From the third quarter of 2008 to the last quarter of 2012, the proportion of loans from government-controlled banks increased from 34.3% to 47.3%. Bearing this variation of 13% in mind, the fixed-effects estimate of δ_2 in Model 2 implies a reduction of 16% of the average voting premium of firms that the government controls between 20% and 50% of the voting shares. The predicted change explains 62.9% of the median 25.4% reduction of the voting premium of these firms. If we consider that the effect of the government's activism is the difference between the coefficient estimates of δ_2 and δ_1 , then the fixed-effects regression of Model 2 explains 29.5% of the median reduction of the voting premium.

Similar results for the fixed-effects regressions hold in Model 3, which collapses in a single group the firms that the government belongs to the control group. Moreover, Table 4 also shows that an F-Test does not reject the hypothesis that an increase in the share of loans from government-controlled banks lowers the voting premium of firms where the government is a majority shareholder by the same magnitude that it lowers the voting premium of firms where the government is in the control group but isn't a majority shareholder. As the voting premium model of Section 1 shows, this finding goes against a significant *interventionism effect*: apparently the Brazilian government's

activism does not alter the controlling shareholders' ability to divert firm value. It does support, however, a relevant *voting effect*. This means that the activism of the Brazilian government as a large shareholder did harm minority shareholders by making minority votes less important for corporate decisions.

To be sure, our empirical strategy relies heavily on our proxy for the probability that the government behaves as an active large shareholder in mixed-owned firm. As Figure 1 shows, such a proxy has a steep trend, making one wonder whether some nonstationary variable is the main driving force of our result, despite the fact that the share of loans from government-controlled banks does not have a statistically significant impact on the voting premium (see Model 1 in Table 4). Still, we challenge our favorite interpretation of the results in Table 4 in three placebo tests, reported in Table 5.

The second column (Placebo 1) of Table 5 reports the interaction coefficient estimates when we replace $GOV[a, b]$ with the dummy variables $S_1[a, b]$, which take value one if the equity stake of the largest shareholder lies between $a\%$ and $b\%$. Note that we do not control for whether the government is the largest shareholder. Like a placebo test, this interaction should not be significant if our story about the probability of the government's intervention in mixed-owned firms holds water. We find no significant differences between the estimates of the interaction coefficients. As a matter of fact, we cannot even reject that the partial effects of these interaction terms are either individually or jointly equal to zero.

The third column (Placebo 2) replaces $GOV[a, b]$ with the product between a dummy that takes value one if the government controls no votes in the firm, $GOV\{0\}$, with the equity stake of the first, second or third largest shareholder: S_i , with $i = 1, 2, 3$. This placebo test is stronger than the first because the interaction now takes value zero if the government controls *any* number of votes at the firm. Indeed, the interaction coefficient estimates are now very close to zero and, as before, not statistically different (from each other and from zero) at the usual significance levels.

Finally, if the government wishes to intervene in a firm, it might think about increasing its equity participation. Ruling out the endogeneity of the government's equity holdings weakens a potentially important mechanism that is available for the government to intervene in business decisions of mixed-owned firms, biasing downwards the impact on the voting premium of the probability that

the government behaves as an active large shareholder. The last column (Placebo 3) of Table 5 reports the interaction coefficient estimates, fixing $GOV[a, b]_{i,t}$ to their initial values in January 2008. As expected, the $GOV[a, b]_i$ interaction coefficients are never statistically significant.³⁴

4 Robustness checks

4.1 The thresholds for control

In the benchmark model, we allow for the effect on the voting premium of the share of loans from government-controlled banks to vary across three groups: (i) firms where the government controls less than 20% of the voting shares, (ii) firms where the government controls at least 20% but less than 50%, and (iii) firms where the government controls at least 50% of the voting shares. These thresholds are widely used in the corporate governance literature to define who is in the controlling group (20% threshold) and who has unilateral control over business decisions (50% threshold). Nonetheless, it is easy to think of examples in which these thresholds do not determine whether there is unilateral control or if an investor belongs to the control group.

Shareholders' agreements, for instance, may require supermajority in merger decisions, preventing majority shareholders from controlling the firm unilaterally. In the other extreme, 10% of the voting shares may give an investor a control position in firms with very dispersed ownership. Measurement errors in the thresholds of the benchmark model may therefore bias the estimation of the effects of the share of loans from government-controlled banks. To address this concern, we extend regression (16) to allow for heterogeneous effects on different intervals of the government's equity holdings: 0% to 10%, 10% to 20%, 20% to 50%, 50% to 60%, and 60% to 100%.

Model 4 in Table 6 reports results of fixed-effects regressions of the extended model, with their robust standard errors. As in the benchmark model, the strongest impact of the share of loans from government-controlled banks is on the voting premium of firms with government's equity holdings between 20% and 50%. With a significant coefficient estimate of -0.7769 , the effect on this group of firms is basically the same as in the benchmark model. F-tests do not reject the equality of the effects of the share of loans from government-controlled banks on firms with government's voting shares in the $[0, 10)$ and $[10, 20)$ intervals as well as in the $[50, 60)$ and $[60, 100]$ intervals. A Wald

³⁴ The only sizeable point estimate is in the coefficient of the interaction of the proxy of the probability that the government behaves as an active large shareholder with $GOV[20, 50]_i$. This estimate is very imprecise because there are not many firms in January 2008 for which the government's equity participation was between 20% and 50%.

test is quite close to reject (at 10% level) the hypothesis that the effect on firms with government's voting shares in the $[10, 20)$ interval is larger (in absolute value) than the effect on firms with government's voting shares in the $[20, 50)$ interval.

Models 5 to 7 in Table 6 focus on the threshold for control. Lowering the 20% threshold of the benchmark model to 10% makes it easier for firms to be classified as government controlled. Still, we find statistically significant differences (at the 10 percent level) between the effects of the probability that the government behaves as an active large shareholder in firms that, according to the new threshold, are classified as government controlled and privately controlled. In turn, raising the threshold to 30% and 40% might mistakenly classify as privately controlled firms a large number of firms in which the government belongs to the controlling group. Models 6 and 7 adopt the 30% and 40% thresholds, respectively, finding no statistically significant differences between the effects of the probability that the government behaves as an active large shareholder between the government controlled and privately controlled firms. We interpret these findings as evidence that the 20% and 10% cutoffs for the voting shares are the most relevant thresholds to identify whether the government belongs to the controlling group.

4.2 The aggregation of voting shares

Errors in the measurement of the voting shares under the government's control are another potential source of bias in our estimates, especially in firms with pyramidal ownership structures. In these firms, the benchmark criterion to compute the government's control stake adds the voting shares in the government's name to the voting shares owned by the firm in the next layer of the control chain, provided that the government owns (directly or indirectly) at least 20% of this firm's voting shares. The next firm's voting shares are ignored, if the 20% threshold is not met. This aggregation criterion assigns a misleading majority position for the government in some firms and underestimates the government's equity holdings in others.³⁵

In this section, we re-estimate Models 2 and 3 in Table 4 under two alternative aggregation criteria for the voting shares in the government's control. The first criterion lowers the threshold

³⁵ The ownership structure of Oi S.A., discussed in Section 2.3, is a good example of how the benchmark aggregation criterion may bias the government's equity holdings in both directions. The criterion assigns no voting shares for the government from January 1, 2008 to September 29, 2009, even if, in that period, the government owned up to 10% of the voting shares of Oi's largest shareholder. In contrast, the criterion assigns to the government 79.6% of Oi's voting shares from September 30, 2009 to October 4, 2012, because the government owned 33.7% of Telemar Participações, which, indirectly, owned 79.6% of Oi's voting shares.

for adding a firm’s voting shares to the government’s equity holdings from 20% to 10%, as in La Porta, Lopez-de-Silanes, and Shleifer (1999). We call this aggregation criterion *last link* $\geq 10\%$; it implies that the average equity holdings of the government in the full sample is 21.0% against 20.4% with the benchmark criterion of Section 2.3.

In Table 7, Model 2 under the column *last link* $\geq 10\%$ shows that halving the threshold for aggregating voting shares slightly increases the effects of the share of loans from government-controlled banks on the voting premium of firms that the government is a majority shareholder and also on the voting premium of firms that the government’s voting shares lie between 20% and 50%. As expected, the minor increase in the effects of these two groups of firms slightly decreases the effect on the premium of the privately controlled firms. More importantly, the main message of the one-sided Wald tests remain the same. There is no statistically significant difference between the effects of the share of loans from government-controlled banks in the two groups of firms in which the government is a controlling shareholder, whereas the effect on the group of firms that the government controls at least 20% of the votes is larger in magnitude than the effect on privately controlled firms. The results of Model 3 under the column *last link* $\geq 10\%$ also shows no relevant difference with respect to the regression results of Model 3 under the benchmark aggregation criterion.

The column *weakest link* contemplates a criterion for aggregating voting shares that reduces the chances of misclassifying firms as majority-owned by the government, without necessarily increasing the odds of incorrectly excluding the government from the controlling group. Using this criterion, the average equity holdings of the government decreases (vis-à-vis the 20% criterion) from 20.4% to 18.1% in the full sample.³⁶

To illustrate the weakest link criterion, consider the ownership structure of Oi in the period ranging from September 30, 2009 to October 4, 2012. The benchmark criterion assigns no votes for the government at Oi, despite the fact that, in the time period in question, the government owned between 5.3% and 6.2% of a firm, Brasil Telecom, that owned 99.1% of Oi’s voting shares. The weakest link considers that the government’s share of Oi’s voting stocks is equal to its share of Brasil Telecom’s voting stock, which is smaller than the share of Oi’s voting stock in the hands

³⁶ Faccio and Lang (2002) and Claessens, Djaankov, and Lang (2000) apply the weakest link criterion to aggregate votes in pyramids.

of Brasil Telecom.

Estimating Model 2 under the *weakest link* criterion shows that the strongest effect of the share of loans from government-controlled banks is once more on the voting premium of firms that the government is in the controlling group but not a majority shareholder. Unlike in the previous criterion, the *weakest link* lowers the effect on the voting premium of firms that the government controls more than 50% of the voting shares, making it statistically insignificant at 10%. The tests that compare the coefficients now reject the hypothesis that the effects do not vary between the firms that the government has majority control and the firms that the government is in the controlling group but isn't a majority shareholder. Note, however, that the test does not support the hypothesis that the decrease in the voting premium is due to stricter *interventionism effect* on the controlling shareholders' ability to divert firm value given that the effect of our proxy for the probability π of intervention is weaker in the firms that the government has more voting shares.

Last but not least, substituting the *weakest link* criterion for the *last link* $\geq 10\%$ in Model 3 does not alter qualitatively the estimation results.

4.3 Trimming and quantile effects

In the sample of firms that we use in our empirical analysis, we exclude any average quarterly voting premium larger than 180%. While there are good reasons to exclude at least some of these observations (e.g., problems in the adjustment for dividends and splits), it is sometimes difficult to determine whether other observations are indeed outliers or part of the distribution of the voting premium in a country plagued by agency problems. To address this concern, Table 8 reports the fixed-effects coefficient estimates and their standard errors for Models 2 and 3 under alternative exclusion criteria: 140%, 150%, 160%, 200%.

Once we move from a threshold of 180% to 200%, the sample size slightly increases from 1,827 to 1,832 observations. In the process, the effects of the share of loans from government-controlled banks increase (in absolute value) for all three groups of firms, but the main qualitative results remain unchanged. In particular, the effect on the voting premium of the privately controlled firm is nearly half of the effect on the firms where the government is a large shareholder. A Wald test rejects at the 10% level of significance, with a p-value of 0.0598, the hypothesis that the effect on the voting premium of privately controlled firms is larger or equal (in absolute value) than the

effect on firms where the government controls between 20% and 50% of the voting shares. A test of equality of means cannot reject the equality of the effects on the voting premium of the two groups of firms where the government belongs to the controlling group.

The pattern is very similar if we set the maximum voting premium at lower levels. Although reducing the threshold to 140%, 150% or 160% yield smaller effects of the share of loans from government-controlled banks in all groups of firms, the impact on the voting premium of firms for which the government is a large shareholder remains about twofold the impact on privately controlled firms. Indeed, we can always reject the hypothesis at the 10% level that the effect on the privately-controlled firms is at least equal to the effect on the firms for which the government is a large, but not a majority shareholder. Moreover, we cannot reject that the effects are the same for firms that the government’s voting shares lie in the $[20, 50)$ and $[50, 100)$ intervals.

Another way of investigating the weight of outliers in our results is to estimate the regression parameters using a least absolute deviation criterion (rather than least squares). This is the essence of quantile regressions as developed in Koenker and Bassett (1978). Intuitively, their approach allows the model’s coefficients to vary across across quantiles of the voting premium, even if jointly estimated. As in Koenker (2004), we introduce fixed effects in the quantile regressions and bootstrap the standard errors using 500 artificial samples.³⁷

Table 9 reports estimates of the coefficients for Model 2 in three quartiles of the voting premium: $Q1 = 25\%$, median (50%), and $Q3 = 75\%$. To some extent, we may interpret the first quartile regression as more relevant for firms with good enough corporate governance practice to warrant relatively lower voting premia, while the third quartile regression is more relevant for firms with poor corporate governance standards. The baseline sample for the quantile regressions excludes voting premia observations larger than or equal to 300%, which is a cutoff slightly larger than the 221.8% threshold set by Zingales (1995) in his study of the voting premium in the U.S.³⁸ For the sake of comparison, we also report the coefficients of the quantile regressions for the original sample

³⁷ It is worth stressing the role that fixed effects play in quantile regression. Ideally, they should capture some firm-specific source of variability that implies a distributional shift. However, there are not enough degrees of freedom to make this shift depend on the quantile. Hence we consider a constant fixed effect across quantiles as in Koenker (2004). In this formulation, the fixed effects have a pure location shift effect on the conditional quantiles of the voting premium, unlike the controls that may affect each quantile in a different manner.

³⁸ Zingales (1995) excludes two observations of voting premium corresponding to the trading of the superior voting class of a firm near a takeover (918%) and another firm just before insolvency (-9,424%). Given the well known differences between the legal protection of the shareholders’ rights in the U.S. and Brazil, we don’t treat voting premia between 221.8% and 300% as outliers.

that excludes voting premia over 180%.³⁹

To provide some point of reference for each conditional quartile, Table 9 displays the minimum, mean and maximum values of the voting premia in three intervals. These intervals are formed so that their median values are equal to the corresponding conditional quartile of the quantile regression. The interval of the first quartile regression (Q_1) starts at the smallest voting premium (-85.55%) and ends in the median voting premium (4.58% in the baseline sample and 4.02% in the original sample that excludes voting premia larger or equal to 180%). The interval of the third quartile regression (Q_3) ranges from the median to the largest voting premium (296.92% in the baseline sample and 178.04% in the original sample). The interval of the median quantile regression starts at the first quartile (-6.54% in the baseline sample and -6.91% in the sample that excludes voting premia larger or equal to 180%) and ends in the third quartile (24.07% in the baseline sample and 22.32% in the original sample).

We find that the coefficient estimates for the interaction between $GOV[a, b]$ and our proxy for the probability that the government behaves as an active large shareholder (i.e., the share of loans from government-controlled firms) follow different patterns across quantiles. The coefficient estimates for the first conditional quartile are actually very similar for both samples (i.e., baseline with a cutoff of 300% and original with a cutoff of 180%). As expected, the focus on the smallest voting premia lowers the impact of the share of loans from government-controlled firms on the voting premium of firms that have the government in the control group. Still, we find no evidence of statistical difference between the $GOV[20, 50)$ and $GOV[50, 100)$ interaction coefficients, and we reject that they are smaller or equal in magnitude to the $GOV[0, 20)$ interaction coefficient. Here, the main novelty of the quantile regressions is that, in the sample with a cutoff of 300% , the statistically significant effect of the share of loans from government-controlled firms lies on firms where the government is a majority shareholder.

For the conditional median, the point estimates of the interaction coefficients seem to increase with the government's equity stake. In particular, the estimates of the $GOV[50, 100]$ interaction coefficient are much larger than those of the $GOV[0, 20)$ interaction: -0.5679 against -0.2057 in the

³⁹ We first estimate the quantile regression for the original sample that excludes voting premia larger than or equal to 180% , using a random set of initial values. We then use the resulting coefficient estimates as initial values for the quantile regression in the alternative sample that uses a cutoff of 300% .

original sample, and -0.6167 against -0.1747 for the exclusion criterion of 300%. These discrepancies are statistically significant at the 5% level in both instances. As for the GOV[0, 20) and GOV[20, 50) interactions, their differences are borderline significant in the sample for exclusion criterion of 300%, with p-value of the one-sided Wald test are around 11%.

Finally, the interaction coefficients increase substantially in magnitude for the conditional third quartile in both samples. But, we find evidence of statistical difference between the GOV[0, 20) and GOV[50, 100) interaction coefficient estimates only for the larger sample that excludes voting premia over 300%. All in all, it seems that the government’s activism is *more* damaging for firms whose standards of corporate governance are low enough to allow for large voting premia.

5 Conclusion

Since the outbreak of the subprime crisis, there has been a wave of government interventions in the private sector. In particular, several governments in Europe and Latin America have used their equity stakes in mixed-owned companies to block massive layoffs. In a sense, the subprime crisis induced governments to play a more active role as large shareholders.

In this paper, we model the corporate governance consequences of an increase in the probability that the government behaves as an active large shareholder in mixed-owned firms. We disentangle the consequences of the government’s activism in a *voting effect* that lowers the relevance of minority votes to business decisions and an *interventionism effect* that may either enhance or constrain the controlling shareholders’ ability to divert firm value. The *voting effect* offers one explanation for why setting up political connections are associated with positive stock reactions in private firms, but not in mixed-owned firms. Political connections in mixed-owned firms may trigger a more active role of the government as a large shareholder, lowering the importance of the minority votes for corporate decisions.

Last but not least, our model shows how to exploit data on government ownership and voting premia to empirically disentangle the *voting effect* from the *interventionism effect*. This allows us to assess the governance impact of the enhanced activism of the Brazilian government as a large shareholder, from the outbreak of the subprime crisis in 2008 through the end of 2012. In this period, we find that only the *voting effect* is statistically significant. Indeed, our estimates suggest

that, in the sample period, the *voting effect* explains 62.9% of a massive 25.4% drop in the median voting premium of firms in which the government isn't a majority shareholder, but controls more than 20% of the votes.

And yet, there are reasons to believe that the *voting effect* does not embed the full loss that the stronger activism of the Brazilian government in the 2008-2012 period has imposed on the minority shareholders of that country's mixed-owned firms. An event study in the Online Appendix B provides some evidence that the activism of the Brazilian government as a large shareholder correlates with economic policies and political institutions that harm minority investors, whether they own voting or nonvoting shares. As such, the decline of the voting premium due to the *voting effect* is a cost of the government's activism as a large shareholder that adds to the minority shareholders' loss from any other loss of profits that the greater activism may impose on mixed-owned firms.

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Appendix: Proofs of Propositions

Proof of Proposition 1. Continuity of the objective function and compactness of the opportunity set ensure that Program 5 has a solution, which is unique because strict convexity of $\Psi(\cdot)$ implies that the objective function is strictly concave. Moreover, the unique solution lies in the interior of the interval $[-1, 1]$, because, by assumption, $\lim_{e \rightarrow -1} \Psi'(e) = -\infty$ and $\lim_{e \rightarrow 1} \Psi'(e) = \infty$. Hence, the program's first-order condition is necessary and sufficient for its optimal solution e^* :

$$(1 - \alpha_0)\Psi'(e^*) = 2b\eta. \quad (17)$$

Let $e^*(\alpha_0, \eta)$ be the solution of Program 5, as a function of the parameters α_0 and η . Conditioned on the optimal intervention, the private benefits in the mixed-owned firm amount to $B(\alpha_0, \eta) = 2b(1 - e^*(\alpha_0, \eta))$, and the government's intervention in the private benefits is $\Delta B(\alpha_0, \eta) = -2be^*(\alpha_0, \eta)$.

Consider first that $\eta = 0$. In this case, the right-hand side of the first-order condition (17) vanishes, forcing the left-hand side to go to zero as well. Since $\alpha_0 \in (0, 1)$, setting the left-hand of equation (17) at zero yields $\Psi'(e^*) = 0$, which, from $\Psi'(0) = 0$, pins down $e^*(\alpha_0, 0) = 0$ and $\Delta B(\alpha_0, 0) = 0$. Following the same argument, a positive (negative) value for η implies, from equation (17), that $\Psi'(e)$ is positive (negative), proving that $e^*(\alpha_0, \eta)$ is positive for $\eta > 0$ and negative for $\eta < 0$.

To prove the second part of Proposition 1, write the effect of a change in η on $B(\alpha_0, \eta)$ as

$$\frac{\partial B(\alpha_0, \eta)}{\partial \eta} = \frac{\partial B(\alpha_0, \eta)}{\partial e^*} \frac{\partial e^*}{\partial \eta} = -2b \frac{\partial e^*}{\partial \eta}. \quad (18)$$

To determine the sign of $\frac{\partial e^*}{\partial \eta}$, just note that an increase in η raises the right-hand side of equation (17). To match the increase in the right-hand side, $\Psi'(e^*)$ must go up, pinning down a raise in $e^*(\alpha_0, \eta)$ because $\Psi(\cdot)$ is strictly convex. Plugging $\frac{\partial e^*}{\partial \eta} > 0$ into equation (18) proves that $\frac{\partial B(\alpha_0, \eta)}{\partial \eta} < 0$.

As for the effect on $B(\alpha_0, \eta)$ of a change in the equity stake α_0 , note that

$$\frac{\partial B(\alpha_0, \eta)}{\partial \alpha_0} = \frac{\partial B(\alpha_0, \eta)}{\partial e^*} \frac{\partial e^*}{\partial \alpha_0} = -2b \frac{\partial e^*}{\partial \alpha_0}. \quad (19)$$

If $\eta > 0$, then the right-hand side of equation (17) is positive, implying that $\Psi'(e^*) > 0$. In this case, an increase in α_0 lowers the left-hand side of equation (17) and $\Psi'(e^*)$ must go up for the first-order condition to hold. Strict convexity of $\Psi(\cdot)$ thus implies that $\frac{\partial e^*}{\partial \alpha_0} > 0$. If $\eta = 0$, the first part of the proof of Proposition 1 shows that $e^*(\alpha_0, 0) = 0$ for any $\alpha_0 \in (0, 1)$, implying that $\frac{\partial e^*}{\partial \alpha_0} = 0$. Finally, $\eta < 0$ implies that the right-hand side of equation (17) is negative, which in turn requires $\Psi'(e^*) < 0$. In this case, an increase in α_0 raises the left-hand side of equation (17). $\Psi'(e^*)$ must thus go down for the first-order condition to hold. Strict convexity of $\Psi(\cdot)$ thus implies that $\frac{\partial e^*}{\partial \alpha_0} < 0$. Plugging into equation (19) how e^* changes with α_0 demonstrates that, as long as $\eta \neq 0$, an increase in the government's equity stake makes it eager to intervene in the private benefits:

$$\frac{\partial B(\alpha_0, \eta)}{\partial \alpha_0} = \frac{\partial B(\alpha_0, \eta)}{\partial e^*} \frac{\partial e^*}{\partial \alpha_0} = -2b \frac{\partial e^*}{\partial \eta} \begin{cases} < 0 \text{ if } \eta > 0, \\ = 0 \text{ if } \eta = 0, \\ > 0 \text{ if } \eta < 0, \end{cases} \quad (20)$$

completing the proof. ■

Proof of Proposition 2. The proof is by backward induction, starting with the government's decision at $t = 2$ to intervene in the private benefits of the mixed-owned firm. The proposed strategy for the government is optimal at $t = 2$ because it amounts to the government's strictly optimal reduction in the private benefits, $2be^*(\alpha_0, \eta)$, as a function of its equity stake α_0 and the parameter η that captures the extent to which the government is aligned with the minority shareholders. This means that there are no incentives for the government to deviate from the proposed strategy at $t = 2$. Proposition 1 shows that $2be^*(\alpha_0, \eta) < 2be^*(\alpha_0, \hat{\eta})$ for $\hat{\eta} > \eta$, and standard continuity properties of best responses establish that the optimal intervention converges to $2be^*(\alpha_0, \eta)$ as $\hat{\eta}$ gets arbitrarily close to η , thereby proving that the threatened reduction of private benefits may be arbitrarily small. Moving back to $t = 1$, the government's vote for project A ensures its preferred project, given that the other controlling shareholders also vote for A in the candidate for equilibrium. This demonstrates that there is no incentive for the government to deviate from the proposed strategy.

Consider now the strategies of the private investors in the control group. Regardless of the government's intervention in the private benefits, equation (7) shows that the private investors in the control group are either indifferent with respect to the two projects or they have conflicting preferences. If they are indifferent, then neither of them has any incentive to deviate from their proposed strategy in view that agreeing with Project A prevents the government from lowering private benefits at $t = 2$.

If one of the private investors in the control group strictly prefers project B over A , there are two cases to analyze. In the first one, the dissenting private investor has no chance of blocking project A because the government and the other private investor in the control group hold the majority of the votes. The best action of the dissenting private investor is thus to agree with project A to prevent the government from lowering private benefits at $t = 2$. In the second case, the dissenting private

investor may become the majority shareholder by purchasing minority votes. Note, however, that any such attempt from the dissenting private investor would induce the government's ally in the control group to bid for the minority votes as well. We would have a bidding war for minority votes with complete information and two symmetric bidders. As in a Bertrand game with symmetric players, the unique Nash Equilibrium of the bidding war implies that the two private investors in the control group bid their payoffs from becoming a majority shareholder: the private benefit b from the preferred project plus the verifiable cash flows paid to the minority investor with voting shares. The winner of the bidding war, therefore, gains nothing from purchasing the minority shares to select its preferred project and neither does the loser. They nonetheless internalize the losses in the private benefits from the assets in place at $t = 0$ due to the government's proposed strategy: if the dissenting controlling shareholder wins the bid, the government reduces these private benefits from $(1 - e^*(\alpha_0, \eta))b$ to $(1 - e^*(\alpha_0, \hat{\eta}))b$. Anticipating such a loss, the dissenting controlling shareholder is better off voting for Project A .

Uniqueness of the equilibrium follows from two conditions. First, the assumptions on the cost function $\Psi(\cdot)$ imply that the government's optimal intervention in the private benefits is unique. Second, the private investors in the control group cannot threaten the government to vote for B in exchange for more private benefits of control at $t = 2$. Such a threat is not credible because the private investors know that the investment decision is sunk at $t = 2$. ■

Proof of Proposition 3. From Proposition 1, the *interventionism effect* increases with η , while the *voting effect* is $-b/2$ for any η . As a result, the largest sensitivity of the firm's value with respect to π – see equation (11) – obtains at $\eta = \bar{\eta}$:

$$\frac{\partial \{P^{NV} + P^V\}}{\partial \pi} = 2b |e^*(\alpha_0, \bar{\eta})| - b/2. \quad (21)$$

If $2b |e^*(\alpha_0, \bar{\eta})| \leq b/2$, then the *voting effect* prevails over the *interventionism effect* for any η . In this case, Proposition 3 obtains for $\tilde{\eta} = \bar{\eta}$. Otherwise, $2b |e^*(\alpha_0, \bar{\eta})| > b/2$ and $2b |e^*(\alpha_0, 0)| = 0 < b/2$, implying, from the Intermediate Value Theorem, that there exists $\tilde{\eta} \in (0, \bar{\eta})$ such that $2b |e^*(\alpha_0, \tilde{\eta})| = b/2$. Proposition 3 obtains for such $\tilde{\eta}$, from the strict monotonicity of $2b |e^*(\alpha_0, \eta)|$ with respect to η , established in Proposition 1. ■

Table 1. Sample characteristics

The initial sample comprises all firms with dual class shares at BM&FBovespa, from January 2008 to December 2012. For each firm, we compute the percentage differences of the daily prices of voting and non-voting shares. We average out these percentage differences in quarterly *Voting Premium*, excluding observations larger than or equal to 180%. We report the number of firms in the final sample and in the set of *Excluded* observations, along with mean and median values (in parentheses) of firm characteristics. *Relative Liquidity* is the ratio of the number of traded voting shares over the number of traded non-voting shares. *First Shareholder* is the percentage of voting shares that the largest shareholder owns, with analogous definitions for *Second Shareholder* and *Third Shareholder*. *Sales* is quarterly revenues in US\$ million. *Fixed Asset Ratio* is the percentage of fixed assets relative to total assets. *Leverage* is the percentage of debt relative to total assets. *Operating Margin* is in %. *Government* is the percentage of voting shares that the government controls (directly or indirectly).

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2008–2012 | Excluded |
|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Number of Firms | 143 | 134 | 130 | 120 | 105 | 163 | 24 |
| Firm-Quarters | 471 | 449 | 421 | 404 | 355 | 2,100 | 114 |
| Voting Premium | 17.42 (7.02) | 13.71 (3.50) | 11.95 (7.00) | 12.43 (4.14) | 5.49 (0.64) | 12.55 (4.02) | 4,036.5 (370.3) |
| Relative Liquidity | 9.46 (0.06) | 14.66 (0.07) | 17.90 (0.08) | 16.24 (0.08) | 17.94 (0.10) | 15.00 (0.08) | 64.64 (0.004) |
| First Shareholder | 64.02 (61.30) | 64.00 (62.30) | 63.06 (61.80) | 62.71 (61.40) | 62.32 (60.70) | 63.28 (61.40) | 66.45 (86.25) |
| Second Shareholder | 14.14 (12.40) | 13.68 (11.80) | 13.66 (11.80) | 14.34 (13.05) | 14.63 (12.20) | 14.07 (12.10) | 11.70 (10.50) |
| Third Shareholder | 5.31 (3.00) | 4.87 (2.50) | 4.82 (2.22) | 4.76 (2.10) | 4.88 (3.00) | 4.94 (2.50) | 4.42 (0.16) |
| Sales | 1,200.6 (214.6) | 1,161.8 (210.2) | 1,485.1 (244.7) | 1,844.1 (277.6) | 1,769.4 (261.5) | 1,492.2 (241.7) | 414.1 (67.82) |
| Fixed Asset Ratio | 32.88 (32.06) | 32.56 (33.72) | 29.50 (30.64) | 24.96 (22.17) | 25.59 (22.40) | 29.36 (29.79) | 32.30 (33.13) |
| Leverage | 29.81 (24.43) | 26.26 (23.97) | 26.86 (23.28) | 33.35 (23.69) | 27.15 (26.69) | 28.74 (24.26) | 41.06 (30.34) |
| Operating Margin | −807.0 (10.22) | −17.41 (9.69) | −90.74 (11.83) | −15.25 (11.62) | −177.5 (9.98) | −238.9 (10.70) | 514.7 (7.54) |
| Government | 18.79 (0) | 19.14 (0) | 20.34 (0) | 21.54 (0) | 22.38 (0) | 20.32 (0) | 8.62 (0) |

Table 2. Sample characteristics by control

We breakdown the sample of firms in two groups. G is the set of firms that the government controls (directly or indirectly) at least 20% of the voting shares. We refer to these firms as under the government's control. P comprises firms that the government controls less than 20% of the voting shares. We refer to these firms as under private control. The sum of firms under government and private control is larger than the number of firms in Table 1 in 2008 and 2011 because, in these years, the government's voting shares of some firms are larger than 20% in a quarter and smaller than 20% in another. This happens with three firms: Contax Participações, Coteminas, and Brasken. In 2012, the number of firms in Table 2 is smaller than the number in Table 1 because the latter does not ignore firms with missing values in the government's equity holdings. We report the number of firms in each group, along mean and median values (in parentheses) of firm characteristics. See description of the variables in Table 1.

| | 2008 | | | 2009 | | | 2010 | | | 2011 | | | 2012 | | |
|--------------------|--------------------|--------------------|--|--------------------|------------------|--|--------------------|--------------------|--|--------------------|--------------------|--|--------------------|--------------------|--|
| | G | P | | G | P | | G | P | | G | P | | G | P | |
| Number of Firms | 35 | 110 | | 29 | 105 | | 31 | 99 | | 29 | 92 | | 30 | 75 | |
| Voting Premium | 15.69 (5.89) | 18.26 (9.36) | | 12.73 (3.49) | 13.91 (3.43) | | 7.29 (1.76) | 13.52 (7.56) | | 6.65 (2.31) | 14.41 (4.38) | | 4.68 (0) | 5.79 (0.82) | |
| Relative Liquidity | 30.78 (0.13) | 2.85 (0.06) | | 39.37 (0.11) | 7.01 (0.05) | | 58.06 (0.09) | 4.39 (0.07) | | 59.81 (0.06) | 1.32 (0.08) | | 14.94 (0.13) | 19.04 (0.10) | |
| First Shareholder | 69.13 (67.00) | 62.45 (60.50) | | 69.53 (67.00) | 62.27 (60.80) | | 72.35 (77.80) | 59.93 (59.00) | | 73.41 (79.60) | 59.05 (58.90) | | 72.79 (77.80) | 58.50 (57.30) | |
| Second Shareholder | 12.45 (7.80) | 14.67 (13.95) | | 12.20 (6.70) | 14.15 (11.87) | | 10.46 (5.75) | 14.75 (13.50) | | 11.29 (6.40) | 15.40 (14.80) | | 12.98 (6.70) | 15.24 (14.70) | |
| Third Shareholder | 3.44 (0) | 5.89 (5.00) | | 2.98 (0) | 5.46 (5.10) | | 2.65 (0) | 5.55 (5.09) | | 2.41 (0) | 5.56 (4.73) | | 2.34 (0) | 5.81 (5.10) | |
| Sales | 2,083.6 (428.2) | 916.5 (146.6) | | 1,941.0 (494.5) | 903.8 (134.5) | | 2,608.3 (762.5) | 1,054.1 (142.8) | | 3,351.7 (786.8) | 1,336.4 (141.3) | | 3,130.5 (679.2) | 1,263.8 (141.3) | |
| Fixed Asset Ratio | 37.61 (40.97) | 31.05 (29.62) | | 37.80 (42.28) | 30.79 (30.94) | | 35.97 (36.66) | 27.37 (28.46) | | 29.03 (24.18) | 23.65 (21.44) | | 30.30 (23.09) | 23.96 (22.18) | |
| Leverage | 21.98 (18.96) | 29.40 (26.59) | | 22.31 (19.50) | 27.63 (25.37) | | 22.35 (20.02) | 28.41 (24.52) | | 20.64 (20.23) | 37.58 (26.35) | | 23.18 (22.94) | 28.60 (28.02) | |
| Operating Margin | 17.80 (19.10) | -1,077.4 (8.81) | | 25.70 (17.42) | -32.09 (7.84) | | 21.62 (18.31) | -128.7 (10.09) | | 21.84 (18.05) | -27.88 (8.95) | | -162.3 (14.71) | -183.4 (9.05) | |
| Government | 75.68 (85.20) | 1.31 (0) | | 77.04 (85.40) | 1.09 (0) | | 78.34 (88.85) | 0.76 (0) | | 81.70 (89.40) | 0.96 (0) | | 80.11 (89.30) | 1.28 (0) | |

Table 3. Voting premium and proportion of voting shares under the government's control

We breakdown the mean and median voting premia by the proportion of voting shares controlled by the government. As before, the median values are in parentheses. Apart from the full sample, we consider two subsamples: third quarter of 2008 and the year of 2012. The column 'GOV' refers to the proportion of voting shares under government control, whereas 'premium' corresponds to the voting premium (in %). The columns 'firms' and 'firm-quarters' count the number of firms for which the government controls the given fraction of voting shares and the corresponding number of observations in the sample, respectively. Table 3 does not control for double counting due to changes in the government's control stake. More precisely, if the government raises its equity stake on a firm, say, from 15% to 30%, this firm will appear in the statistics for both GOV[10,20) and GOV[20,50). As a result, although the government controls at least 20% of the voting shares in 39 firms, the figures in column 'firms' add up to 47.

| GOV | full sample | | | 2008:3 | | 2012 | | | change in premium |
|-----------|-----------------|-------|---------------|------------------|-------|-----------------|-------|---------------|--------------------|
| | premium | firms | firm-quarters | premium | firms | premium | firms | firm-quarters | |
| 0 | 14.38 (5.42) | 117 | 1,356 | 21.05 (9.70) | 73 | 6.32 (0.79) | 53 | 221 | -14.73 (-8.91) |
| (0, 100] | 9.22 (1.64) | 64 | 744 | 17.13 (6.66) | 42 | 4.13 (0) | 41 | 134 | -13.00 (-6.66) |
| (0, 10) | 11.37 (3.51) | 21 | 130 | 22.31 (21.50) | 9 | -1.38 (3.49) | 6 | 20 | -23.69 (-18.01) |
| [10, 20) | 4.33 (-2.70) | 12 | 87 | 4.99 (-2.90) | 4 | 7.21 (-0.07) | 5 | 19 | 2.22 (2.83) |
| [20, 50) | 31.11 (6.78) | 7 | 47 | 44.71 (29.43) | 4 | 4.58 (4.03) | 3 | 7 | -40.13 (-25.40) |
| [50, 60) | 4.59 (13.29) | 8 | 81 | 7.10 (17.03) | 5 | 2.68 (2.83) | 5 | 14 | -4.42 (-14.20) |
| [60, 100] | 8.02 (0.00) | 32 | 392 | 15.17 (5.29) | 19 | 5.06 (-0.18) | 26 | 74 | -10.11 (-5.47) |

Table 4. Voting premium and the government's activism

In all regressions, the quarterly average of the voting premium, $(P_{it}^V - P_{it}^{NV})/P_{it}^{NV}$, is the dependent variable. The regressor of interest in Model 1 is the fraction of loans from government-controlled banks, $\frac{\text{gov loans}}{\text{total loans}}$. The other regressors include the CBOE's options-implied market volatility index (VIX), relative liquidity of the shares with voting rights, proportion of fixed assets, operating margin, market capitalization (in logs), and the fractions of voting shares held by the three largest shareholders. Model 2 interacts the fraction of loans from government-controlled banks with dummy variables $GOV[a, b]$, which take value one if, at quarter t , firm i 's voting shares under the government's control lie in the interval $[a, b]$. Model 3 pools the dummies $GOV[20, 50]$ and $GOV[50, 100]$ in a single dummy, $GOV[20, 100]$. ***, **, and * denote statistical significance at one, five and ten percent, respectively. Robust standard-errors are in parentheses. We also report the p-values of the Wald tests for restrictions on the coefficients of the interaction terms involving the dummy variables $GOV[a, b]$. The alternative hypotheses are the negation of the null hypotheses we state in the first column.

| | Model 1 | | Model 2 | | Model 3 |
|--|---|---|---|---|---|
| | OLS | Fixed Effects | OLS | Fixed Effects | Fixed Effects |
| $\frac{\text{gov loans}}{\text{total loans}}$ | -0.6601 (0.8076) | -0.8241 (0.4628) | | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0, 20]$ | | | -0.6768 (0.8022) | -0.6552 (0.4983) | -0.6571 (0.4925) |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[20, 100]$ | | | | | -1.2519** (0.5183) |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[20, 50]$ | | | -0.1881 (0.8166) | -1.2280** (0.5450) | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[50, 100]$ | | | -0.6570 (0.8013) | -1.2618** (0.5452) | |
| VIX | -0.0009 (0.0011) | 0.0002 (0.0010) | -0.0009 (0.0011) | 0.0003 (0.0009) | 0.0003 (0.0010) |
| $\frac{\text{total volume}^V}{\text{total volume}^{NV}}$ | -0.0002*** (0.0001) | 2.2×10^{-5} (2.9×10^{-5}) | -0.0002*** (0.0001) | 2.9×10^{-5} (2.2×10^{-5}) | 2.9×10^{-5} (2.2×10^{-5}) |
| $\frac{\text{fixed assets}}{\text{total assets}}$ | 0.0003 (0.0004) | 0.0012 (0.0008) | -0.0004 (0.0004) | 0.0013 (0.0009) | 0.0011 (0.0007) |
| Operating Margin | -1.73×10^{-7} (2.88×10^{-7}) | -6.29×10^{-8} (2.18×10^{-7}) | -1.87×10^{-7} (2.92×10^{-7}) | -1.02×10^{-7} (2.10×10^{-7}) | -6.69×10^{-8} (2.15×10^{-7}) |
| ln(MarketCap) | -0.0320*** (0.0038) | -0.0649 (0.0479) | -0.0323*** (0.0041) | -0.0591 (0.0450) | -0.0591 (0.0450) |
| First Shareholder | -0.0006 (0.0004) | 0.0031 (0.0028) | -0.0006 (0.0004) | 0.0027 (0.0022) | 0.0027 (0.0023) |
| Second Shareholder | -0.0038*** (0.0007) | 0.0050* (0.0030) | -0.0039*** (0.0007) | 0.0046 (0.0029) | 0.0047* (0.0028) |
| Third Shareholder | 0.0031* (0.0017) | 0.0038 (0.0040) | 0.0026 (0.0017) | 0.0031 (0.0039) | 0.0032 (0.0038) |
| Year Dummies | included | included | included | included | included |
| sample size | 1,827 | 1,827 | 1,827 | 1,827 | 1,827 |
| R^2 , within | | 0.0668 | | 0.0775 | 0.0774 |
| R^2 , between | | 0.0444 | | 0.0402 | 0.0401 |
| R^2 | 0.0948 | 0.0441 | 0.1018 | 0.0340 | 0.0338 |
| hypothesis testing | | | | | |
| $\mathbb{H}_0: [0, 20] \leq [20, 100]$ | | | | | 0.0802 |
| $\mathbb{H}_0: [0, 20] \leq [20, 50]$ | | | | 0.0592 | |
| $\mathbb{H}_0: [20, 50] = [50, 100]$ | | | | 0.9283 | |

Table 5. Placebo regressions

We estimate three placebo regressions using the voting premium model 2 for the sample that excludes voting premia above 180%. Placebo 1 replaces the dummy variables $GOV[a, b]$ in the interaction terms with similar variables based on the equity stake of the largest shareholder $S_1[a, b]$. Placebo 2 uses the equity stakes of the three largest shareholders in privately controlled firms (i.e., government has no equity participation) instead of $GOV[a, b]$ in the interaction terms. Placebo 3 fixes the dummy variables $GOV[a, b]$ to their initial values in January 2008. In every regression for the voting premium, we include fixed effects and year dummies as well as the other controls in Table 4. $***$, $**$, and $*$ denote statistical significance at one, five and ten percent, respectively. Figures within parentheses refer to robust standard errors. We also report the p-values of the Wald tests for restrictions on the interaction coefficients. The alternative hypotheses are the negation of the null hypotheses we state in the first column.

| | Placebo 1 | Placebo 2 | Placebo 3 |
|---|---------------------|---------------------|---------------------|
| $\frac{\text{gov loans}}{\text{total loans}} S_1[0, 20)$ | 0.0063 (0.0054) | | |
| $\frac{\text{gov loans}}{\text{total loans}} S_1[20, 50)$ | -0.0089 (0.0079) | | |
| $\frac{\text{gov loans}}{\text{total loans}} S_1[50, 100]$ | -0.0062 (0.0231) | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0]S_1$ | | 0.0010 (0.0019) | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0]S_2$ | | 0.0008 (0.0070) | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0]S_3$ | | -0.0152 (0.0147) | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0, 20)_{2008}$ | | | -0.7775 (0.5295) |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[20, 50)_{2008}$ | | | -4.1718 (3.1906) |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[50, 100]_{2008}$ | | | -0.4070 (0.5960) |
| sample size | 1,827 | 1,827 | 1,827 |
| R^2 , within | 0.0738 | 0.0674 | 0.0769 |
| R^2 , between | 0.0373 | 0.0417 | 0.0115 |
| R^2 | 0.0322 | 0.0413 | 0.0013 |
| hypothesis testing | | | |
| $\mathbb{H}_0: [0, 20) = [20, 50]$ | 0.1080 | | 0.2988 |
| $\mathbb{H}_0: [20, 50) = [50, 100]$ | 0.9119 | | 0.2518 |
| $\mathbb{H}_0: GOV[0]S_1 = GOV[0]S_2 = GOV[0]S_3$ | | 0.5634 | |

Table 6. Varying the intervals of the government's equity holdings

In every specification, the voting premium is the dependent variable and the regressors of interest are the interactions of the fraction of loans from government-controlled banks, $\frac{\text{gov loans}}{\text{total loans}}$, with the dummy variables $GOV[a, b)$, which take value one if, at quarter t , firm i 's voting shares under the government's control lie in the interval $[a, b)$. We also include fixed effects and year dummies, as well as the other controls in Table 4. $***$, $**$, and $*$ denote statistical significance at one, five and ten percent, respectively. Robust standard-errors are in parentheses. We also report the p-values of the Wald tests for restrictions on the coefficients of the interaction terms involving the dummy variables $GOV[a, b)$. The alternative hypotheses are just the negation of the null hypotheses we state in the first column.

| | Model 4 | Model 5 | Model 6 | Model 7 |
|--|----------------------|---------------------|---------------------|---------------------|
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0, 10)$ | -0.3371 (0.5127) | | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[10, 20)$ | -0.4125 (0.4597) | | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[20, 50)$ | -0.7769* (0.5447) | | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[50, 60)$ | -0.7148 (0.5507) | | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[60, 100]$ | -0.7144 (0.5363) | | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0, 10)$ | | -0.6653 (0.5018) | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[10, 100]$ | | -1.1069 (0.4657) | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0, 30)$ | | | -0.6367 (0.5134) | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[30, 100]$ | | | -1.2963 (0.5633) | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0, 40)$ | | | | -0.6385 (0.5144) |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[40, 100]$ | | | | -1.2258 (0.5353) |
| sample size | 1,827 | 1,827 | 1,827 | 1,827 |
| R^2 , within | 0.0781 | 0.0742 | 0.0759 | 0.0751 |
| R^2 , between | 0.0406 | 0.0458 | 0.0397 | 0.0399 |
| R^2 | 0.0343 | 0.0407 | 0.0387 | 0.0392 |
| hypothesis testing | | | | |
| $\mathbb{H}_0: [0, 10) = [10, 20)$ | 0.3667 | | | |
| $\mathbb{H}_0: [20, 50) = [50, 60)$ | 0.9002 | | | |
| $\mathbb{H}_0: [50, 60) = [60, 100]$ | 0.9100 | | | |
| $\mathbb{H}_0: [10, 20) \leq [20, 50)$ | 0.1035 | | | |
| $\mathbb{H}_0: [0, 10) \leq [10, 100]$ | | 0.0871 | | |
| $\mathbb{H}_0: [0, 30) \leq [30, 100]$ | | | 0.1207 | |
| $\mathbb{H}_0: [0, 40) \leq [40, 100]$ | | | | 0.1248 |

Table 7. Varying the computation of the voting shares under the government's control

In the benchmark criterion for computing the government's fraction of voting shares, we sum the voting shares of the government with the voting shares of the firm in the next layer of the pyramid, provided that the government controls (directly or indirectly) at least 20% of the voting shares of the latter firm. In this table, we report the results of the fixed-effect regressions under two alternative criteria for computing the government's fraction of voting shares. The criterion *last link* ≥ 10 is similar to the benchmark one, but with a threshold of 10% (rather than 20%) for considering the next firm's voting shares. In the *weakest link* criterion, the voting shares under the government's control is the sum of its voting shares in the firm with the minimum fraction of voting shares it owns in any layer of the pyramid. In every regression, the voting premium is the dependent variable and the regressors of interest are the interactions of the fraction of loans from government-controlled banks, $\frac{\text{gov loans}}{\text{total loans}}$, with the dummy variables $GOV[a, b)$, which take value one if, at quarter t , firm i 's voting shares under the government's control lie in the interval $[a, b)$. We also include fixed effects and year dummies as well as the other controls in Table 4. $***$, $**$, and $*$ denote statistical significance at one, five and ten percent, respectively. Robust standard-errors are in parentheses. We also report the p-values of the Wald tests for restrictions on the coefficients of the interaction terms involving the dummy variables $GOV[a, b)$. The alternative hypotheses are just the negation of the null hypotheses we state in the first column.

| | last link $\geq 10\%$ | | weakest link | |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| | Model 2 | Model 3 | Model 2 | Model 3 |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0, 20)$ | -0.6083 (0.5022) | | -0.8405* (0.4985) | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[20, 50)$ | -1.2335** (0.5546) | | -1.7553** (0.6627) | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[50, 100]$ | -1.3295** (0.5468) | | -0.4975 (0.4836) | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0, 20)$ | | -0.6150 (0.4964) | | -0.6571 (0.4925) |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[20, 100]$ | | -1.3012** (0.5219) | | -1.2519** (0.5183) |
| sample size | 1,827 | 1,827 | 1,827 | 1,827 |
| R^2 , within | 0.0805 | 0.0803 | 0.0881 | 0.0774 |
| R^2 , between | 0.0376 | 0.0376 | 0.0111 | 0.0401 |
| R^2 | 0.0308 | 0.0303 | 0.0058 | 0.0338 |
| hypothesis testing | | | | |
| $\mathbb{H}_0: [0, 20) \leq [20, 100]$ | | 0.0596 | | 0.0802 |
| $\mathbb{H}_0: [0, 20) \leq [20, 50]$ | 0.0553 | | 0.0401 | |
| $\mathbb{H}_0: [20, 50) = [50, 100]$ | 0.8065 | | 0.0494 | |

Table 8. Varying the maximum voting premium

We estimate the voting premium models 2 and 3 considering alternative cutoffs for excluding quarterly observations of the voting premium from the final sample: 200%, 160%, 150%, and 140%. In every regression, the voting premium is the dependent variable and the regressors of interest are the interactions of the fraction of loans from government-controlled banks, $\frac{\text{gov loans}}{\text{total loans}}$, with the dummy variables $GOV[a, b]$, which take value one if, at quarter t , firm i 's voting shares under the government's control lie in the interval $[a, b]$. We also include fixed effects and year dummies as well as the other controls in Table 4. ***, **, and * denote statistical significance at one, five and ten percent, respectively. Robust standard-errors are in parentheses. We also report the p-values of the Wald tests for restrictions on the coefficients of the interaction terms involving the dummy variables $GOV[a, b]$. The alternative hypotheses are the negation of the null hypotheses we state in the first column.

| Exclusions | Premium $\geq 200\%$ | | | Premium $\geq 160\%$ | | | Premium $\geq 150\%$ | | | Premium $\geq 140\%$ | | |
|--|-----------------------|-----------------------|--|-----------------------|------------------------|--|----------------------|----------------------|--|----------------------|---------------------|--|
| | Model 2 | Model 3 | | Model 2 | Model 3 | | Model 2 | Model 3 | | Model 2 | Model 3 | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0, 20)$ | -0.7461 (0.5208) | -0.7468 (0.5148) | | -0.5499 (0.4817) | -0.5478 (0.4747) | | -0.3493 (0.4188) | -0.3449 (0.4129) | | -0.3667 (0.4271) | | |
| -0.3581 (0.4215) | | | | | | | | | | | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[20, 50)$ | -1.3229** (0.5657) | | | -1.0545** (0.5258) | | | -0.7681* (0.4216) | | | -0.6792* (0.4067) | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[50, 100]$ | -1.3359** (0.5576) | | | -1.0186* (0.5440) | | | -0.7015 (0.4556) | | | -0.5494 (0.4145) | | |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[20, 100]$ | | -1.3321** (0.5329) | | | -1.02797** (0.5116) | | | -0.7228* (0.4221) | | | -0.5939 (0.3987) | |
| sample size | 1,832 | 1,832 | | 1,817 | 1,817 | | 1,810 | 1,810 | | 1,804 | 1,804 | |
| R^2 , within | 0.0744 | 0.0744 | | 0.0833 | 0.0833 | | 0.0781 | 0.0783 | | 0.0731 | 0.0750 | |
| R^2 , between | 0.0365 | 0.0365 | | 0.0312 | 0.0313 | | 0.0331 | 0.0321 | | 0.0254 | 0.0257 | |
| R^2 | 0.0322 | 0.0321 | | 0.0294 | 0.0297 | | 0.0339 | 0.0315 | | 0.0349 | 0.0361 | |
| hypothesis testing | | | | | | | | | | | | |
| $\mathbb{H}_0 : [0, 20) \leq [20, 100]$ | | 0.0827 | | | 0.1190 | | | 0.1312 | | | 0.1669 | |
| $\mathbb{H}_0 : [0, 20) \leq [20, 50]$ | 0.0598 | | | 0.0693 | | | 0.0670 | | | 0.0590 | | |
| $\mathbb{H}_0 : [20, 50) = [50, 100]$ | 0.9727 | | | 0.9203 | | | 0.8222 | | | 0.5609 | | |

Table 9. Quantile effects

We report the quantile regression results for the first, second, and third quartiles of the voting premia in the columns ‘Q1’, ‘median’, and ‘Q3’, respectively. We estimate the voting premium model 2 for two alternative cutoffs for excluding quarterly observations of the voting premium, namely, 180% and 300%. In every regression, the voting premium is the dependent variable and the regressors of interest are the interactions of the fraction of loans from government-controlled banks, $\frac{\text{gov loans}}{\text{total loans}}$, with the dummy variables $GOV[a, b]$, which take value one if, at quarter t , firm i ’s voting shares under the government’s control lie in the interval $[a, b]$. We also include fixed effects and year dummies as well as the other controls in Table 4. $\star\star\star$, $\star\star$, and \star denote statistical significance at one, five and ten percent, respectively. Figures in parentheses are bootstrap-based standard errors using 500 artificial samples. We display the minimum, mean and maximum values of the voting premia in three intervals. The interval of the first quartile regression ($Q1$) starts at the smallest voting premium and ends in the median voting premium. The interval of the third quartile regression ($Q3$) ranges from the median to the largest voting premium in the sample. The interval of the median quantile regression starts at the first quartile and ends in the third quartile. Finally, we report the p-values of the Wald tests for restrictions on the interaction coefficients. The alternative hypotheses are the negation of the respective null hypotheses we state in the first column.

| Exclusions | Premium $\geq 180\%$ | | | Premium $\geq 300\%$ | | |
|--|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------------|
| | Q1 | median | Q3 | Q1 | median | Q3 |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[0, 20)$ | -0.2133 (0.2532) | -0.2057 (0.2596) | -0.4674 (0.3891) | -0.1431 (0.2423) | -0.1747 (0.2806) | -0.6823 \star (0.3765) |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[20, 50)$ | -0.4319 \star (0.2671) | -0.3475 (0.2832) | -0.7508 \star (0.4115) | -0.3654 (0.2722) | -0.3932 (0.3084) | -0.9598 $\star\star$ (0.4235) |
| $\frac{\text{gov loans}}{\text{total loans}} GOV[50, 100]$ | -0.5094 \star (0.2883) | -0.5679 \star (0.2962) | -0.7514 \star (0.4262) | -0.4822 \star (0.2698) | -0.6167 \star (0.3280) | -1.1267 $\star\star$ (0.4408) |
| voting premium values | minimum | -0.8555 | -0.0690 | 0.0403 | -0.8555 | -0.0653 |
| | mean | -0.1011 | 0.0563 | 0.3522 | -0.0984 | 0.0623 |
| | maximum | 0.0401 | 0.2228 | 1.7804 | 0.0458 | 2.9692 |
| sample size | 1,827 | 1,827 | 1,827 | 2,140 | 2,140 | 2,140 |
| pseudo R^2 | 0.4892 | 0.4899 | 0.5484 | 0.4803 | 0.4931 | 0.5681 |
| hypothesis testing | | | | | | |
| $\mathbb{H}_0 : [0, 20) \leq [20, 50]$ | 0.0060 | 0.1533 | 0.0768 | 0.0621 | 0.1141 | 0.1468 |
| $\mathbb{H}_0 : [0, 20) \leq [50, 100]$ | 0.0191 | 0.0174 | 0.1381 | 0.0058 | 0.0209 | 0.0836 |
| $\mathbb{H}_0 : [20, 50) = [50, 100]$ | 0.5964 | 0.1644 | 0.9969 | 0.5092 | 0.1758 | 0.1673 |