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The effects of privatization on the capital structure of Brazilian firms

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ABSTRACT

This article investigates the effects of privatization under Brazil's National Privatization Program during the 1990s on companies' capital structure. Our model suggests that privatized firms increased their market leverage by 10 to 14% on average relative to the level before privatization. The effect of privatization on book leverage level was 8 to 12% on average. These results indicate a positive effect of the privatization process on the levels of leverage of privatized firms, as predicted by signalling and agency theories.

Keywords: Capital structure, leverage, privatization, signalling.

Subject classification codes: G30, G32, L33.

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I. INTRODUCTION

Between 1990 and 2002 the federal and state governments in Brazil privatized 68 state-owned companies, which generated more than seventy billion dollars in revenues. This wave of privatizations was followed by the creation of ten regulatory agencies. This movement in the direction of a more private-run economy was part of a strategy to increase the efficiency of the Brazilian economy and reduce public debt.

We took advantage of this privatization process in Brazil to measure how the capital structure of firms was affected by privatization. Changes of firm ownership are a significant changes that certainly affect the competitive environment, so it is natural to ask whether and how the capital structure evolves in response to such a change.

The theoretical arguments in favour of privatization are based on the welfare theorems. Under certain circumstances, the private sector will drive the economy to an efficient allocation of resources. If the privatization of Brazilian companies happened under such circumstance, these gains in efficiency in the production of goods and services should have increased the value of the privatized firms.

Ross (1977) showed that a change in the capital structure of firms can be a way to signal the market that the firm is more efficient and has a higher value. The mechanism is relatively simple: privatized firms become more efficient, their projects have higher quality, and they are safer, more profitable and less likely to face political risks (Myers, 2001; Miller, 1991). Under private ownership, managers choose riskier projects (with higher returns), and firms choose a more leveraged capital structure, to signal the quality of these new projects.[1]

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[1] Leverage measures are an indirect way to measure efficiency gains from privatization. More direct measures, like productivity and profitability, also help to measure the effects of privatization. See Anuatti-Neto et al. (2005) and Pinheiro (1996), for example.

Additionally, as a consequence of privatization, agency problems emerge (Berle and Means (1932)). To minimize corporate governance problems, firms may choose to increase leverage levels and so drive managers away from less profitable projects (Jensen and Meckling, 1976; Shleifer and Vishny, 1989; Harris and Raviv, 1991).

This article investigates the effects of the privatizations under the National Privatization Program (PND) during the 1990s in Brazil on the capital structure of the privatized firms. We built our sample using all publicly traded non-financial companies listed on the São Paulo Stock Exchange (BOVESPA) from 1988 to 2009. The sample is restricted to companies with annual data available in the Economatica database that had firm-year observations for the period. Our final sample consists of 4,718 firm-year observations.

We take advantage of privatization as an experiment and use a difference-in-difference specification to compare the change (before and after privatization) in the market leverage and book leverage of treated companies (private and privatized firms) with the corresponding change in control companies (never-privatized state-owned firms). Our results show that the average effect of privatization was to increase both market and book leverages. Our model suggests that, after controlling for firms and time fixed effects, a privatized firm increased its market leverage by 10 to 14% on average relative to its level before privatization. The effect of privatization on book leverage was 8 to 12%. These results indicate a positive effect of the privatization process on the levels of leverage of privatized firms, as predicted by the theory.

The remainder of this paper is organized as follows. The next section describes the privatization processes in Brazil since 1990. The data set, descriptive statistics, and the empirical strategy are presented in Section III, and the results are presented in Section IV. Section V concludes.

II. PRIVATIZATION IN BRAZIL

The National Privatization Program (PND) was one of the first Brazilian government initiatives intended to reduce the presence of the state in the economy. It was part of a national strategy to increase the efficiency of the economy and reduce public debt. [2]

Between 1990 and 2002, 68 companies were privatized in more than 10 different sectors, generating over than 70 billion dollars in revenues[3]. Many privatized companies were from infrastructure sectors (energy, telecommunications, etc.). Because most of these companies were public monopolies, whereby the government exerted regulatory power directly through ownership, after the opening to private investors, the government created a series of regulatory agencies, among them the National Telecommunications Agency (ANATEL) and the National Electric Energy Agency (ANEEL). The PND was the most significant privatization program in the history of Brazil.

III. DATA AND EMPIRICAL STRATEGY

Our sample contains firm-specific fiscal-year-end data on publicly traded non-financial companies listed on the BOVESPA from 1988 to 2009. The sample is restricted to companies with annual data available in the Economatica database that had firm-year observations for the period and no missing data for the following variables: market equity, total debt, assets, EBITDA and fixed assets. Our final sample consists of 4,718 firm-year observations.

In order to analyse the effects of privatization on the capital structure of these companies, we constructed the variables market leverage (total debt/(market equity + total debt) and book leverage (total debt/total assets).

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[2] Created by the Federal Law 8031/1990.

[3] Source: Brazilian Central Bank.

We used two definitions of leverage as a way to account for possible distortions caused by different accounting procedures or extreme changes in firms' market valuations. Additionally, we normalized the fixed assets (fixed assets/total assets), divided the EBITDA by ten million, and used total assets in logs instead of in levels. In each year, companies were divided into private (private =1) and state-owned companies (private = 0). When a firm was privatized, it was re-categorized as private.

We take advantage of our panel-data format and use a difference-in-difference estimator.[4] First, we use the difference-in-difference specification to compare the change (before and after privatization) in the market leverage and book leverage of treated companies (private and privatized firms) with the corresponding change in the control companies (never-privatized state-owned firms). The model can be written in regression form as:

$$y_{it} = \alpha_i + \gamma_t + \beta(d_i^M \times d_{iit}^P) + \sum_j \Phi_j X_{jit} + \epsilon_{it} \qquad (1)$$

The dependent variable y_{it} is the market or the book leverage of company i in year t. The regressors include a fixed effect for each company, α_i, a fixed effect for each year, γ_t, the interaction of a variable indicating whether the firm is or became private, d_i^M, and an indicator of whether it is the post-privatization period, d_{iit}^P. There are also a series of control variables (X_{jit}'s) that vary over time and across firms, such as fixed assets, size, and profitability. The firm fixed effects control for firm-specific factors that are constant over time, while the year fixed effects control for factors that vary over time but are common across all companies - both treatment and control. The coefficient β is the difference-in-difference estimate of the impact of privatization on market or book leverage.

[4] See Banerjee, Gertler and Ghatak (2002) for an example of a very similar approach.

Our difference-in-difference model assumes that treated and control companies would show the same dynamic in their leverage measures in case no intervention (privatization) had happened, i.e., the control group represents the true counterfactual for the treated. While it is not possible to test this counterfactual assumption directly, we can check the pattern of the market and book leverages of both groups of firms (treated and control) before the privatization period. If they present the same dynamic across time, we cannot reject the hypothesis that our control group is a good counterfactual.

To analyse the dynamics of these leverage measures before the beginning of privatization, we regressed the change in the market and book leverages ($\Delta y_{it} = y_{it} - y_{it-1_i}$) on a dummy variable that was equal to one if the firm was treated and on year dummies. The results are presented in Table 1.

In both cases we cannot reject the null hypothesis that treated and control companies have the same dynamic in their market and book leverage levels before intervention. Hence, we can assume that treatment and control companies faced very similar capital structure dynamics before privatization took place. We can then proceed with our difference-in-difference method to test if privatization affected the companies' choices of capital structure.

IV. RESULTS

We estimated a basic difference-in-difference model with company and year fixed effect and time-varying controls for market and book leverage levels (Equation 1). Due to the differences in the size, profitability, and tangibility of assets of the firms in our treatment and control groups, we also estimated our model in using two sub-samples as a robustness check. We ran our model conditioning the firms from the treatment group to be bigger than the smallest firm from the control group - sub-sample (2) - and

having size (total assets), profits (EBITDA), and fixed assets bigger than the smallest firm from the control group - sub-sample (3). The estimates from the difference-in-difference models for market leverage are presented in columns 1, 2, and 3 in Table 2. Analogously, columns 4, 5, and 6 present the results when the dependent variable is book leverage.

The average effect of privatization was to increase both market and book leverages. Our model suggests that a privatized firm increased its market leverage between 0.047 and 0.062, or about 10% to 14%, relative to its level before privatization. The effect of privatization over book leverage level was to increase it between 0.033 to 0.053 points, or 8% to 12.7%.

These results indicate a positive effect of the privatization process on the levels of leverage of privatized firms, which is in line with the predictions of signalling theory and agency costs theory. Under private ownership, managers may choose riskier projects (with higher returns) and firms would choose a more leveraged capital structure, to signal the quality of these new projects. Also, firms tend to choose to increase leverage levels to discipline managers.

V. CONCLUDING REMARKS

The present article measured how the capital structure of Brazilian firms changed as a consequence of privatization. We used a sample of all publicly traded non-financial companies listed on the BOVESPA from 1988 to 2009 and estimated a difference-in-difference specification to compare the change in the market leverage and book leverage of treated companies (private and privatized firms) with the corresponding change in the control companies (never-privatized state-owned firms). Our results suggest that after controlling for firm and time fixed effects a privatized firm increases its market leverage by about 10 to 14% and its book leverage by about 8 to 12% relative to the level before

privatization. These results are robust to restrictions in the size of the firms in the sample and are in line with signalling and agency costs theories.

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