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Abstract

There is a growing literature comparing the performance of private vs. state-owned companies. Yet, there is little work examining the effects of having the government as a minority shareholder of private companies. We conduct such a study using data for 296 publicly-traded corporations in Brazil, looking at the effects of equity purchases by the National Bank for Economic and Social Development (BNDES) on firm performance between 1995 and 2003. Our fixed-effects regressions show that BNDES's purchases of equity lead to increases in return on assets and investment in fixed assets. Finally, we find that the positive effect of BNDES' equity purchases is reduced when the target firms belong to state-owned and private pyramidal groups. Therefore, our argue that having development banks owning minority stakes can have a positive effect on performance as long as they promote long-term investments and are shielded from governmental interference and potential minority shareholder expropriation.

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Introduction

Significant efforts over the past three decades to privatize state-owned enterprises and banks around the world notwithstanding, state capitalism (i.e., large and significant state ownership of productive assets) remains widespread and is in many places increasing. Whereas some countries have seen large-scale sales of full ownership and control of formerly state-owned enterprises (SOEs), in others privatization has been more gradual, with large numbers of companies only partially sold to private parties (Bortolotti and Faccio, 2009; Pistor and Turkewicz, 1996). Today, nearly three decades after privatization was made a desirable state objective by Margaret Thatcher, the corporate landscape of the world's largest countries is populated by a mix of private and state-owned companies, in some of which governments are minority shareholders. Minority equity positions are commonly purchased as part of a bailout, but in emerging markets development banks and state-owned holding companies also invest in equity. Unfortunately, most discussion of this form of intervention deals with *whether* the state should buy minority stakes in private companies. *How* such interventions might be made to work better has been little discussed (Rodrik, 2008).

We attempt in this paper to fill this void. The process of privatization was accompanied in Brazil by the rise of a new form of indirect state ownership of corporations via equity purchases by the Brazilian National Development Bank, BNDES, through its investment subsidiary, BNDESPAR. Being responsible for executing Brazil's privatization program, the bank actively sought to form consortia with private acquirers, relinquishing majority control even in case where it provided loans and equity (De Paula, Ferraz and Iootty, 2002). BNDESPAR subsequently acquired minority equity positions in a variety of public and private firms such that, by 2004, the market value of BNDES' equity participations totaled US$ 13.5 billion, or 4% of Brazil's stock market capitalization. By 2009, BNDESPAR's holdings, albeit still accounting for 4% of stock market capitalization, were valued at US$ 53.4 billion, triggering criticism that equity purchases favored large local business groups with financial clout to execute their projects alone, without help from the development bank (e.g., Almeida, 2009).

We inform this debate by using a rich panel dataset with financial information for 296 firms traded on the São Paulo stock exchange between 1995 and 2003 to examine the effect of having BNDES as a shareholder. We use firm, year, and industry-year fixed effects and, because our temporal window includes a number of instances of privatization and corporate restructuring, also control for a variety of firm characteristics including membership in business groups, nationality, and whether a company is private or state-owned. Because BNDES held minority equity positions not only in private domestic groups, but also in foreign corporations with Brazilian subsidiaries and in state-owned pyramids, we are able to measure variations in the effect of its stakes depending on whether the companies in which it invested belonged to a public or private business group.

Our study contributes to the evolving literature on the performance effects of government ownership. Most theory and empirical work on state ownership has focused on companies that are fully owned, or at least fully controlled, by a government. Scholars have variously proposed that officials commonly use SOEs for political purposes (Shleifer and Vishny, 1994) and that the managers of such corporations have no incentive to perform or are poorly monitored (Ehrlich, Gallais-Hamonno, Liu and Lutter, 1994; Karpoff, 2001). Consistent with this view, a number of empirical studies have found SOEs to underperform private companies (Boardman and Vining, 1989; Kikeri, Nellis, and Sherley, 1992; La Porta and Lopez-de-Silanes, 1999; and, in Brazil, Anuatti-Neto, Barossi-Filho, Carvalho, and Macedo, 2005).

We would expect outcomes to be different for companies with government minority equity ownership. Organizational problems of the type found in SOEs (e.g., public bureaucrats pursuing political interests or running companies to maximize employment) may be minimal, or at least less intense, in private companies in which the government is only a minority shareholder. Evidence on the effect of minority stakes by the government, however, has been scant. The only evidence thus far of the effects of minority ownership is for partially privatized firms, which are known to perform better than state-owned, but not necessarily than private, companies (Gupta, 2005; Majumdar, 1998). Giannetti and Laeven (2009), examining public pension funds, find minority equity holdings to increase firm value, but the effect to be reduced for firms that are part of business groups. However, they focus on public pension funds instead of governmental agencies such as development banks. Other authors like de Aghion (1999), Torres (2009), and Yeyati, Micco, and Panizza (2004) have studied the role of development banks to alleviate credit constraints in developing countries, but have not examined the activities of such banks as equity owners. Because those banks can be used as a vehicle for industrial policy, providing long-term capital to support risky projects (e.g. Rodrik, 2004), our study informs the literature by examining whether and under what conditions firm performance is enhanced by development banks' minority holdings.

In fact, we find in our regressions with fixed effects a positive and significant effect of BNDES' minority equity stakes on firm performance (return on assets), which we attribute to the alleviation of capital constraints faced by publicly traded companies through improved access to equity. One possible channel of this positive effect is due to greater capacity to undertake long-term investments: our data show that having BNDES as an equity holder is positively correlated with having a higher proportion of fixed relative to total assets. The longer-term horizon and flexibility of equity, as opposed to debt, facilitate investments in dedicated industrial plants and machinery, assets that are, to a large extent, nonredeployable (e.g., Williamson, 1988). This is particularly important in emerging markets, in which firms typically face constraints in terms of equity as well as debt. In Brazil, for instance, between 1995 and 2003, average stock market capitalization to GDP was 29.8% compared to 87.4% in Chile and 133.8% in the United States. Purchasing minority shares may enable governments to not only reduce capital constraints, but also avoid the political distortions that often accompany state control of corporations (e.g., as described in Shleifer and Vishny, 1994).

Given the prevalence of pyramidal groups in emerging economies, Brazil included (Khanna and Yafeh, 2007), we control for whether BNDES invests in companies that belong to foreign, national, or state-owned business groups, and find BNDES' equity ownership in a domestic pyramidal group to yield a negative coefficient. We provide two explanations for this effect. First, if, as some scholars have proposed, groups in emerging markets create internal capital markets that substitute for the lack of external financing (Khanna and Palepu, 2000; Leff, 1978), development bank capital may be more effective when targeted at unaffiliated firms that lack that option. Second, consistent with some of the literature on pyramidal ownership structures, minority owners' equity capital may be used to bolster the performance of other companies in the group or simply be expropriated by the controlling shareholders (Bertrand, Mehta, and Mullainathan, 2002; Morck, Wolfenzon, and Yeung, 2005).

BNDES' investments in SOEs affiliated with state-owned business groups are also associated with a strong negative effect on performance. Although outright political interference of the sort commonly observed in private companies in which the government has majority control is not in evidence in companies in which it has a minority stake, capital injections into companies that belong to state-owned groups may be allocated for reasons other than efficiency. For instance, BNDES' equity can be used as to rescue an underperforming subsidiary or support politically led initiatives sponsored by the state-owned group.

Our finding that BNDES' equity purchases affect company performance positively can arguably be due to improving targeted companies' access to debt. For instance, BNDES equity purchases can come accompanied by subsidized loans from the same bank or other state banks, or they may send a positive signal to the market that now the firm has an implicit guarantee of the government, thus reducing the cost of external debt. We do not, however, find any significant effect of BNDES equity purchases on leverage (debt over total assets). All other things being equal, having BNDES as a shareholder neither increases nor decreases debt levels in any significant way. This result is consistent with allegations that BNDESPAR, BNDES' equity arm, usually operates independently not only of the bank unit responsible for debt financing, but of other government banks as well.

One important concern with our data is that we do not have a natural experiment: BNDES does not randomly select the companies in which it invests. Moreover, in recent years, officials in charge of Brazil's industrial policy have been using credit and equity purchases to create "national champions." Given the resulting potential for selection bias, we run our panel regressions using firm, year, and industry-year fixed effects controlling for a variety of firm characteristics (size, leverage, ownership, and so forth). We address the possible selection of "champions" by running conditional Logit regressions in which the presence of a BNDES stake is a dependent variable, and using as independent variables firm performance (return on assets) and other controls. That we find no evidence that BNDES selects firms with higher return on assets suggests that the direction of the effect runs from BNDES equity to performance, and not the other way.

Our paper proceeds as follows. In the next section, we provide details of the privatization process in Brazil and role of BNDES, and in the section that follows our hypotheses. Data and results are presented and discussed in subsequent sections. Our concluding remarks follow the presentation of a number of short case studies that illustrate our main quantitative findings.

Privatization and Government Minority Ownership in Brazil

State-owned enterprises have prevailed in myriad sectors in Brazil, including banking and railways, since the nineteenth century. But the state's sphere of influence increased after World War I, and more rapidly in the 1940s when the government of Getúlio Vargas inaugurated an ambitious plan of government investment in steel mills, mining, chemicals, and a wide array of other sectors (Baer, Kerstenetzky, and Villela, 1973; Musacchio, 2009). By the 1980s, when the first census of state-owned enterprises was conducted, more than five hundred companies were owned by the federal government and at least a thousand more operated by state governments (Trebat, 1983).

In the 1960s, pyramidal business groups began to be organized with ten or more state-owned enterprises in multiple sectors linked to a holding company at the top. Notorious among these groups were Eletrobras in utilities, Telebras in telecommunications, Vale Do Rio Doce in mining and logistics, and Siderbras in steel (Trebat, 1983).

A series of joint studies conducted in 1952 by the governments of Brazil and the United States concerned with investing in the expansion of Brazil's infrastructure led to the organization of a national development bank to provide long-term credit for undertaking improvements to the nation's energy and transportation networks. The National Bank of Economic Development (BNDE in Portuguese, later changed to BNDES when social development was added to its mission) assumed over the following decade other roles including financing machinery purchases in foreign currency, serving as guarantor in credit operations abroad, and lending directly to Brazilian companies (BNDES, 2002).

In the 1970s, BNDES began through different programs to invest directly in the equity of Brazilian companies. In 1982, it created BNDESPAR to manage those holdings. According to Trebat (1983), some of the equity positions held since the 1960s and 1970s were acquired when companies failed to repay BNDES' loans or as part of orchestrated bailouts.

In the early 1990s, in the midst of financial instability, hyperinflation, and high budget deficits, SOEs began to be reconsidered. For instance, the dividends paid by Vale do Rio Doce (a mining firm), the most profitable SOE, during the 1980s and early 1990s, did not cover the government's cost of capital for the company's substantial debt. Between 1988 and 1992, Vale's return on equity was between 0.5% and 5.2% against interest payments on its debt on the order of 20% per year (Pinheiro and Giambiagi, 1997).

The privatization of state-owned firms begun by the government of Fernando Collor (1990-1992) had been accelerated under Fernando Henrique Cardoso (1995-1998, 1999-2002) as part of a larger macroeconomic adjustment program aimed at reducing debt and liberalizing the economy. One way to reduce the government's debt burden being to sell SOEs and use the cash to amortize debt (or, in fact, accept government bonds as payment), between 1990 and 2002 federal and local governments collected the equivalent of $87 billion from the privatization of 165 companies.

BNDES has played three roles since the early 1990s. First, it served as an agent of the government in privatization transactions, selling and sometimes financing operations. Second, it provided loans to private and public enterprises. Third, through equity holding arm BNDESPAR, the bank purchased minority stakes in a variety of publicly traded firms. BNDES was involved in the privatization process not only to attenuate criticism that the state was losing its grip on the economy, but also, by making available substantial capital, to attract private players to the ongoing auctions. Approximately 86% of the revenues collected from privatization auctions came from block sales, acquirers typically forming consortia that included domestic groups, foreign investors, and public entities such as BNDESPAR and pension funds of state-owned companies (Anuatti-Neto, Barossi-Filho, Carvalho, and Macedo, 2005; De Paula, Ferraz and Iootty, 2002; Lazzarini, 2007).

Table 1 shows how BNDES' holdings (through BNDESPAR) increased for our sample of firms between 1995 and 2003. In each of these years, BNDES held equity stakes in from 25 to 29 companies, half being direct equity purchases rather than purchases of equity by a BNDES-owned company (i.e., indirect stakes). BNDES' direct equity stakes averaged 16%-20% of the firms' total equity. (Because pyramidal structures are complex and often involve private companies, the size of BNDES' indirect holdings is not always publicly available.) Involuntary bailouts and conversions of debt for equity notwithstanding, most of these equity holdings were part of an explicit strategy of investment management formulated by BNDESPAR analysts in tandem with the restructuring events of the 1990s. The effect of these purchases of minority equity positions on firm performance, and factors that may have motivated BNDES to provide equity capital to the firms in our database, are examined below.

<<Table 1 around here>>

Hypotheses and Methodology

Hypotheses

We begin with a simple hypothesis derived from the literature on development banks (Yeyati, Micco, and Panizza, 2004). Development of debt and equity markets in emerging and underdeveloped countries is frequently inhibited by poor legal protection and high transaction costs. Development banks can alleviate credit constraints in the private sector and promote projects with positive net present value that might otherwise not have been undertaken (Rodrik, 2004; Torres, 2009). Scholars have tended to focus on the role of debt (i.e., loans, often subsidized) provided by governmental banks. A hypothesis that follows from the literature and Williamson (1988) is that equity allocations by development banks should be particularly advantageous to firms that incur large capital expenditures to build productive fixed assets. Sufficient long-term equity will enable such firms to revamp their investments and thereby improve their performance.[1]

A selection effect may also be at play. If BNDES is selecting the best companies in which to invest, we should expect the probability of having BNDES as a new shareholder to be higher

[1] Williamson (1988) argues that investments in nonredeployable assets (such as dedicated industrial plants and machinery) are best served by equity due to the higher flexibility of this financing mode. While debt requires a fixed return over the duration of the contract, equity can better adapt to changing circumstances that might negatively affect the value of nonredeployable assets. Shareholders have more discretion to meet and discuss strategies to reorganize the company and provide a longer-term time frame for the necessary changes. To be sure, not all capital expenditures are nonredeployable, but the database we use lacks precise information on the asset profiles of our sample firms. The extent to which firms invest in fixed assets is thus taken as a proxy for the extent of nonredeployability.

when performance is good. If, as critics of industrial policy contend, governments frequently "pick winners" to artificially create "national champions," the apparent effect of governmental intervention may be spurious (e.g., Pack and Saggi, 2006). On the other hard, if managers of firms on the receiving end of BNDES' capital injections perceive their new shareholder to be able to bail the firm out if things go wrong and hence become willing to take greater risks, we should expect having BNDES as a new shareholder to be associated with lower return on assets, higher debt-equity ratios, and shorter survival rates. If BNDES does use its equity participation as a bailout tool, we should find bad firm performance to increase the likelihood of having BNDES as a shareholder. In our empirical analysis, we test for these alternative channels.

We also have reason to expect the effect of BNDES' equity to vary with ownership structure. Since Leff's (1978) original contribution, scholars have proposed that business groups (i.e., collections of firms under the same controlling entity) provide credit-constrained firms with financing opportunities that flow through internal capital markets – an effect particularly important to firms in countries in which external financing is scarce or costly (Khanna and Palepu, 2000; Khanna and Yafeh, 2007). But if capital markets internal to groups substitute for the need for external financing, we should expect development banks' equity purchases to be more effective at promoting capital expenditures and increasing firm performance when target firms are *not* affiliated to groups.

Groups may be associated, moreover, with the risk of minority shareholder expropriation. In countries with poorer protection of minority owners, equity from a development bank may be tunneled through complex pyramids to other business units or to support controlling owners' private projects (Bae, Kang, and Kim, 2002; Bertrand, Mehta, and Mullainathan, 2002). BNDES may thus add value for a business group's majority owners without necessarily improving the performance of the companies in which it invests. This effect can be particularly critical in the case of state-owned groups, in which capital allocations driven by political considerations and reasons other than efficiency (Shleifer and Vishny, 1994) may greatly attenuate the performance-enhancing effect of BNDES' equity stakes. Collectively, these arguments imply that the predicted positive effect of development banks' minority stakes, when associated with pyramidal groups, should be lower or even disappear altogether.

The Data

We create a database that tracks basic financial information and ownership for 296 Brazilian firms between 1995 and 2003. All enterprises listed in the stock market during that period for which we could collect reliable financial and ownership information are included. We analyze these firms' ownership profiles using such diverse sources as reports filed with the Brazilian Securities and Exchange Commission (Comissão de Valores Mobiliários, CVM) and Economática, Interinvest, Valor Grandes Grupos as well as by contacting some firms directly. The panel is unbalanced due to mergers, acquisitions, and business attrition.

We code both direct and indirect equity stakes. BNDES' direct equity holdings constitute a continuous variable measuring the percentage of equity held by the bank (*BNDESDir*). Our measure of indirect stakes is discrete because we do not have precise information on BNDES' equity holdings in pyramidal chains. We create a dummy variable, *BNDES*, which is set equal to one for a company among the owners of which is another company in which BNDES has equity. Following this methodology, we code as well for when BNDES owns equity in a company that belongs to a pyramid or business group.[2] We do this in order to reconstruct, by tracing the direct and indirect ownership of majority controllers among private and public firms, pyramids of ownership among Brazilian corporations (Valadares and Leal, 2000). Our coding thus enables us to control for the kinds of companies in which BNDES invests (e.g., companies that belong to pyramidal private groups, companies that belong to pyramidal state-

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[2] We focus on at most two layers of ownership, that is, cases in which BNDES participates in a firm that, in turn, has stakes in another firm.

owned groups, companies that belong to pyramidal foreign groups, and stand-alone companies).

Empirical Approach

Ideally, we would like BNDES to buy shares of Brazilian companies randomly. But BNDES buys stakes in firms that it chooses or that choose it. Consequently, we pursue a second best solution, which is to study what happens to firm performance when BNDES becomes a shareholder, using company and industry fixed effects to control for unobservable factors that might affect ownership choice and performance. We thus essentially measure change in performance over time. This is possible in our data because our period of analysis is associated with intense corporate restructuring (e.g., privatizations) and changes in corporate control. In other words, our database exhibits variation over time in firms' ownership profiles.

We employ fixed effects regressions with return on assets (*ROA*) as a measure of performance, then, in line with our prediction, check whether BNDES' equity affects firms' propensity to undertake capital expenditures (proxied by the variable *Fixed*, which is the ratio of fixed to total assets). Because BNDES' equity may also signal that debt will be repaid or be associated with loans from state-owned banks (BNDES included), or both, we also check whether the bank's minority stakes influence the extent of the loans firms can attract (*Leverage*, defined as total debt to total assets).

To test our hypotheses that the effect of BNDES' equity depends on whether the firm belongs to a group and the nature of the group, we multiply the *BNDESDir* and *BNDES* variables with dummy variables that indicate whether the company belongs to a group, and whether the group is foreign, private-domestic, or state-owned. These variables, not interacted with any other variable, are also used as controls in all the regressions. When we use *ROA* as a dependent variable, we add *Leverage* and *Fixed* as control variables; when we use *Leverage* as a dependent variable, we control for *ROA* and *Fixed*, and so on. Other control variables include ownership dummies coded for whether a firm's controlling owner is state, foreign, or domestic-private (which helps to control for ownership effects for firms that do not belong to groups), gross revenues (as a proxy for size), and year, company, and industry-year fixed effects.[3] Table 2 shows our key variables and provides some descriptive statistics.

<<*Table 2 around here*>>

We examine the selection process by performing additional regressions using *BNDES* as a dependent variable. Our goal is to determine whether *ROA*, *Leverage*, or *Fixed* is associated with the likelihood of BNDES being a minority owner. Because *BNDES* is a discrete variable and we want to control for unobservable firm-specific characteristics that may affect BNDES' choice of companies in which to participate, we adopt the so-called conditional Logit model (Chamberlain, 1980), which is a fixed-effect specification for discrete data. To check whether effects change when we consider the percentage of direct stakes held by BNDES, we run an additional OLS regression with fixed effects using *BNDESDir* as a dependent variable.

Findings

Effect of BNDES' equity on performance

We report the results of our baseline regression in specification 1 of Table 3. We observe that companies with BNDES as a minority shareholder have a return on assets 3.8 percentage points larger than other firms. This effect is positive and significant even when we control for ownership and other firm characteristics. We include interaction effects in specifications 2 and 3 to explore whether the effect of BNDES ownership varies among foreign, state, and private groups. In these specifications, the only significant effect is the interaction with state-owned groups. Consistent with our hypothesis, when BNDES buys equity in a company that belongs to

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[3] We code industries at the 2-digit SIC level because we would otherwise have few representative firms per industry. Note that our firm level fixed effects already control for (invariant) industry membership effects.

a state-owned business group, the positive effect on performance is practically neutralized (the coefficient of *BNDES* is 0.063, that of the interactive effect of *BNDES*state-owned group*, -0.067).

<<*Table 3 around here*>>

Specification 4 of Table 2 looks for a differential effect when BNDES acquires equity directly (i.e., the variable *BNDESDir*). The coefficient for the direct ownership variable is positive and large in magnitude: it implies that an increase in 10 percentage points of BNDES' direct equity is associated with an increase in the firm's return on assets by 5.89 percentage points. Thus, we have evidence that BNDES' equity participation, whether direct or indirect, has a sizeable impact on firm performance.

This effect, however, is again attenuated when BNDES participates jointly with certain types of groups. In specification 3, the positive effect of BNDES' (direct or indirect) equity, when allocated to a state-owned group, disappears and even becomes negative. In specification 4, which considers the effect of BNDES' direct equity, there is a significant negative interaction with the dummy coding private-domestic groups. Because the negative coefficient of the interaction with *state-owned* is much smaller than the coefficient of the interaction with *private-domestic*, our results are consistent with the view that political interference in state-owned enterprises may diminish or negate potential efficiency gains from BNDES' allocations. In other words, the advantage of reduced political inference accompanying a development bank's *minority* stakes may be neutralized when the bank targets companies in which the government is a *majority* owner. Our data thus suggest that a development bank's equity purchases may be more effective in the case of firms that do not belong to groups and least effective in the case of firms that belong to state-owned companies that are part of state-owned business groups.

Effect of BNDES on capital expenditures and leverage

We next examine channels through which equity purchases might affect the profitability of Brazilian companies. Our hypothesis is that BNDES ownership alleviates capital constraints, especially for companies with large capital investment needs. An alternative hypothesis is that BNDES could increase leverage in a firm in which it has bought equity by opening lines of credit (its own or from other banks). Unfortunately, during the period of our data, BNDES did not disclose the amounts lent, and companies are not required to (although some do) report BNDES loans on their balance sheets. We thus have no way to measure whether BNDES increases its loans to companies it acquires. We can test, however, whether BNDES' ownership has an effect on leverage. In specifications 5 to 7 of Table 2, we use *Leverage* as a dependent variable. Examining the coefficient of BNDES ownership, we find that the effect of having BNDES as a new shareholder is not significantly correlated with leverage. That is, BNDES does not appear, when it becomes a minority shareholder, to improve access to loans; or, if it does, companies use the new loans to repay old debt on a one-to-one basis, thereby leaving the leverage ratio unchanged.

Specifications 8 through 11 enable us to examine whether BNDES' allocations influence the extent of fixed assets (*Fixed*). Consistent with our prediction, in specifications 8 and 9 we find the correlation between BNDES' ownership and extent of fixed assets to be positive and significant, albeit only marginally so in specification 8 in which we control for whether a company belongs to a business group. Specification 8 suggests that new BNDES' (direct or indirect) purchases of equity in companies that belong to a group are correlated with lower fixed to total assets. However, according to specification 9, BNDES' equity is correlated with lower fixed assets *only* in state-owned business groups, which further supports the argument that those groups may obtain equity from the development bank for reasons other than to invest in productive assets.

Specifications 10 and 11 examine whether there is a differential effect of BNDES acquiring equity directly or through pyramids. Although there is no significant effect of *BNDESDir* on the extent of fixed assets, our results again show a strong association between BNDES' equity and reduced investment in fixed assets in state-owned groups. That the effect is large and significant further reinforces the negative effect associated with minority stakes in those groups. These stakes, when targeted at state-owned groups, appear to not only have an innocuous effect on performance, but also trigger different internal asset allocations relative to the other firms in the database.

Selection process

One way to check whether our results are driven by selection issues is to study the firm characteristics that may have driven BNDES to buy equity in a company. In particular, we examine whether company performance has any effect on the probability of having BNDES as a minority shareholder.

Specifications 1 to 3 in Table 3 show the results of our conditional logit estimates of the possible determinants of BNDES' decision to acquire equity in a company (either directly or indirectly). Note that the conditional logit model controls for fixed, unobservable firm-specific effects. That *ROA* and *Leverage* have no significant effect on *BNDES* (the dummy coded for whether the bank is a direct or indirect owner) suggests that, at least during our period of study, the bank did not use equity allocations to systematically "pick winners" or "bail out losers." We do, however, find a significant, albeit marginal, effect of *Fixed* on the probability of having BNDES as a minority shareholder, which suggests that the bank chooses firms that mandate higher capital expenditures reflected in a high ratio of fixed to total assets. As an ancillary result, we also find that BNDES tends to systematically allocate equity to foreign groups. A possible explanation is that, during the privatization wave of the 1990s, the government got involved in several consortia with foreign actors participating in the auctions (see the discussion in our second section). In other words, foreign direct investment became intertwined with state capital (De Paula, Ferraz and Iootty, 2002; Lazzarini, 2007).

Specification 4, in turn, uses the extent of BNDES' direct equity as a dependent variable. Here, we find no significant effect of any financial or ownership variable, and the overall regression model is insignificant. Thus, the available data provides no evidence that the effect of BNDES' equity on performance (Table 3) is driven purely by selection.

<<*Table 4 around here*>>

Some Illustrations

We present below some short cases to help illustrate the quantitative findings discussed in the previous session. The cases are not intended to test our hypotheses, but rather to shed additional light on the dynamics supporting our findings, especially with respect to how BNDES' allocations interact with the ownership profile of target companies.

NET (Globo Group)

Globo is a powerful media group in Brazil. Founded by journalist Irineu Marinho in 1925 with the newspaper *O Globo*, and thereafter controlled by the Marinho family, it was by the late 1990s present in television and radio broadcasting (TV Globo and Radio Globo, respectively) as well as newspapers and a number of other activities under the holding company Globopar. Indirectly through Globopar, the Marinho family held stakes in publishing and printing companies, providers of cable and satellite services, and Internet firms, among other businesses.

By 1999, the Marinho family, through Globopar's pyramid, had acquired majority control of Globo Cabo, one of the firms under Globopar, also known as NET. Minority shareholders included Bradesco (a large financial conglomerate in Brazil), RBS (another Brazilian media group), and Microsoft, which had established an alliance with Globo to exploit broadband and Internet services. To support its ambitious plans to expand broadband infrastructure in Brazil, NET had borrowed foreign money denominated in U.S. dollars. In 1999, BNDESPAR agreed to capitalize NET with the purchase of shares worth 160 million reais (around 89 million dollars). The bank had earlier provided loans to support the group's expansion (Globo had aggressively invested not only in cable services through NET, but also in newspapers and satellite broadcasting through Globosat and Sky, the latter a local joint venture with Rupert Murdoch's group).

The currency crisis that affected Brazil in the late 1990s forced a strong devaluation of the real in 1999, driving up Globo's debt and putting financial strain on Globopar and a number of its units including NET. When its market expansion proved unsuccessful, demand (number of subscribers) falling short of expectations, NET posted successive losses. In March 2002, the situation having become critical, Globo announced a capitalization plan of one billion reais (around 430 million dollars) involving the issue of debentures and public offer of shares. BNDES again agreed to contribute, anteing up 284 million reais.[4]

The bank's involvement was heavily criticized, some suggesting that it was acquiescing to the pressure of a strong domestic group and rescuing a failing corporation. Even Eleazar de Carvalho, appointed president of BNDES in December 2001, expressed concern:

> Where does this debt [of the group] come from? It comes from a financial strategy that was affected by currency devaluations … and also from inadequate market strategies. The restructuring initiatives of the company in the past were shown to be ineffective. So what would guarantee that this time things would be different?[5]

BNDES' new capital injection was made conditional on a change in NET's governance practices – which, according to Eleazar, were "the fundamentally basic and primordial element" of the problem. The company was to adhere to new standards of the São Paulo Stock Exchange that improved minority owners' voice and protection. But the financial stress persisted despite the new capitalization and the group defaulted in late 2002. This case reflects our earlier observation that BNDES' minority stakes, although instrumental in supporting new

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[4] See "Continua financiamento da Globo iniciado em 1997," *Gazeta Mercantil*, July 11, 1999; "Mídia nacional acumula dívida de R$ 10 bilhões," *Folha de São Paulo,* February 15, 2004.

[5] Interview in the newspaper article "Para BNDES, ajuda à Globo não é garantida," *O Estado de São Paulo*, March 17, 2002.

investments, can come at the cost of potential shareholder conflicts when the controlling group's decisions fail to create value.

Eletrobras

Established in 1962 to boost investments in the energy sector, state-owned Eletrobras was consolidated during Brazil's military dictatorship into a pyramidal group with subsidiaries in electricity generation (Eletronorte, Chesf, Furnas, and Eletrosul), transmission (EPTE, Furnas, and Eletrosul), and distribution (Light and Escelsa) as well as nuclear power generation (through Furnas and, later, Eletrobras Eletronuclear). Eletrobras also held investments through Lightpar, a holding company, in firms like Eletropaulo, an energy distribution firm located in the State of São Paulo.

Although with its subsidiaries it was instrumental in developing Brazil's electrical infrastructure, Eletrobras was not a particularly efficient corporation, recording a loss of 139.7 million reais (about 145 million dollars) in 1995, and incurring the following year debt to the federal government on the order of 9 billion reais. In 1999, operational problems in Furnas' nuclear power plants sharply reduced generating capacity, necessitating the purchase, at a high price, of energy from other firms to meet contractual obligations. Owing some 578 million reais for its electricity purchases, Furnas had to be rescued by Eletrobras. Concern about possible "excess costs" in Furnas' nuclear operations had been expressed two years earlier by an executive of Eletrobras, which had itself frequently been accused of governmental meddling and selecting top executives based on political criteria.[6]

Despite these problems, BNDESPAR had participated in the capital of Eletrobras and some of its subsidiaries, increasing its stake in Eletrobras from 8% to 19% between 1995 and

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[6] See "Securitization of Eletrobras debt will benefit energy sector," *Gazeta Mercantil Invest News*, November 10, 1997; "Agora, Eletrobrás quer pagar à vista dívida de Furnas com geradoras," *Folha de São Paulo*, December 28, 2000; "Eletrobras wants to measure 'true amount of excess costs'," *Gazeta Mercantil Invest News*, 29/01/1997; and "Dez anos de Petrobras e Eletrobrás," *O Estado de São Paulo*, September 16, 2007.

1996. In 1999, Eletrobras managed to solve the debt problem of another subsidiary, Light, by transferring to BNDESPAR shares worth 203.8 billion reais.[7] This case is illustrative of our quantitative finding that BNDES' stakes, when they are entangled in state-owned groups controlled by the government and used to support inefficient internal allocations, can be associated with lower firm performance.

Aracruz

Aracruz had for three decades been a leading worldwide producer of cellulose, its competitive edge derived from Brazil's abundant land and low production costs. Cellulose production typically being vertically integrated, Aracruz had investments in eucalyptus (the tree from which cellulose is extracted) farms and forest cultivation technology as well as in processing plants. Its annual revenues circa 2003 were approximately one billion dollars, and its assets totaled 3.5 billion dollars (about 65.7% fixed).[8] With 98% of production exported, Aracruz was considered a highly competitive producer with distinctive technology, especially at the farm level.

BNDES was instrumental in promoting Aracruz's initial development. With 38% of voting shares in 1975, BNDES helped fund approximately 55% of the industrial investments that enabled the firm to initiate cellulose production in 1978.[9] BNDES later sold some of its shares to domestic groups like Safra and Lorentzen. However, Aracruz was practically managed as a stand-alone firm. In 1992, to support its planned expansion, Aracruz executed a public offer of shares and pioneered the use of NYSE American Depository Shares (ADS) in Brazil. Foreign listing required that Aracruz improve transparency and control mechanisms to meet superior governance standards. Board members were given a voice in key decisions

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[7] "Brazil's Eletrobras transfers shares of Light to BNDESpar," *Bloomberg,* August 1999.

[8] From Aracruz's Annual Report and Form 20-F, submitted to the U.S. Securities Exchange Commission.

[9] From Spers, E. E., "Aracruz Celulose S.A.: uma estratégia financeira de emissão de ADRs," PENSA case study, University of São Paulo, 1997.

related to capacity expansion, acquisitions, and distribution of dividends. BNDESPAR, with approximately 11% of Aracruz's total equity, was active in the company's governance, having one representative on its board of directors.[10]

Production efficiency was substantially improved through capital expenditures supported by the new capitalization program in the 1990s. Aracruz's processing capacity jumped from 400 thousand tons of cellulose per year in 1978 to 1,070 thousand tons in 1994 and 1,240 thousand tons in 1998. The ambitious expansion plan approved by the board in 2000 triggered some 800 million dollars in new capital expenditures between 2001 and 2003, 75% allocated to industrial processing plants and 20% to investments in land and forest technology. The case of Aracruz therefore illustrates how the equity of BNDES and other investors was used to boost productive fixed investments in a context in which improved governance practices helped mitigate expropriation by minority shareholders.

Conclusion

This paper examines minority equity purchases by development banks as a way to pursue industrial policy in developing economies. We find a positive and significant effect of BNDES' minority equity stakes on firm performance (return on assets). We interpret this result as a sign that having the development bank as a shareholder alleviates capital constraints faced by publicly traded companies. One channel of this positive effect is apparently improved capacity to undertake long-term investments. The positive effect on performance is neutralized, however, when firms in which BNDES holds equity are associated with business groups, especially state-owned and private-domestic groups. The negative interaction is particularly strong in the case of state-owned groups, in which internal allocations may be driven by reasons other than efficiency. Our results thus suggest that a development bank's minority stakes can

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[10] "BNDES explains director's position in Aracruz," *Gazeta Mercantil Invest News*, Abril 24, 1997.

positively affect performance to the extent that they are able to promote long-term investments and are shielded from governmental interference and potential minority shareholder expropriation.

The policy implications of our study are straightforward. Some scholars contend that development banks' actions tend to have distortionary effects in any economy. They can affect monetary policy, distort private credit markets, and generate moral hazard by facilitating access to credit by firms with ill-considered projects or bailing out ailing industries. Our evidence suggests, however, that development banks' purchase of equity stakes in publicly traded corporations may not be problematic depending on the governance profile of the target firm. Particularly in the context of poorly developed capital markets, government-backed, long-term equity can promote capital expenditures needed to achieve the efficiency gains. The potential for political distortions associated with government ownership are attenuated in the case of BNDES because its minority holdings leave other investors and managers to be the key actors in the private companies in which it invests. Only when it injects capital into pyramidal groups (especially domestic and state-owned ones) does BNDES' equity participation tend to be associated with negative effects. In such cases, the capital injections apparently either become unnecessary (perhaps because of the existence of internal capital markets) or are tunneled through the pyramid to support inefficient allocations.

Our results thus suggest that policy makers considering minority equity stakes as an industrial policy tool avoid pyramidal groups with poor governance and focus investments where there is a clear need to undertake productive capital expenditures by well-run private firms unable to finance these investments through existing capital markets.

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Table 1. Equity stakes by BNDESPAR, 1995-2003

Year	Number of BNDESPAR's equity stakes (direct or indirect)	Number of BNDESPAR's direct equity stakes	Average direct equity purchase as a percentage of total equity
1995	23	12	16%
1996	17	11	19%
1997	25	14	15%
1998	23	14	12%
1999	29	14	19%
2000	28	15	20%
2001	28	16	17%
2002	23	13	19%
2003	23	10	20%

Source: Compiled by the authors from data on publicly traded corporations. See the methodology section for further details. Indirect stakes occur when BNDESPAR participates in pyramidal ownership structures (e.g., BNDES owns Valepar, which in turn owns Vale).

Table 2. Variables and descriptive statistics

Variable	Description	Mean	Std. Dev.
ROA	Net profit over total assets	-0.071	0.763
BNDES	Dummy variable equal to 1 if BNDES is a direct or indirect owner of the firm	0.100	0.300
BNDESDir	Fraction of the firm's equity that is directly owned by BNDES (0 to 1)	0.010	0.047
Belongs to a group	Dummy variable equal to 1 if the firm belongs to some group	0.467	0.499
Foreign group	Dummy variable equal to 1 if the firm belongs to a foreign group	0.128	0.334
State-owned group	Dummy variable equal to 1 if the firm belongs to a state-owned group	0.029	0.168
Domestic group	Dummy variable equal to 1 if the firm belongs to a private-domestic group	0.310	0.463
Gross revenues	Gross revenues of the firm (billion dollars)	0.638	2.078
Leverage	Total debt over total assets	0.754	2.545
Fixed	Fixed assets over total assets	0.343	0.251
Foreign	Dummy variable equal to 1 if the firm is foreign-owned	0.192	0.394
State-owned group	Dummy variable equal to 1 if the firm is state-owned	0.079	0.270

Table 3. The effect of BNDES's equity on return on assets, leverage, and extent of fixed assets

Variables	ROA	ROA	ROA	ROA	Leverage	Leverage	Leverage	Fixed	Fixed	Fixed	Fixed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
BNDES ownership											
BNDES (direct and indirect stakes - dummy)	0.038**	0.063**	0.063**		0.004	-0.005		0.055**	0.052*		
	[0.017]	[0.026]	[0.027]		[0.069]	[0.068]		[0.027]	[0.027]		
BNDESDir (direct stakes only - percentage)				0.589***			0.117			0.074	0.092
				[0.178]			[0.741]			[0.122]	[0.176]
Group dummies											
Foreign group			-0.056	-0.06		-0.076	-0.082		-0.065		-0.078
			[0.078]	[0.082]		[0.174]	[0.183]		[0.052]		[0.049]
State-owned group			-0.042	-0.044		-0.268	-0.228		0.014		0.033
			[0.073]	[0.075]		[0.294]	[0.289]		[0.064]		[0.067]
Belongs to a group	0.045	0.055	0.081	0.09	0.216	0.278	0.3	0.023	0.052	0.039	0.066**
	[0.039]	[0.041]	[0.068]	[0.073]	[0.211]	[0.258]	[0.275]	[0.026]	[0.033]	[0.026]	[0.031]
Interactions with group dummies											
BNDES*group		-0.05			-0.038			-0.048*			
		[0.036]			[0.118]			[0.028]			
BNDES*foreign group			-0.045			0.025			-0.043		
			[0.045]			[0.086]			[0.036]		
BNDES*state-owned group			-0.067*			-0.084			-0.153**		
			[0.040]			[0.116]			[0.076]		
BNDES*domestic group			-0.048			-0.033			-0.032		
			[0.049]			[0.149]			[0.032]		
BNDESDir*foreign group				-0.09			0.263				-0.227
				[0.226]			[0.868]				[0.211]
BNDESDir* state-owned group				-3.831***			1.816				-6.139***
				[1.216]			[2.876]				[1.648]
BNDESDir*domestic group				-0.499*			-0.481				0.079
				[0.276]			[1.088]				[0.269]
Controls											
ROA	N	N	N	N	Y	Y	Y	Y	Y	Y	Y
Gross revenue	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Leverage	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y
Fixed	Y	Y	Y	Y	Y	Y	Y	N	N	N	N
Ownership dummies (foreign, state, etc.)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year, industry, industry-year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Constant	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,793	1,793	1,793	1,702	1,793	1,793	1,702	1,793	1,793	1,702	1,702
Number of firms	296	296	296	291	296	296	291	296	296	291	291
p (F test)	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Adjusted R-squared (panel)	0.083	0.084	0.081	0.077	0.042	0.039	0.031	0.242	0.245	0.22	0.224

*** p < 0.01 ** < p < 0.05 * p < 0.10. Robust standard errors in parenthesis

Table 4. Factors affecting the likelihood that BNDES will be a minority owner

Variables	BNDES Conditional logit (1)	BNDES Conditional logit (2)	BNDES Conditional logit (3)	BNDESDir OLS with fixed effects (4)
ROA and interactions				
ROA	-0.104	0.567	0.471	0.002
	[0.645]	[1.239]	[1.202]	[0.002]
ROA*Belongs to a group		-1.095		
		[1.048]		
ROA*Foreign group			-4.739	0.003
			[7.075]	[0.005]
ROA*State-owned group			-62.469	0.120
			[68.960]	[0.110]
ROA*Domestic group			-0.927	-0.001
			[0.986]	[0.006]
Group dummies				
Foreign group			14.099***	0.003
			[1.677]	[0.005]
State-owned group			3.115	0.006
			[4.345]	[0.041]
Belongs to a group	0.350	0.353	-0.145	0.002
	[1.050]	[1.031]	[1.619]	[0.010]
Financial variables				
Gross revenues	-0.626	-0.068	0.095	-0.001
	[0.611]	[0.607]	[0.509]	[0.001]
Leverage	-1.058	-1.096	-1.102	0.000
	[0.772]	[0.819]	[0.835]	[0.000]
Fixed	4.116*	4.146*	4.232*	-0.007
	[2.375]	[2.413]	[2.426]	[0.012]
Controls				
Ownership dummies (foreign, state, etc.)	Y	Y	Y	Y
Year and firm fixed effects	Y	Y	Y	Y
Observations	1,746	1,746	1,746	1,702
Number of firms	295	295	295	291
p (Wald test)	< 0.001	< 0.001	< 0.001	
p (F test)				0.873
Pseudo R-squared	0.122	0.125	0.140	
Adjusted R-squared (panel)				0.002

*** p < 0.01 ** < p < 0.05 * p < 0.10. Robust standard errors in parenthesis.