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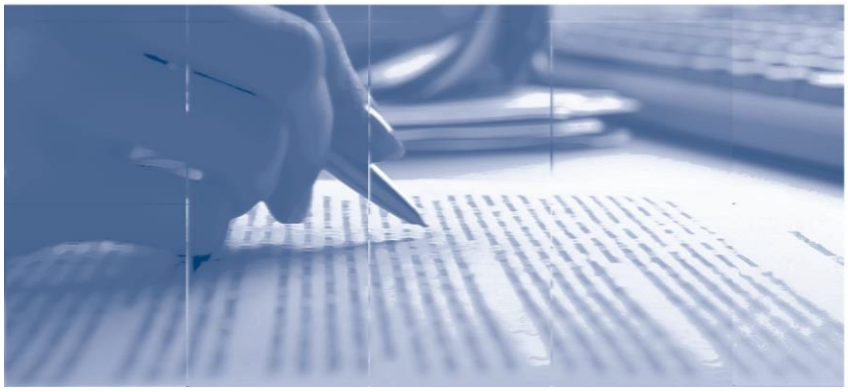

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Investment of Firms in Brazil: Do Financial Restrictions, Unexpected Monetary Shocks and BNDES Play Important Roles?*

Fernando N. de Oliveira**

Abstract

The Working Papers should not be reported as representing the views of the Banco Central do Brasil. The views expressed in the papers are those of the author(s) and do not necessarily reflect those of the Banco Central do Brasil.

Our objective in this paper is to estimate the dynamics of firm investment in Brazil. For this purpose, we built an original database with confidential and public data containing balance sheet and financial information of 5,026 public and private firms from the third quarter of *994 to the fourth quarter of 2010. We then classify these firms as financially restricted or not, according to several classification schemes found in the literature. Our results show that unexpected monetary policy, financial restrictions and Brazil´s development bank, BNDES, financing policies are very important to explain the dynamics of investment in Brazil. Our results are robust to several model specifications, econometric techniques and classifications schemes of financially and non-financially restricted firms.

Keywords: Investment, Unexpected Monetary Shocks, Firms Financially Restricted, BNDES

JEL Classification: E50, G30, G32

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1. Introduction

Investment of firms is one of the most important topics in economics.[1] There is a vast literature that has been studying this topic for a long time. It evolved from the neoclassical theory (see, for example, Tobin (1969) or Hayashi (1982)) to more recent developments, which focus on the relations between financial frictions and investment (see, for instance, Kaplan and Zingales (1997), Fazzari et al (1998) and Campello et al (2013)).

The great majority of empirical contributions to this literature are related to OECD countries. In these countries, real interest rate is relatively low and stable, and there are developed capital and credit markets. However important as they may be, financial restrictions should play a relatively less important role in these economies than in emerging market ones. In these, cost of capital is higher and credit and capital markets are much less developed. [2]

Take an emerging economy like Brazil for instance. Brazil is an important emerging market, with still high levels of capital cost, in which credit restrictions should play a very important role to explain the investment of firms.

In the more modern empirical literature that studies firm investment, the usual modeling approach is to include in a reduced form model financial variables that indicate some form of financial restrictions as explanatory variables alongside some variable related to the neoclassical model, such as Q of Tobin.

One can understand this modeling strategy for OECD countries because of their historical low levels of interest rate and relatively stable monetary policies (see Mishkin (1996)). However, not including as explanatory variables those that give some indication of monetary stance for emerging economies looks as a very important misspecification of these models.

[1] Investment is capital expenditure, CAPEX.
[2] Mishkin (2001) discusses credit conditions and financial policies in emerging markets.

In the specific case of Brazil, there is also another important feature. Brazil´s development Bank, BNDES, supplies most of the long term credit for investment in Brazil, as it is well known. Therefore, omitting this information from the model of investment of Brazilian firms may hamper its estimation and interpretation significantly.[3]

Our objective in this paper is to estimate a model that can describe better the investment of private and public firms in Brazil, taking in consideration these particularities, cited above, of Brazil´s financial and credit market. In the process, we will estimate the responses of investment of firms in Brazil to unexpected monetary policy, financial restrictions and to BNDES financing.

To achieve our objectives, we use an original and confidential database composed of unbalanced balance sheet and financial information of 291 public firms and 4,735 private firms. Of the private firms, 102 disclose quarterly information while all the others disclose only end of the year information.[4] The information of the public firms comes from *Comissão de Valores Imobiliários* (CVM) and Economatica and the information of the private firms comes from *Valor Econômico* and from confidential data of SERASA and *Gazeta Mercantil*. [5,6]

Our results show that the responses of investment to unexpected monetary shocks and financial restrictions are relevant in Brazil. We also find strong empirical evidence that BNDES, Brazil´s development bank, financing policy is also very important to explain

[3] See Lazarini et al (2012) for an interesting analysis of BNDES financing policies in Brazil in recent years.
[4] All public corporations disclose quarterly balance sheet information. We use their consolidated balance sheet information.
[5] SERASA is a privately held company that has one of the largest databases of financial and accounting information of firms and individuals in the world. The data is related to debt of firms and individuals in Brazil. The information of SERASA is provided to banks, to trade shops, small, medium and large companies, with the goal of giving support to credit decisions and thus make business more cheap, fast and reliable. The data from SERASA goes from 1998 to 2007, and is both quarterly and annual.
[6] The data from Gazeta Mercantil is annual and goes from 1998 to 2007 and is based on the balance sheet information of private firms published in this newspaper. The information from Valor Econômico is annual and goes from 2008 to 2010 and is based on the balance sheet information available on the 1000 Maiores Empresas publication.

this dynamics. Our results are robust to several model specifications, classification schemes of financially restricted and non restricted firms and econometric techniques. Because asymmetric information prevents interest rates and securities prices from fully adjusting to allow firms to undertake all desired investment, internal finance and interest expense constrain investment directly, rather than indirectly through financial effects on firms' cost of capital. [7] If financial restrictions are important, this implies that the supply of investment finance is not perfectly elastic for firms that face asymmetric information problems in capital markets.[8]

Athey and Fazzari (1987) point out that if a firm has enough cash flow from existing operations to finance its investment internally, it can avoid the external capital market, where it may be rationed. Thus, the availability of internal finance enhances a firm's ability to invest. Furthermore, internal finance is important for firms that must seek external funding in capital markets subject to rationing.

Fazzari, Hubbard and Petersen (hereafter FHP) (1988) link the neoclassical models of investment to findings from the research on market imperfections, such as contract theory and models of adverse selection and moral hazard. The authors extend the neoclassical model based on Tobin's Q including the cash flow of the firm to capture the sensitivity of investment to changes in its capital structure. The main findings indicate that there is a significant relationship between investment and changes in the levels of cash flow of a firm.

One difficulty with this approach is parameter stability both across firms and over time. To try to remedy this problem, Kaplan and Zingales (hereafter KZ) (1997) took a different approach from FHP to classify firms in financially and non-financially constrained. They show that firms they classify as constrained do indeed have the

[7] Hubbard (1998) in his review on the studies of the investment and market imperfections derives a partial equilibrium model for investment suggesting that corporate executives have access to privileged information on relevant issues of the firm at levels much higher than shareholders and creditors and that this information asymmetry lead to potential problems of adverse selection and moral hazard.

[8] There is a large body of microeconometric studies that has provided some evidence of an impact of external finance constraints on investment. For example, Whited (1992), Bond and Meghir (1994), and Klapper and Love (2004) show that including financial constraints in an investment Euler equation will improve its fit.

characteristics one would associate with external finance constraints. They have high debt to capital ratios, and they appear to invest at a low rate, despite good investment opportunities. However, using the index coefficients on a much larger sample of firms in a different time period leaves open the question of whether this index is truly capturing financial constraints.[9]

As suggested by Jensen and Meckling (1976) and Myers and Majluf (1984), the existence of moral hazard and adverse selection problems hamper the ability of constrained firms to raise external funds. Accordingly, in comparing to financially unconstrained firms, investment of constrained firms would be more dependent on internal cash flow even in the periods of overvaluation. In other words, constrained firms are financially less flexible to react to mispricing.

Jensen and Meckling (1976) show that conflicts of interest and costly monitoring of managerial actions may induce external fund providers to charge a higher rate of return. This may compensate the monitoring costs and potential moral hazard problems. In the same spirit, Myers and Majluf (1984) show that adverse selection problems may lead to a gap between internal and external funds. The difference in the effective relative cost of internal and external funds makes the availability of internal funds relevant.

We believe that our findings are consistent with the view that the credit and financial market in Brazil have many imperfections, sometimes related to high capital costs, sometimes related to undeveloped stock market. Thus, the problems faced by Brazilian companies to obtain credit from financial institutions have significant negative impacts on their investment demands.

Our paper is related to the literature on the macroeconomic effects of financial constraints. Theoretical works such as Bernanke and Gertler (1989), Calstrom and Fuerst (1997), and Kiyotaki and Moore (1997) argue that under asymmetric information, agency costs force firms to use collateral to borrow capital in the credit market. The value of collateral thus limits the extent to which a firm can finance its

[9] Furthermore, one of the variables in the KZ index is Tobin's q, which, as shown in Erickson and Whited (2000), contains a great deal of measurement error.

investment projects through external funds. Because adverse macroeconomic shocks typically reduce collateral values, financially constrained firms are forced to cut back on investment more than unconstrained ones. Gertler and Gilchrist (1994) and Bernanke, Gertler, and Gilchrist (1996) support this idea by finding evidence that small firms reduce their economic activity sooner and in a more pronounced way than large firms in response to adverse macroeconomic shocks.

Our paper also contributes in several manners to the literature. We explicit the importance of monetary policy and BNDES for investment of firms in our empirical specifications; we do an in-depth classification of Brazilian firms from financially restricted to non financially restricted using several criteria; we use a new criteria of classification based on the estimation of the External Finance Premium (EFP) using state space models, following Oliveira (2012); finally, due to our original and unique database of private and public firms, we think that we can gauge much better the differences in the dynamics of investment and even financing of Brazilian firms.
The rest of this paper is organized as follows. In Section 2, we describe the data. In section 3, we present our classification of financially restricted and non restricted firms and the identification of unexpected monetary policy shocks. In section 4, we present the empirical analyses. In section 5, we conclude.

2. Data

We built an original and confidential database of an unbalanced panel of balance sheet information of 291 public firms and 4,735 private firms from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information while all the others disclose only end of the year information.[10] The information of the public firms comes from Comissão de Valores Imobiliários (CVM) and Economatica and the information of the private firms comes from Valor Econômico and confidential data of SERASA and Gazeta Mercantil.

The definition of Q of Tobin follows FHP (1988). The Q of Tobin is:

[10] All public corporations disclose quarterly balance sheet information. We use their consolidated balance sheet information.

$$Q = \frac{(V + B - N)}{K} \qquad (1)$$

V, B e *N* ,K correspond, respectively, to market share of firms stocks, debt, inventories and stock of capital at the beginning of the period.[11]

The variable cash flow in turn was calculated as the sum of net income of the firm (after interest and taxes) and all deductions levied on non-financial revenue, as depreciation and amortization.

Panel A of Table 1 shows the number of firms in our database separated in private and public. As one can see, the services sector is predominant for public firms (13.40%), and private firms (23.00%).

Panel B of Table 1 shows financial characteristics of all firms separated by sectors of the economy. As one can verify, the sector with the highest average of Q of Tobin is the Chemical and Petroleum sector (1.13), while the ones with highest average of Cash Flow/Assets and Leverage are Services (0.16) and Mining and Metalurgy (0.68) respectively.

Panel C of Table 1 shows financial characteristics of firms separated in quarterly and annual data. Firms with only quarterly data are on average bigger, more profitable, invest more and distribute more dividends than firms with only annual data. We also do a mean test of the averages of these series, that we not report due to space restrictions, that confirm these observations.

Panel D of Table 1 presents information about outstanding loans of firms in our sample of firms with BNDES during our sample period. As one can see, there are 106 firms (21.09%) with outstanding loans. Most come from the food and beverages sector

[11] Hubbard (1998, p.27) discusses the main problems of using average Q of Tobin as a proxy for marginal Q .

(16.98%).[12] Finally, Panel E Table 1 shows a correlation matrix of some of the variables used in our empirical analysis.

In the following section, we show how we classify firms with respect to their access to the financial markets using several classification schemes as well as how we identify unexpected monetary shocks. For the latter, we use the SELIC rate as our main measure of monetary contractions and the Boshen-Mills (1995) index as our second alternative measure.

3. Classification Scheme of Financially Restricted Firms and Identification of Monetary Shocks

3.1 Classification of Financially Restricted Firms

A firm is classified as financially constrained if its cost of external funds well exceeds its cost of internal funds (Kaplan and Zingales (1997)). A large literature examines the impact of capital market imperfections on corporate behavior. In this literature, the standard empirical approach (and the one we will follow in this paper) is to gather archival data and use indirect metrics such as asset size, ownership form and credit ratings among others to characterize a firm as either financially constrained or unconstrained. [13]

Our main empirical analysis employs five proxies of financial constraints, namely: (a) dividend payout ratio (FHP (1988)); (b) book value of total assets (Gilchrist and Himmelberg (1995) and Almeida et al. (2004)); (c) the KZ (1997) index (Almeida et al. (2004); (d) the Whited and Wu (WW) (2006) index and one based on a state space estimation of the external finance premium (EFP) using Kalman Filter, following Oliveira (2012). Below, we discuss in details each one of our proxies.

[12] To obtain the information on BNDES we looked at off balance sheet information of public firms as well as information disclosed on the homepage of BNDES at the Internet.
[13] Campello et al (2010) in a more recent paper directly ask whether a company´s operation are "not affected" somewhat affected or very affected by difficulties in accessing the credit markets. They ask firms in the United States and Europe.

3.1.1 Size

We take size, measured by total assets, as one of our classification criteria following Gertler and Gilchrist (1994). We observe that size is highly correlated with other financial variables that indicate the capacity firms have to access the financial markets. We classify firms in small and large. We will show that our small firms have relatively less access to the financial markets than large corporations.

Our interest in separating firms in large and small ones is that, as Gertler and Gilchrist (1994) point out, by doing this we can infer the level of access to the financial markets of the corporations. In theory, small firms will depend much more on bank loans than large firms. The latter will also issue more short and long term debt and have more inventories.

In the case of firms with quarterly information, we consider a possible candidate for being small, a firm whose logarithm of total assets is less or equal to the 30^{th} percentile of the distribution of total assets in all quarters of our sample periods. In a similar fashion, we consider a possible candidate for being a large firm, one whose logarithm of total assets is greater or equal to the 70^{th} percentile in all quarters of our sample periods. By doing this, we obtain 92 small firms and 58 large firms.

In the case of firms with yearly information, we consider a firm small if its logarithm of total assets is less or equal to 30^{th} percentile in all years of our sample period. A firm is large if its logarithm of total assets is greater or equal to 70^{th} percentile in all years of our sample period. By doing this, we obtain 78 large firms and 153 small firms.

Panel A of Table 2 lists some descriptive statistics of financial characteristics of small and large firms with quarterly data. We have 58 non restricted and 92 restricted firms. As we can easily verify, large firms have greater long and short-term debt in average than small firms. Large firms also have more fixed assets and net operational revenues as a percentage of total assets. Finally, 20 large firms have outstanding loans at BNDES compared to only 8 small firms.

Panel B of Table 2 shows the small and large private firms with only end of the year information. There are 108 non restricted and 181 restricted firms. As one can easily verify, non financially restricted firms have greater long and short-term debt in average than financially restricted firms. Non financially restricted firms also have more fixed assets and net operational revenues as a percentage of total assets. Finally, 16 non financially restricted firms have outstanding loans at BNDES compared to only 7 of financially restricted firms.

3.1.2 Dividends

Following FHP (1988), firms are classified into constrained and unconstrained groups according to their dividend payout ratio. Non-dividend paying firms are classified as financially constrained because financially constrained firms tend not to pay dividends (or to pay lower dividends) to avoid the need to raise external funds in the future.

We classify a firm using this criterion as financially restricted or non financially restricted when the payout ratio is lower than the 30^{th} percentile or above the 70^{th} of the cross section distribution of payout ratio in all quarters or years respectively of our sample.

Panel A of Table 3 lists some descriptive statistics of some financial characteristics of financially restricted and non financially restricted firms with quarter data. We have 127 non restricted and 168 restricted firms. As we can easily verify, non-financially restricted firms have greater long and short-term debt in average than financially restricted firms. Non-financially restricted firms also have more fixed assets and net operational revenues as a percentage of total assets. Finally, 32 non-financially restricted firms have outstanding loans at BNDES compared to only 7 of financially restricted firms.

Panel B of Table 3 shows the financially restricted and non financially restricted private firms with end of the year information. We have 70 non restricted and 513 restricted

firms. Again, as one can easily verify, non financially restricted firms have greater long and short-term debt in average than financially restricted firms. Non financially restricted firms also have more net operational revenues as a percentage of total assets. Finally, 20 non financially restricted firms have outstanding loans at BNDES compared to only 5 of financially restricted firms.

3.1.3 Kaplan and Zingales (KZ) (1997) Index

Kaplan and Zingales (KZ) (1997) challenge the conclusions made by FHP (1988). They provide contrary evidence, suggesting that firms with easier access to external funds rely more on internal funds for financing investment. KZ claim that managers, in financially restricted firms, are overly risk-averse in their investment decisions. Therefore, the level of investment becomes less elastic to the availability of internal funds. [14]

We follow KZ (1997) classification scheme and use both subjective and objective criteria. We rank firms on an ordinal scale, five groups, from least- to most-obviously financially constrained. Then, we estimate an ordered regression which relates our ranking to the following variables: Q, leverage, cash flow/total assets, cash balances, dividends/total assets and a dummy that indicates that the firm had an outstanding loan with BNDES in our sample period. Thus, the parameters estimated of this regression allow us to create a synthetic "KZ index" of financial constraints for a non financially restricted sample of firms.[15]

[14] Kaplan and Zingales (1997) re-examine the relationship using the same sample of Fazzari et al. (1998). They re-classify the level of financial constraints based on quantitative and qualitative information obtained from company annual reports and generate a more comprehensive measure of financial constraints, namely the *KZ* index. They show that financially constrained firms display weaker investment-cash flow sensitivity. They argue that their result is due to managerial risk aversion: the managerial risk aversion within financially constrained firms is relatively high and so such managers tend to underinvest. This view is supported by Cleary (1999) who documents consistent result in the US and Cleary (2004) who also documents consistent findings in his cross-country analysis. Cleary (1999, 2004) argue that financially constrained firms display lower investment-cash flow sensitivities because they are devoted to accumulating financial slack which provides long-term value as suggested by Myers and Majluf (1984).

[15] See Lamont, Polk and Saa-Requejo (2001).

To build our index, we collect, in the case of public firms, financial statements, notes of financial statements, information on bankruptcy, and information from the department of investors of the firm. In the case of private firms, we use our balance sheet information only.

The first group contains firms that we think are non-financially restricted. We place a firm in this category if the firm initiated or increased the payout ratio, repurchased stock or if its cash reserves were above the 70^{th} percentile in every quarter or year of our data sample or an outstanding loan with BNDES.

The second group includes firms that we label more likely not to be financially restricted. These firms tend to have sizeable cash reserves, unused lines of credit and high interest coverage. So in this category, a typical firm would have as quantitative measures interest rate coverage and cash reserves between the 60^{th} and 70^{th} percentile in our database and possibly an outstanding loan with BNDES

The third group includes firms that we find difficult to classify as either financially or non financially constrained. Frequently, these firms face an adverse product market environment but are not explicitly strapped of cash. This category also includes firms which provide contradictory indications of their financial situation. These firms would tend to have sizeable cash reserves, unused lines of credit and high interest coverage. In terms of quantitative measure, we put a firm in this category if it its cash and interest rate coverage was between the 50^{th} and 60^{th} percentile in all quarters or years of our cross section distribution and if the firm did not present any outstanding loan with BNDES.

The fourth group includes firms that we consider more likely to be financially restricted. These firms do not tend to have sizeable cash reserves unused lines of credit and high interest coverage. Firms in this category would have measures interest rate coverage and cash reserves between the 30^{th} and 50^{th} percentile in our database and no outstanding loan with BNDES.

The fifth group contains firms we think are undoubtedly financially restricted. We place a firm in this category if the firm that declared bankruptcy in our data sample period, have been cut out of their usual source of credit, are renegotiating debt payments or declare that they are forced to reduce investments because of liquidity problems. In more quantitative measures, the firm would experience its cash and interest coverage ratio below the 30^{th} percentile in all quarters or years of our data sample and no outstanding loans with BNDES.

Panel A of Table 4 presents the results of the estimated ordered equation. As one can easily see the estimated coefficients have the appropriate signs and are all statistically significant for quarterly data: the positive one are Q of Tobin, cash flow/assets and BNDES; the negative one is leverage coefficient. Interesting to note the sign and statistical significance of BNDES coefficient, which is another evidence of the importance of BNDES for investment in Brazil.

We consider a firm as non restricted if the predicted KZ is below the 30^{th} percentile and -financially restricted if it is above the 70^{th} percentile in all quarter or years of our sample period.

Panel B of Table 4 lists mean, median and standard deviation values of some financial characteristics of financially restricted and non financially restricted firms with quarterly data using the predicted KZ. We have 78 non restricted and 182 restricted considering this classification. As we can easily verify, non-financially restricted firms have greater long and short-term debt in average than financially restricted firms. Non-financially restricted firms also have more fixed assets and net operational revenues as a percentage of total assets. Finally, 36 non financially restricted firms have outstanding loans at BNDES compared to only 06 financially restricted firms.

Panel C of Table 4 shows the financially restricted and non financially restricted private firms with end of the year information. We have 52 non restricted and 105 restricted firms. As we can easily verify, non financially restricted firms have greater long and short-term debt in average than financially restricted firms. Non-financially restricted

firms also have more fixed assets and net operational revenues as a percentage of total assets. Finally, 26 non financially restricted firms have outstanding loans at BNDES compared to only 7 financially restricted firms.

3.1.4 Whited and Wu (WW) (2006) index

Instead of using traditional tests for financial constraints based on regressions of Tobin and cash flow as in FHP (1988), the Whited and Wu (WW) (2006) index is constructed based on a structural model which avoids the measurement errors associated with Tobin Q.

The WW index excludes Tobin Q as an explanatory variable and, instead, incorporates six variables which most likely affect the financial status of firms: ratio of cash flow to total assets (CashFlow); dividend dummy variable equal to 1 if the firm pays dividend (DIV); total debt to total assets ratio (Leverage) and natural log of total assets (Size). We include in this set of variables, due the particularities of Brazil´s financial market the dummy BNDES, that is one when the firm had an outstanding loan with BNDES during our sample period and zero when this does not happen.

The WW index is higher for more constrained firms and lower for less unconstrained firms. Whited and Wu (2006) state that their index performs better than the KZ index for at least three reasons. First, the coefficient estimates of Kaplan and Zingales (1997) are based on an analysis of only 49 firms from 1970 to 1984. As such, the KZ index may not fully capture the financial status of firms in a larger and more comprehensive sample and over a different time period. Second, the KZ index includes Tobin Q as one of the variables which contains significant measurement error. Third, firms which are classified as constrained by the WW (KZ) index tend to be financially restricted (unrestricted), underinvested (overinvested) and have unrated (above average rated) bonds.[16]

[16]Our WW index for Brazil was built by estimating with Generalized Method of Moments (GMM) the same structural equation estimated by Whited and Wu (2006) did, with the same assumptions for the dynamics of the stochastic discount factor and lagrange multiplier. In the case of the discount factor, Whited and Wu (WW) (2006) adopted a reduced-form specification for the stochastic discount factor, using the three-factor model of Fama and French (1992); in the case of the lagrange multiplier, because it

Panel A of Table 5 shows the GMM estimation of the WW index. As one can see, the index is positively correlated with leverage and negatively related with cash flow, dividends, size, sales growth and BNDES. [17]

We use the distribution of estimated values of this equation to discriminate between financially restricted and non financially restricted firms. We consider a firm to be financially restricted in the sense of the WW index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 20^{th} percentile in all quarter or years of our sample period respectively.

Panel B of Table 5 lists descriptive statistics of some financial characteristics of financially restricted and non financially restricted using WW. There are 59 non restricted and 103 restricted. As one can easily verify, non-financially restricted firms have greater short-term debt in average than financially restricted firms. Non-financially restricted firms also have more fixed assets and net operational revenues as a percentage of total assets. Finally, 28 non-financially restricted firms have outstanding loans at BNDES compared to only 06 of financially restricted firms.

Panel C of Table 5 shows the financially restricted and non financially restricted firms with end of the year information There are 48 non-financially restricted firms and 98 financially restricted firms. Finally, 32 non-financially restricted firms have outstanding loans at BNDES compared to only 07 of financially restricted firms.

3.1.5 EFP

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is non observable it was parameterized by the following variables: ratio of the long-term debt to total assets, is an indicator that takes the value of one if the firm pays dividends; firm sales growth: natural log of total assets; ratio of cash total assets; ratio of cash flow to total assets; in the case of public firms the number of analysts following the firm and a dummy variable equal to 1 if the firm has outstanding loans with BNDES.

[17] Our instruments include all of the Euler equation variables, as well as inventories, depreciation, current assets, current liabilities, the net value of the capital stock, and tax payments, all of which are normalized by total assets. We also include three extra variables found by Fama and French (2000) to be good predictors of profitability: the ratio of dividends to total assets, average profitability over the previous three quarters, and a dummy if profitability was positive in time t – 1.

Our final classification scheme is based on Oliveira (2012). Oliveira estimates the external finance premium (EFP) which is a non observable variable using a state space approach. EFP is the state of the model and is different for each firm. The Kalman filter is the smooth Kalman filter of this state.

We use the distribution of estimated values of this equation to discriminate between financially restricted and non financially restricted firms. We consider a firm to be restricted in this case restricted if the estimated values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period.

Panel A of Table 6 lists financial characteristics of financially restricted and non financially restricted firms for the whole sample relative to its assets. We have 65 non restricted and 96 restricted firms. As we can easily verify, non financially restricted firms have greater short-term debt in average than financially restricted firms. Non financially restricted firms also have more fixed assets and net operational revenues as a percentage of total assets. Finally, 36 non financially restricted firms have outstanding loans at BNDES compared to only 9 of financially restricted firms.

Panel B of Table 6 shows the financially restricted and non-financially restricted private firms with end of the year information separated by the sector of the economy they belong to. We have 58 non restricted and 198 restricted firms. As we can easily verify, non-financially restricted firms have greater short-term debt in average than financially restricted firms. Non-financially restricted firms also have more fixed assets and net operational revenues as a percentage of total assets. Finally, for firms with quarterly information 36 of non-financially restricted firms have outstanding loans at BNDES compared to only 9 financially restricted firms. Finally, for firms wiyh annual information, 32 non-financially restricted firms have outstanding loans at BNDES compared to only 5 of financially restricted firms.

3.2. Identification of monetary shocks

After having classified firms in financially restricted and non-financially restricted, we now move to explain how we define an unexpected monetary shocks. We document the reactions of firms in Brazil with respect to monetary contractions. We consider monetary contractions because we think they are much more relevant to understand the effects of monetary policy on firms in Brazil than monetary expansions.[18]

A prerequisite for all our tests is a good indicator of monetary policy. However as Bernanke and Mihov (1998) point out there is no consensus in the literature as to the best indicator of monetary stance. We decide to use two measures to indicate monetary contractions: the SELIC nominal rate and the Boshen-Mills (1995). [19]

Bernanke and Blinder (1993) advocate that the interest rate set by the Central Bank in its open market operations is a good indicator of monetary policy except in periods where the interest is very volatile, which was not the case in Brazil in our sample period (that goes from the fourth quarter of 1999 to the fourth quarter of 2007).

We use the quarterly series of the effective nominal SELIC rate. SELIC rate is a nominal interest rate that the Central Bank of Brazil sets as its target in open market operations. The selection of SELIC nominal rate follows Gertler and Gilchrist (1994).

We define a monetary contraction by looking at the first difference of nominal SELIC rate. A monetary contraction occurs in the quarter in which we observe that the first difference of the nominal SELIC is greater than the mean of the series plus one standard deviation. Panel A of Table 7 shows descriptive statistics of the series of the first difference of the SELIC nominal rate in several sub samples periods. Using this criteria,

[18] The reason for this is our economic history of high inflation rates and even hyperinflation in some periods. This makes the inflation memory in Brazil more important than in other countries. As a consequence, the Central Bank of Brazil is more prone to intervene rising interest rates to curb inflation.

[19] Bernanke and Mihov (1998) propose another form of identifying monetary shocks, in particular monetary contractions. They build a flexible VAR model that nests previous VARs based on more specific assumptions about FED´s monetary policy, such as funds rate target, and non-borrowed reserves target. The methodology is useful for calculating high frequency monetary shocks or as indicator of the overall stance of monetary policy.

we observe 2 monetary contractions for nominal SELIC rate. They occur in the following quarters: fourth quarter of 1997 and fourth quarter of 1998.

Our second methodology of identifying monetary is related to the Boshen-Mills (1995) index. Boshen and Mills read the Federal Open Market Committee, FOMC, documents and classify monetary contractions in five categories: strongly expansionary, mildly expansionary, neutral, mildly contractionary, and strongly contractionary. The classification is based on relative weights they perceived the FED put on the short-term tradeoff between inflation against unemployment.

To build Boshen-Mills (1995) index for Brazil we read all COPOM documents and other official documents related to the interest rate decision and for each document classified monetary policy in one of the five categories mentioned above. Panel B of Table 7 details the results of our classification. We identify four COPOM meeting that can be categorized as strongly contractionary. These meetings were: fourth quarter of 1997, the fourth quarter of 1998, and the second quarter of 1999 and in the fourth quarter of 2002.

After describing our sample of financially and non financially restricted firms as well as our monetary contractions, we proceed to our empirical analysis in the next section.

4. Empirical Analysis

Our main empirical analysis is based on the estimation of reduced form investment equation (2) below for all our classification schemes. In this equation, the dependent variable is CAPEXit/Assetsit. As explanatory variables, we have Qtit , where Q of Tobin defined as in equation (1); CFit/Assetsit , where CF is cash flow divided by lagged book assets; FRi is a dummy variable equal to 1 is the firm is financially restricted and 0 otherwise; Shockt is equal to 1 if there is an unexpected monetary contraction in t and 0 otherwise; BNDESi is equal to 1 if the firm had outstanding loans

with BNDES during our sample period and ai is the cross section fixed effect. The Hypothesis concerning the error are: $E[\varepsilon_{it}|X] = 0$ e $Var[\varepsilon_{it}|X] = \sigma 2$.[20]

$$\frac{Capex_{it}}{Assets_{it}} = \beta_0 + \beta_1 \frac{Cashflow_{it}}{Assets_{it}} + \beta_2 Q_{it} + \beta_3 Shock_t$$
$$+ \beta_4 \left(FR_i . Shock_t \frac{Cashflow_{it}}{Assets_{it}} \right) + \beta_5 \left(BNDES_{it} \right) + \beta_6 FR_i$$
$$+ \beta_7 \left(FR_i . \frac{Cashflow_{it}}{Assets_{it}} \right) + \beta_8 \left(Shock_t . \frac{Cashflow_{it}}{Assets_{it}} \right) + \qquad (2)$$
$$\beta_9 \left(BNDES_{it} . FR_i \frac{Cashflow_{it}}{Assets_{it}} \right) + \beta_{10} \left(BNDES_{it} . FR_i \right) + \beta_{11} \left(Shock_t . FR_i \right)$$
$$+ \beta_{12} \left(BNDES_{it} . \frac{Cashflow_{it}}{Assets_{it}} \right) + a_i + e_{it}$$

Following the modern literature on investment, the coefficient of $CF_t/Assets_{t-1}$ as well as Q_{it} should be positive and statistically significant and the coefficient of FR_t alone should be negative and interacting with $CF_t/Assets_t$ should be positive and statistically significant in both cases. Additionaly, we want to test if the coefficients of $Shock_t$ alone is negative and interacting with FR and $CF_t/Assets_t$ is positive and statistically significant. Finally, we would like to test if the coefficients related to the BNDES variables are positive and statistically significant. [21]

[20]We followed Brambor et al (2006) and included all possible interactions between the regressors FR, BNDES and Shock.

[21] Regardless of the true economic process at the foundation of investment demand, the supply of low-cost finance, and therefore the level of internal cash flow, enters the reduced-form investment equation of firms for which internal and external finance are not perfect substitutes. In view of the longstanding debates in the literature over the appropriate specification of the model's demand side, we examine three broad empirical specifications that encompass the most common approaches: models based on q that emphasize market valuations of the firm's assets as the determinant of investment, sales accelerator models in which fluctuations in sales or output motivate changes in capital spending, and neoclassical models that combine measures of output and the cost of capital to explain investment demand. The most extensive tests of alternative specifications and estimation techniques are presented for the q model. These tests lead to similar conclusions for the other models.Most of the literature, however, derives the fundamental model of FHP (1988) looking for evidence of other variables in the explanation of financial investment. Fazzari and Petersen (1993) investigate the role of working capital as the first option to balance the levels of investment firms in the presence of financial constraints. Already Bond and Meghir (1994) deepen the theme of the effects of cyclical shocks in demand by analyzing the sensitivity of investment with respect to the availability of domestic financing in response to exogenous shocks. Carpenter, Fazzari and Petersen (1994) analyze the sensitivity of inventory production in response to

Equation (2) extends very standard regressions in investment theory (see FHP (1988) or KZ (1997), among many others). It encompasses the neoclassical theory of investment with the inclusion Q of Tobin. It also includes the more recent theory that studies financial restrictions by the including cash flow and a dummy variable indicating financial restrictions as regressors. Due to Brazil particularities, as we discussed before, we include additional regressors, related to unexpected monetary contraction shocks and to the financing of investment policies by BNDES.

If information problems in capital markets lead to financing constraints on investment, they should be most evident for the classes of firms that retain most of their income. If internal and external finance are nearly perfect substitutes, however, then retention practices should reveal little about investment by the firm. Firms would simply use external finance to smooth investment when internal finance fluctuates.

The current state of literature on the subject suggests that the results in favor of the proposed methodology by FHP(1988) reveal significant evidence of a strong relationship between investment and cash flow supporting the hypothesis of a hierarchy of capital. This methodology seeks to test investment models adapted traditional market imperfections on sets of samples divided by criteria chosen a priori.[22]

Some of the literature, however, derives the fundamental model of FHP (1988) looking for evidence of other variables in the explanation of financial investment. Fazzari and Petersen (1993), for example, investigate the role of working capital as the first option to balance the levels of investment firms in the presence of financial constraints.

It is important to mention the work of Ness and Esteves Filho (2005). They investigate the possibility of financial constraints to investment in a sample of Brazilian companies

changes in capital structure and Calomiris, Himmelberg and Wachtel (1994) investigate the characteristics of firms issuing debt commercial paper.

[22] There are at least two problems in measuring Q that might affect the econometric results for cash flow. First, to the extent the stock market is excessively volatile, Q may not reflect market fundamentals. Second, the replacement capital stock in Q may be measured with error. In some of our robustness tests, we will deal with these problems.

traded using the fundamental model of FHP (1988) including working capital as an independent variable.

Other articles in turn sought to demonstrate the inability of neoclassical model showing its weaknesses. Blundell et al (1992) analyze the extent to which neoclassical investment models using Tobin's Q framework provide empirical representative for the investment decisions of firms in general. The results suggest a high sensitivity of the Q indicator to errors of measurement and its specification (Q criticism that would be based on very strong assumptions). Furthermore, the authors conclude that these restrictions compromise the use of the average Q as a proxy for marginal Q.

Almeida et al (2004) model the demand for liquidity of a company in order to develop a new test of the effect of financial constraints on decisions of investment financing of companies. The effect of financial constraints is captured by the firm's propensity to save in the form of cash accumulation. They estimate empirically the sensitivity of cash flows to the cash resources of the manufacturing companies during the period 1971-2000 and find support for his theory.[23]

Before estimation, we did panel unit root tests of all the variables in equation (2), with the exception of the ones including dummies, and rejected unit root for all of them. We did a Haussman test in all estimations. Estimation was performed using randon effects for all types of classification of financially restricted firms criteria. We used White cross section to correct for heterocedasticity. We also did several Wald tests to confirm the relevance of financial restrictions, unexpected monetary contractions and BNDES for investment in Brazil.

Panels A, B of Table 8 present the results of estimation of equation (2) for firms with quarter and annual data. The coefficients have the expected sign and are in most cases statistically significant. As one can see by the sign of the FR coefficient, financial

[23] D`Espalier et al (2008) evaluate two commonly used models for discriminating between restricted and non-restricted financially. They compare the method of cash flow sensitivity of investment and cash flow sensitivity of cash resources to firms. They show evidence of the superiority of models who choose restricted financial firms as those more sensitive to investment.

restrictions play a relevant role to explain investment. Controlling for other regressors, the negative effect of the dummy financial restrictions on $CAPEX_{it}/Assets_t$ varies from 2% to 6%. If we sum the coefficient of a monetary shock with the coefficient of financial restrictions, we get that on average investment in relation to assets decrease between 5% and 10% on average. The BNDES effect is also statically significant to explain investment, varying from 2% to 10%. Firms that are financially restricted in the presence or not of a monetary shock and that have access to BNDES observe on average a smaller decrease in their investment than restricted firms that do not have access to BNDES.

For all our classification classifications of financially restricted or non financially restricted firms, average Capex/Investment is less than 10%, as we showed above in section 3.1. Therefore, financial restrictions, monetary shocks and BNDES financing seem to be very import in explaining investment in Brazil in recent years.

In terms of marginal effects, the unexpected monetary shock interacted with FR increases the sensitivity of investment to cash flow, as one verify by the correspondent Wald test. The inclusion of BNDES in this interaction has the effect of decreasing this sensitivity and is also statically significant.

We did several robustness tests.[24] In a first attempt to test our previous results, we estimated equation (2) for constrained and non constrained firms with quarter and annual data. Therefore, we excluded from equation (2), the dummy FR.

Panels A, B of Table 9 present the results of estimation of equation (2) for constrained and unconstrained firms with quarterly data respectively. As one can see, in the case of unconstrained firms the coefficients of unexpected shocks are statistically significant, but less relevant than the coefficients related to shock variable in the case of constrained

[24] In all our robustness tests, we did, as before, panel unit root tests of all the variables in equation (2), with the exception of the ones including dummies, and rejected unit root for all of them. We did a Haussman test in all estimations and in all of them we did not reject fixed effects. We used cross section white to avoid problems of heterocedasticity. We also did several Wald tests to confirm the relevance of financial restrictions, unexpected monetary contractions and BNDES for investment in Brazil.

firms. Once again, BNDES participation is positive and relevant statistically both on average and on the margin for constrained and unconstrained firms alike.

In a second attempt to test the robustness of our results, we used the lag of investment ($CAPEX_t/Assets_t$) as a regressor. Eberly et al (2012) document the importance of lagged investment in addition to cash flow and Q of Tobin to explain investment.

Estimation was performed using two stage least squares, with the second lag of investment in relation to assets as our instrument. We used White cross section to correct for heterocedasticity. Panels A, B of Table 10 present the results of estimation of equation (2) for quarterly and annual data. The coefficients of lagged investment are negative and statistically significant, suggesting a mean reversion behavior of investment. Moreover, all the other results are similar to the ones we obtained in the main estimation presented in Table 8.

In a third attempt to look at the robustness of our results, we considered a classification criteria which defines a restricted firm only if it is also defined as restricted in all other criteria. We called this criteria intersection.

Panel A of Table 11 lists financial characteristics of financially restricted and non financially using the intersection criteria for quarter data. We have 18 non restricted and 29 restricted firms. As we can easily verify, non-financially restricted firms have greater long debt in average than financially restricted firms. Non-financially restricted firms also have more fixed assets and net operational revenues as a percentage of total assets.

Panel B of Table 11 lists financial characteristics of financially restricted and non financially using the intersection criteria for quarter data. We have 27 non restricted and 43 restricted firms. As we can easily verify, non-financially restricted firms have greater long and short-term debt in average than financially restricted firms. Non-financially restricted firms also have more fixed assets as a percentage of total assets.

Panel C of Table 11 presents the results of estimation of equation (2) for quarter and annual data. The coefficients have the right sign and are statistically significant. This confirms the relevance of financial restrictions, unexpected monetary shocks and BNDES for investment in Brazil.

In a fourth attempt to gauge the robustness of our previous results, we investigated the influence of economic crises on financial constraints in accessing credit. We ponder that economic shocks over the business cycle of a country would be amplified due to worse conditions in the credit market. These adverse conditions would be motivated in turn by agency problems and commensurate with the inefficiency of the local market. We consider as financial crisis the following: Mexican crisis (1995Q4), Asian Crisis (1997Q3), Russia crisis (1998Q4), Election crisis in Brazil (2002Q3) and Subprime crisis (2007Q4). We created a quarter and annual dummy for each one of these crises an included this dummy in equation (2). The results, presented in Panels A and B of Table 12, confirm once more our previous results.

These results indicate that in periods of economic crisis, amplifying macroeconomic shocks tend to restrict the general credit market. This restriction would be explained mainly by the increase of the premium charged by the financing institutions for the decision to take risks in periods of economic turmoil. In such periods, the agency costs are also amplified by higher charges on the risk exposure.

In a fifth attempt to test our results, we include in equation (2) several other regressors that could be very correlated to financial restrictions and could well explain investment, in line with accelerator models in which fluctuations in sales or output motivate changes in capital spending. These variables are: leverage, sales, growth of sales and cash reserves. Panel A and B of Table 13 show the results of estimation of equation (2) with the inclusion of these variables for quarter and annual data. The coefficients have the right sign and are statistically significant. This confirms once again the relevance of financial restrictions, unexpected monetary shocks and BNDES for investment in Brazil.

We did several other robustness tests, whose results we do not present due to space restrictions. Some of them were: we estimated several other specifications, changed the cutoff percentile of our financially and non restricted classification from 70^{th}(30^{th}) to 80^{th}(20^{th}) percentile; used current assets instead of lagged assets; used only firms with complete data in our sample period, that is a balanced panel; included a time fixed effect in our panel estimation; estimated equation (2) with two stage least squares, using as instruments for Q of Tobin leverage, sales, cash reserves and EFP; and estimated equation (2) using different sample periods. In general terms, our results did not change. They point to the relevance of financial restrictions, unexpected monetary contractions and BNDES for investment of private and public firms in Brazil.

As is common knowledge, the effects on the corporate cash squeeze on economic behavior depend largely on the ability firms have to smooth the drop in cash flows by borrowing. Firms that have relatively poor access to credit markets may have to respond to declining cash-flows by cutting investment, while firms with good access to credit will face less financial stress.

We think that unexpected contractionary monetary policy caused the balance sheet of constrained firms to deteriorate due to a reduction in their revenues and asset prices. A reduction in revenues meant a lower capacity to use internal financing which is very relevant for these firms. A reduction in asset prices reduced the value of their collateral. In these circumstances, loans may not have been rolled over upon maturity or may have been prematurely recalled. As a result, these firms may have been forced to use up cash to meet their obligations. When they ran short of cash they might have been forced to raise additional funds by selling assets. This could have led them to fire sales, depressing asset prices even further. These effects reduced their net worth. Lower net worth meant that small firms had less collateral to pledge against their loans and so these firms potential losses from agency problems were higher.

Non-financially restricted firms in Brazil, which are more likely to obtain loans from the BNDES, respond to an unanticipated decline in cash flows in a different manner from small firms. They can at least temporally be able to maintain their levels of production

and employment in the face of higher interest costs and declining revenues through other sources of short-term and long-term financing. However, this is not the case for small firms. These firms, which have more limited access to the financial markets, tend to lose inventories and revenues and to cut work hours and production.

5. Conclusion

This paper analyzed empirically corporate investment in the presence of market imperfections, unexpected monetary shocks and BNDES financing by applying an extending an empirical model derived from FHP (1988).

Our main empirical analysis employs five proxies of financial constraints, namely: (a) dividend payout ratio (Fazzari et al. (1988)); (b) book value of total assets (Gilchrist and Himmelberg (1995) and Almeida et al. (2004)); (c) the Kaplan and Zingales (1997) index (Almeida et al. (2004) and Hovakimian and Hovakimian (2005)); (d) the Whited and Wu (2006) index and one index based on a state space estimation of the external finance premium (EFP), using Kalman Filter, following Oliveira (2012).

Our results show that the relationships of investment to unexpected monetary shocks and financial restrictions are relevant in Brazil. We also find strong empirical evidence that BNDES, Brazil´s development bank, is also very important to explain the dynamics of investment.

Our results are robust to several model specifications, classification schemes of financially restricted and non restricted firms and econometric techniques. They are also impressive. In almost all our estimations, the coefficients have the sign that economic theory would predict and they are also statistically and economically significant.

Additionally, this paper investigated the influence of economic crises for the dynamics of investment. Regarding them, our results indicate that the decrease in the levels of credit in periods of crises affected in general the demand of business investment in Brazil.

These differences in access to financial markets between firms more and less financially constrained in Brazil have many possible reasons. Among them we can mention: bankruptcy legislation that makes it difficult for lenders to resume lending; the high spreads that prevail in Brazil, especially for companies with tighter credit and long-term financing for investment coming primarily from the BNDES, which is easier for large companies, in principle, those that are less financially constrained.

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Table 1. Descriptive Analysis of the Database

Our sample is composed of 291 non-financial public corporations and 4,735 private firms. Our sample period goes from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information as well as yearly information while all the others disclose yearly information only. The information on the public corporations comes from the Brazilian Securities and Exchange Commission (CVM), and Economatica and the information on the private firms comes from Valor Econômico and confidential information from SERASA and Gazeta Mercantil. Panel A shows the number of firms in our database separated in private and public. Panel B shows financial characteristics of all firms separated by sectors of the economy. Panel C shows financial characteristics of firms separated in quarterly and annual data. Panel D presents information about outstanding loans of firms in our sample of firms with BNDES during our sample period. Finally, Panel E shows a correlation matrix of some of the variables used in our empirical analysis.

Panel A Total Number of Firms Classified by type (private or public) and sectors

	Public	Private
Chemical/Petroleum	36	273
Foods and Beverage	40	90
Mining/Metalurgy	8	31
Eletrical/Eletronic	14	92
Transportation	18	268
Public Services	30	91
Textile	35	75
Services	39	1,110
Others	71	3,815
Total	291	4,735

Panel B Financial Indicators by Sectors of the Economy

	N	Log(Assets)	Net Operational Revenues/Assets	Q	Cash Flow/Assets	Leverage
Chemical/Petroleum	309	19.01	0.64	1.13	0.07	0.43
Food and Beverages	130	18.14	0.49	0.89	0.08	0.31
Mining/Metallurgy	39	18.17	0.39	1.12	0.13	0.68
Electro/Electronic Equipment	106	18.21	0.52	0.95	0.091	0.34
Public Services	121	19.04	0.32	1.01	0.12	0.63
Textiles	110	18.42	0.58	0.73	0.15	0.48
Services	1,149	11.35	0.28	0.72	0.16	0.34
Others	3,886	10.01	0.66	0.68	0.19	0.26
Total	5,026					

Panel C Financial Characteristics of Firms Separating by Quarterly and Annual Information

	Quarterly Data (A)				Annual Data (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	393	18.31	18.05	4.19	4735	17.17	17.05	3.51
Operational revenues/Assets	393	0.68	0.6	0.85	4735	0.36	0.18	0.58
Financial Expenses/Assets	393	0.19	0.18	0.35	4735	0.19	0.19	0.42
Fixed Assets/ Assets	393	0.47	0.53	0.46	4735	0.36	0.36	0.83
Short-term Debt/Assets)	393	0.68	0.65	0.91	4735	0.49	0.17	0.15
Long-term Debt/Assets	393	0.23	0.19	0.17	4735	0.09	0.12	0.13
Capex/Assets	393	0.076	0.082	0.01	4735	0.067	0.068	0.14
Q	393	1.35	1.39	0.21	4735	1.23	1.58	0.03
Cash Flow/Assets	393	0.13	0.124	0.32	4735	0.1	0.12	0.05
ROA	393	0.15	0.13	0.11	4735	0.1	0.14	0.001
Payout ratio	393	0.27	0.24	1.46	4735	0.18	0.23	0.53
BNDES Loans	62				44			

Panel D BNDES Loans Outstanding during Sample Period

Sector	Number of Firms
Foods and beverages	18
Retail	7
Construction	6
Electro-electronics	3
Industrial Machinery	3
Mining	4
Non-metallic minerals	0
Pulp and paper	5
Oil and gas	6
Chemical	11
Metallurgy and steelmaking	11
Textile	9
Transportation	6
Vehicles and Spare Parts	3
Agriculture and fisheries	0
Others	17
Total	106

Table 2 Classification of Financially and Non-financially Restricted Firms: Size

Our sample is composed of 291 non-financial public corporations and 4,735 private firms. Our sample period goes from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information as well as yearly information while all the others disclose yearly information only. The information on the public corporations comes from the Brazilian Securities and Exchange Commission (CVM), and Economatica and the information on the private firms comes from Valor Econômico and confidential information from SERASA and Gazeta Mercantil. We classify a firm as being large when its logarithm of its total assets is above the 70th percentile in all quarters or years of our sampling period. We classify a firm as small when the logarithm of its total assets is below the 30th percentile in all quarters or years of our sampling period. Panel A of Table 2 lists some descriptive statistics of financial characteristics of small and large firms with quarterly data. Panel B of Table 2 shows the small and large private firms with only end of the year information.

Panel A Quarterly Data

	Non Restricted (A)				Restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	58	18.31	18.05	4.19	92	17.17	17.05	3.51
Net Operational Revenues/Assets	58	0.68	0.6	0.85	92	0.36	0.18	0.58
Financial Expenses/Assets	58	0.19	0.18	0.35	92	0.19	0.19	0.42
Fixed Assets/Assets	58	0.47	0.53	0.46	92	0.36	0.36	0.83
Short-term Debt/Assets	58	0.68	0.65	0.91	92	0.49	0.17	0.15
Long-term Debt/Assets	58	0.23	0.19	0.17	92	0.09	0.12	0.13
Capex/Assets	58	0.082	0.079	0.001	92	0.054	0.051	0.001
Q	58	1.06	1.04	0.003	92	0.47	0.37	0.023
Cash Flow/Assets	58	0.153	0.162	0.002	92	0.121	0.132	0.003
BNDES Loans	20				8			

Panel B Annual data

	Non restricted (A)				Restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	108	11.87	11	3.51	181	8.32	8.7	4.76
Operational revenues/Assets	108	0.61	0.42	2.65	181	0.31	0.47	0.49
Financial Expenses/Assets	108	0.15	0.05	1.28	181	0.19	0.16	0.29
Fixed Assets/Assets	108	0.63	0.35	0.43	181	0.47	0.31	0.61
Short-term Debt/Assets	108	0.41	0.41	0.61	181	0.39	0.14	0.51
Long-term Debt/Assets	108	0.32	0.05	0.31	181	0.28	0.23	0.29
Capex/Assets	108	0.072	0.078	0.002	181	0.031	0.0034	0.002
Q	108	1.09	1.085	0.0034	181	0.52	0.59	0.034
Cash Flow/Assets	108	0.142	0.156	0.028	181	0.112	0.123	0.004
BNDES Loans	16				7			

Table 3 Classification of Financially and Non-financially Restricted Firms: Dividends

Our sample is composed of 291 non-financial public corporations and 4,735 private firms. Our sample period goes from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information as well as yearly information while all the others is close yearly information only. The information on the public corporations comes from the Brazilian Securities and Exchange Commission (CVM), and Economatica and the information on the private firms comes from Valor Econômico and confidential information from SERASA and Gazeta Mercantil. We classify a firm using this criteria as financially restricted or non financially restricted when the payout ratio is lower than the 30^{th} percentile or above the 70^{th} of the cross section distribution of payout ratio in all quarters or years of our sample period respectively. Panel A of Table 3 lists some descriptive statistics of some financial characteristics of financially restricted and non financially restricted firms with quarter data. Panel B of Table 3 shows the financially restricted and non financially restricted private firms with end of the year information.

Panel A Financial Characteristics of Firms with Quarterly Data

	Non restricted (A)				restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	127	18.11	18.01	3.23	168	17.12	17.02	2.34
Operational revenues/Assets	127	0.58	0.56	0.8	168	0.31	0.12	0.23
Financial Expenses/Assets	127	0.23	0.16	0.25	168	0.12	0.12	0.26
Fixed Assets/ Assets	127	0.31	0.52	0.28	168	0.34	0.32	0.52
Short-term Debt/Assets)	127	0.55	0.67	0.76	168	0.42	0.12	0.18
Long-term Debt/Assets	127	0.27	0.14	0.19	168	0.14	0.11	0.18
Capex/Assets	127	0.094	0.063	0.003	168	0.043	0.045	0.004
Q	127	1.02	1.01	0.007	168	0.53	0.39	0.033
Cash Flow/Assets	127	0.121	0.143	0.004	168	0.134	0.122	0.024
BNDES	32				7			

Panel B Financial Characteristics of Firms with Annual Data

	Non restricted (A)				Restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	70	11.87	11	3.51	513	8.3	8.36	3.26
Net Operational Revenues/Assets	70	0.61	0.42	2.65	513	0.29	0.42	0.32
Financial Expenses/Assets	70	0.15	0.05	1.28	513	0.18	0.18	0.49
Fixed Assets/Assets	70	0.63	0.35	0.43	513	0.42	0.39	0.52
Short-term Debt/Assets	70	0.41	0.41	0.61	513	0.34	0.17	0.61
Long-term Debt/Assets	70	0.32	0.05	0.31	513	0.23	0.26	0.42
Capex/Assets	70	0.058	0.083	0.005	513	0.024	0.0024	0.012
Q	70	1.01	1.045	0.0042	513	0.57	0.79	0.038
Cash Flow/Assets	70	0.16	0.178	0.038	513	0.132	0.142	0.025
BNDES	20				5			

Table 4 Classification of Financially and Non-financially Restricted Firms: Kaplan and Zingales (1997)

We follow Kaplan and Zingales (1997). We rank firms on an ordinal scale, five groups, from least- to most-obviously financially constrained. To build our index, we collect, in the case of public firms, financial statements, notes of financial statements, information on bankruptcy, information from the department of investors relation of the firm. In the case of private firms, we use balance sheet information only.The first group contains firms we think are non financially restricted. We place a firm in this category if the firm initiated or increased the payout ratio, repurchased stock or if its cash reserves were above the 70^{th} percentile in any quarter or year of our data sample or an outstanding loan with BNDES. The second group includes firms that we label more likely not to be financially restricted. These firms tend to have sizeable cash reserves unused lines of credit and high interest coverage. So in this category, a typical firm would have as quantitative measures interest rate coverage and cash reserves between the 60^{th} and 70^{th} percentile in our database and possibly an outstanding loan with BNDES. The third group includes firms that we find difficult to classify as either financially or non financially constrained. Frequently, these firms face an adverse product market environment but are not explicitly strapped of cash. This category also includes firms which provide contradictory indications of their financial situation. These firms would tend to have sizeable cash reserves unused lines of credit and high interest coverage. In terms of quantitative measure, we put a firm in this category if it its cash and interest rate coverage was between the 50^{th} and 60^{th} percentile of the quarter or annual cross section distribution and if the firm did not present any outstanding loan with BNDES. The fourth group includes firms that we label more likely to be financially restricted. These firms do not tend to have sizeable cash reserves unused lines of credit and high interest coverage. Firms in this category would have measures interest rate coverage and cash reserves between the 30^{th} and 50^{th} percentile in our database and no outstanding loan with BNDES. The fifth group has firms we think are undoubtedly financially restricted. We place a firm in this category if the firm that declared bankruptcy in our data sample period, have been cut out of their usual source of credit, are renegotiating debt payments or declare that they are forced to reduce investments because of liquidity problems. In more quantitative measures, the firm would experience its cash and interest coverage ratio below the 30^{th} percentile in any quarter or year of our data sample and no outstanding loans with BNDES. Panel A of Table 4 presents the results of the estimated ordered equation. Panel B of Table 4 lists mean, median and standard deviation values of some financial characteristics of financially restricted and non financially restricted firms with quarterly data using the predicted KZ. Panel C of Table 4 shows the financially restricted and non financially restricted private firms with end of the year information.We consider a firm as non restricted if the predicted KZ is below the 30^{th} percentile and financially restricted if it is above the 70^{th} percentile in all quarters or years of our sample period. P-values are under parenthesis.

Panel A

	Quarterly	Annual
Cash Flow$_t$/Assets $_{t-1}$	1.12	1.36
	(0.03)	(0.23)
Div$_t$/Assets $_{t-1}$	-13.12	-15.67
	(0.02)	(0.01)
Leverage	-3.23	-0.49
	(0.02)	(0.02)
Q$_{-1}$	1.78	2.34
	(0.02)	(0.18)
BNDES	0.02	0.19
	(0.031)	(0.02)
Cash$_t$/Assets$_t$	1.67	0.61
	(0.03)	(0.04)
Control Variables		
Sample	1994Q3 to 2010Q4	

Panel B Financial Characteristics of Firms with Quarterly Data

	Non restricted (A)				Restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	78	11.87	11	3.51	182	8.32	8.7	4.76
Operational revenues/Assets	78	0.61	0.42	2.65	182	0.31	0.47	0.49
Financial Expenses/Assets	78	0.15	0.05	1.28	182	0.19	0.16	0.29
Fixed Assets/ Assets	78	0.63	0.35	0.43	182	0.47	0.31	0.61
Short-term Debt/Assets)	78	0.41	0.41	0.61	182	0.39	0.14	0.51
Long-term Debt/Assets	78	0.32	0.05	0.31	182	0.28	0.23	0.29
Capex/Assets	78	0.074	0.062	0.003	182	0.042	0.061	0.003
Q	78	1.03	1.08	0.004	182	0.48	0.38	0.124
Cash Flow/Assets	78	0.143	0.166	0.001	182	0.131	0.134	0.035
BNDES Loans	36				6			

Panel C Financial Characteristics of Firms with Annual Data

	Non restricted (A)				restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	52	17.34	16.74	4.1	105	17.11	16.32	3.52
Operational revenues/Assets	52	0.64	0.62	0.82	105	0.31	0.12	0.53
Financial Expenses/Assets	52	0.14	0.15	0.32	105	0.14	0.15	0.41
Fixed Assets/ Assets	52	0.43	0.52	0.48	105	0.3	0.33	0.87
Short-term Debt/Assets)	52	0.67	0.66	0.98	105	0.42	0.14	0.19
Long-term Debt/Assets	52	0.27	0.18	0.19	105	0.08	0.1	0.21
Capex/Assets	52	0.068	0.053	0.002	182	0.032	0.031	0.023
Q	52	0.89	1.04	0.006	182	0.37	0.12	0.158
Cash Flow/Assets	52	0.137	0.168	0.004	182	0.146	0.156	0.041
BNDES Loans	26				7			

Table 5 Classification of Financially and Non-financially Restricted Firms: Whited and Wu (2006)

We built a WW index for Brazil by estimating with Generalized Method of Moments (GMM) the same structural equation estimated by Whited and Wu (2006), with the same assumptions for the dynamics of the stochastic discount factor and for the lagrange multiplier.Our instruments include all of the Euler equation variables, as well as inventories, depreciation, current assets, current liabilities, the net value of the capital stock, and tax payments, all of which are normalized by total assets. We also include three extra variables found by Fama and French (2000) to be good predictors of profitability: the ratio of dividends to total assets, average profitability over the previous three quarters, and a dummy if profitability was positive in time t – 1. Panel A of Table 5 shows the GMM estimation of the WW index. We use the distribution of estimated values of this equation to discriminate between financially restricted and non financially restricted firms. We consider a firm to be non financially restricted in the sense of the WW index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. Panel B of Table 5 lists descriptive statistics of some financial characteristics of financially restricted and non financially restricted using WW. There are 59 non restricted and 103 restricted. Panel C of Table 5 shows the financially restricted and non-financially restricted firms with end of the year information. P-values are under parenthesis.

Panel A Euler Equation Estimation with GMM

	Quarterly	Annual
Cash Flow$_t$/Assets$_{t-1}$	-0.093	-0.19
	(0.02)	(0.01)
Div$_{t-1}$	-0.0073	-0.0089
	(0.04)	(0.01)
Leverage	0.39	0.49
	(0.02)	(0.02)
Log(Assets$_{-1}$)	(0.032)	(0.04)
	(0.01)	(0.18)
BNDES	(0.12)	(0.19)
	(0.031)	(0.05)
Sales Growth	-0.123	-0.112
	(0.02)	(0.03)
Control Variables		
Sargan test over-identifying restrictions	(0.02)	(0.08)
Sample	1994Q3 to 2010Q4	

Panel B Financial Characteristics of Firms with Quarterly Information

	Non Restricted (A)				Restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	59	18.23	17.92	4.1	103	17.14	17.25	2.81
Operational revenues/Assets	59	0.63	0.62	0.82	103	0.34	0.19	0.55
Financial Expenses/Assets	59	0.12	0.14	0.31	103	0.16	0.23	0.44
Fixed Assets/ Assets	59	0.44	0.55	0.42	103	0.34	0.35	0.82
Short-term Debt/Assets)	59	0.61	0.62	0.97	103	0.48	0.12	0.17
Long-term Debt/Assets	59	0.25	0.16	0.11	103	0.29	0.11	0.14
Capex/Assets	59	0.064	0.054	0.005	103	0.032	0.031	0.013
Q	59	0.98	1.1	0.014	103	0.51	0.39	0.128
Cash Flow/Assets	59	0.123	0.178	0.023	103	0.141	0.128	0.045
BNDES Loans	28				6			

Panel C Financial Characteristics of Firms with Annual Information

	Non Restricted (A)				Restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	48	18.21	18.02	4.02	98	17.1	17.25	3.52
Operational revenues/Assets	48	0.67	0.64	0.83	98	0.32	0.12	0.52
Financial Expenses/Assets	48	0.12	0.19	0.32	98	0.13	0.12	0.45
Fixed Assets/ Assets	48	0.42	0.56	0.42	98	0.32	0.35	0.81
Short-term Debt/Assets	48	0.65	0.61	0.96	98	0.42	0.12	0.19
Long-term Debt/Assets	48	0.22	0.11	0.13	98	0.29	0.14	0.11
Capex/Assets	48	0.071	0.062	0.034	98	0.042	0.042	0.042
Q	48	0.92	1.15	0.019	98	0.61	0.37	0.137
Cash Flow/Assets	48	0.142	0.174	0.063	98	0.181	0.121	0.025
BNDES Loans	32				7			

Table 6 Classification of Financially and Non-financially Restricted Firms: Estimating External Finance Premium using State Space Models

EFP classification scheme is based on Oliveira (2012). Oliveira estimates the external finance premium (EFP) which is a non observable variable using a state space approach. EFP is the state of the model and is different for each firm. The kalman filter is the smooth kalman filter of this state. We use the distribution of estimated values of this equation to discriminate between financially restricted and non financially restricted firms. We consider a firm to be restricted in this case restricted if the estimated values are above the 70th percentile of the distribution and non financially restricted if it is below the 30th percentile in all quarters or years of our sample period. Panel A of Table 6 lists financial characteristics of financially restricted and non financially restricted firms for the whole sample relative to its assets. Panel B of Table 6 shows the financially restricted and non financially restricted private firms with end of the year information.

Panel A Financial Characteristics of Firms with Quarterly Data

	Non restricted (A)				Restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	65	18.31	18.05	4.19	96	17.17	17.05	3.51
Operational revenues/Assets	65	0.68	0.6	0.85	96	0.36	0.18	0.58
Financial Expenses/Assets	65	0.19	0.18	0.35	96	0.19	0.19	0.42
Fixed Assets/ Assets	65	0.47	0.53	0.46	96	0.36	0.36	0.83
Short-term Debt/Assets	65	0.68	0.65	0.91	96	0.49	0.17	0.15
Long-term Debt/Assets	65	0.23	0.19	0.17	96	0.09	0.12	0.13
Capex/Assets	65	0.082	0.079	0.001	96	0.054	0.051	0.001
Q	65	1.06	1.04	0.003	96	0.47	0.37	0.023
Cash Flow/Assets	65	0.153	0.162	0.002	96	0.121	0.132	0.003
BNDES Loans	36				9			

Panel B Financial Characteristics of Firms with Annual Data

	Non Restricted (A)				Restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	58	18.21	18.02	4.02	198	17.1	17.25	3.52
Operational revenues/Assets	58	0.67	0.64	0.83	198	0.32	0.12	0.52
Financial Expenses/Assets	58	0.12	0.19	0.32	198	0.13	0.12	0.45
Fixed Assets/ Assets	58	0.42	0.56	0.42	198	0.32	0.35	0.81
Short-term Debt/Assets	58	0.65	0.61	0.96	198	0.42	0.12	0.19
Long-term Debt/Assets	58	0.22	0.11	0.13	198	0.29	0.14	0.11
Capex/Assets	58	0.042	0.034	0.025	198	0.022	0.021	0.021
Q	58	1.43	1.15	0.044	198	0.58	0.34	0.146
Cash Flow/Assets	58	0.223	0.148	0.033	198	0.131	0.131	0.065
BNDES Loans	32				5			

Table 7 Monetary Shocks

To define a monetary contraction we use two methods: Nominal SELIC rate and the Bosch-Mills (1995) index. Panel A shows the quarters of monetary contractions defined by the SELIC rate. With this method we identify a quarter of monetary contraction when the first difference of the SELIC rate is greater than the average of the first difference of the SELIC rate plus one standard deviation. Panel B shows the Boshen-Mills (1995) method. The method consists of reading all COPOM documents and classifing monetary policy in five categories: very expansionist, moderately expansionist, neutral, moderately contractionist and very contractionist.

Panel A Nominal SELIC Rate

	First Phase of Real Plan 1994/4 to 1998/3	Second Phase of Real Plan 1998/4 to 2002/4	Third Phase of Real Plan 2002/1 to 2010/4	Whole Sample 2010/4	Shocks 1997/4
Mean of First Difference	-0.57	-0.043	-0.05	-0.18	2.6
Standard deviations First Differences	1.52	-0.11	-0.06	-0.12	2.6
Median of First Difference	-0.51	-0.11	-0.06	-0.12	2.6

Panel B Boshen-Mills (1995)

	First Phase of Real Plan 1994/4 1998/3	Second Phase of Real Plan 1998/4 2002/4	Third Phase of Real Plan 2002/1 2010/4
Very Expansionist	3	0	1
Moderately Expansionist	2	5	12
Neutral	1	16	13
Moderately Contactionist	1	1	1
Moderately Contactionist	1	13	23
Very Contractionist	2	1	1
Shocks	1997/4 and 1998/4	1999/2	2002/4

Table 8 Investment of Firms: Financial restrictions, Unexpected Monetary Shocks and BNDES

Our sample is composed of 291 non-financial public corporations and 4,735 private firms. Our sample period goes from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information as well as yearly information while all the others disclose yearly information only. The information on the public corporations comes from the Brazilian Securities and Exchange Commission (CVM), and Economatica and the information on the private firms comes from Valor Econômico and confidential information from SERASA and Gazeta Mercantil. We classify a firm as small when the logarithm of its total assets is below the 30th percentile in all quarters or years of our sampling period and large when the logarithm of its total assets is above the 70th percentile in all quarters or years of our sampling period. We classify a firm using dividends criteria as financially restricted or non financially restricted when the payout ratio is lower than the 30th percentile or above the 70th of the cross section distribution of payout ratio in all quarters or years of our sample period respectively. We consider a firm as non restricted if the predicted KZ is below the 30th percentile and financially restricted if it is above the 70th percentile in all quarters or years of our sample period. We consider a firm to be financially restricted in the sense of the WW index if its predicted values are above the 70th percentile of the distribution and non financially restricted if it is below the 30th percentile in all quarters or years of our sample period. We consider a firm to be financially restricted in the sense of the EFP index if its predicted values are above the 70th percentile of the distribution and non financially restricted if it is below the 30th percentile in all quarters or years of our sample period. We eatimate using randon effects and white cross section to correct for heterocedasticity. Panel A presents the estimation of firms with quarterly data and Panel B the estimation with year data. P-values are under parenthesis.

Panel A Firms with Quarterly Data

	Size	Dividends	KZ	WW	EFP
Cash Flow$_{it}$/Assets$_{it}$	0.1	0.17	0.02	0.02	0.04
	(0.08)	(0.22)	(0.08)	(0.06)	(0.02)
Q$_{it}$	0.15	0.08	0.36	0.19	0.15
	(0.09)	(0.03)	(0.28)	0.05)	(0.50)
Shock$_t$	-0.03	-0.04	-0.04	-0.04	-0.03
	(0.04)	(0.10)	(0.12)	(0.08)	(0.02)
FR$_i$*Shock$_t$*(Cash Flow$_{it}$/Assets$_{it}$)	-0.02	-0.04	-0.01	-0.08	-0.03
	(0.012)	(0.09)	(0.06)	(0.25)	(0.03)
BNDES$_i$	0.06	0.05	0.02	0.03	0.1
	(0.12)	(0.04)	(0.12)	(0.01)	(0.20)
FR$_i$	-0.02	-0.08	-0.01	0.003	-0.002
	(0.03)	(0.18)	(0.14)	(0.06)	(0.07)
BNDES$_i$*FR$_i$*Cash Flow$_{it}$/Assets$_{it}$	-0.02	-0.01	-0.04	-0.08	-0.03
	(0.04)	(0.13)	(0.18)	(0.06)	(0.02)
FR$_i$*Shock$_t$	-0.1	-0.034	-0.03	0.02	-0.04
	(0.18)	(0.06)	(0.08)	(0.11)	(0.07)
FR$_i$*(Cash Flow$_{it}$/Assets$_{it}$)	0.06	0.03	0.04	0.02	0.03
	(0.02)	(0.08)	(0.05)	(0.11)	(0.11)
BNDES$_i$*FR$_i$	0.02	0.01	0.02	0.02	0.18
	(0.34)	(0.07)	(0.06)	(0.23)	(0.13)
BNDES$_i$*Cash Flow$_{it}$/Assets$_{it}$	-0.01	-0.02	-0.15	-0.04	-0.24
	(0.01)	(0.28)	(0.03)	(0.01)	(0.48)
Shock$_t$*(Cash Flow$_{it}$/Assets$_{it}$)	0.011	0.012	0.013	-0.01	0.001
	(0.08)	(0.02)	(0.07)	(0.12)	(0.06)
Wald Tests					
(FR$_i$+Shock$_t$+BNDES$_i$)	(0.04)	(0.26)	(0.01)	0.14)	(0.51)
(Shock$_t$+FR$_i$)	(0.19)	(0.02)	(0.04)	(0.02)	(0.02)
(Σ Cash Flow$_{it}$/Assets$_{it}$ without BNDES)	(0.14)	(0.12)	(0.04)	0.02)	(0.06)
(Σ Cash Flow$_{it}$/Assets$_{it}$ with BNDES)	(0.08)	(0.25)	(0.38)	(0.01)	(0.10)
BNDES$_i$=Shock$_t$=0	(0.03)	(0.00)	(0.04)	(0.07)	(0.21)
F test Joint Significance	(0.02)	(0.07)	(0.04)	(0.02)	(0.08)
Hausman Test	(0.13)	(0.24)	(0.45)	(0.01)	(0.26)
R2	0.34	0.52	0.58	0.61	0.72
Total Number of Firms	393				
Sample	1994Q4 to 2010Q4				

Panel B Firms with Annual Data

	Size	Dividends	KZ	WW	EFP
Cash Flow$_{it}$/Assets$_{it}$	0.12	0.1	0.02	0.06	0.02
	(0.21)	(0.09)	(0.01)	(0.04)	(0.01)
Q_{it}	0.14	0.29	0.27	0.28	0.36
	(0.05)	(0.21)	(0.14)	(0.05)	(0.26)
Shock$_t$	-0.03	-0.05	-0.01	-0.04	-0.01
	(0.04)	(0.08)	(0.05)	(0.02)	(0.03)
FR$_i$*Shock$_t$*CashFlow$_{it}$	-0.08	-0.18	-0.03	-0.17	-0.04
	(0.08)	(0.18)	(0.03)	(0.17)	(0.04)
BNDES$_i$	0.02	0.08	0.07	0.02	0.08
	(0.06)	(0.04)	(0.02)	(0.05)	(0.03)
FR$_i$	-0.04	-0.03	-0.03	-0.03	-0.08
	(0.01)	(0.18)	(0.14)	(0.15)	(0.03)
FR$_i$*Shock$_t$	-0.02	-0.02	-0.02	-0.06	-0.04
	(0.06)	(0.04)	(0.09)	(0.09)	(0.03)
Shock$_t$*CashFlow$_{it}$/Assets$_{it}$	0.04	0.01	0.07	0.08	0.03
	(0.14)	(0.03)	(0.04)	(0.03)	(0.04)
FR$_i$*Shock$_t$	-0.18	-0.02	-0.16	-0.01	-0.21
	(0.38)	(0.24)	(0.19)	(0.06)	(0.08)
FR$_i$* CashFlow$_{it}$/Assets$_{it}$	0.12	0.02	0.03	0.05	0.05
	(0.19)	(0.15)	(0.06)	(0.13)	(0.00)
BNDES$_i$*FR$_i$	0.04	0.06	0.04	0.02	0.18
	(0.10)	(0.25)	(0.11)	(0.03)	(0.04)
BNDES$_i$*Cash Flow$_{it}$/Assets$_{it}$	-0.02	-0.05	-0.06	-0.1	-0.07
	(0.14)	(0.09)	(0.07)	(0.12)	(0.03)
BNDES$_i$*FR*Cash Flow$_{it}$/Assets$_{it}$	-0.02	-0.03	-0.14	-0.18	-0.03
	(0.06)	(0.16)	(0.06)	(0.02)	(0.21)
Wald Tests					
FR $_i$+Shock$_t$+BNDES$_i$	(0.02)	(0.00)	(0.03)	(0.04)	(0.18)
BNDES =Shock=0	(0.01)	(0.09)	(0.02)	(0.22)	(0.15)
F test Joint Significance	(0.02)	(0.08)	(0.04)	0.02)	(0.03)
Hausman Test	(0.13)	(0.22)	(0.18)	(0.41)	(0.14)
R^2	0.47	0.66	0.59	0.23	0.18
Number of Restricted Firms	181	513	103	98	198
Total Number of Firms	4735				
Sample Period		1994Q3 to 2010Q4			

Table 9 Investment of Firms: Separating between Financially and Non-Financially Restricted

Our sample is composed of 291 non-financial public corporations and 4,735 private firms. Our sample period goes from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information as well as yearly information while all the others disclose yearly information only. The information on the public corporations comes from the Brazilian Securities and Exchange Commission (CVM), and Economatica and the information on the private firms comes from Valor Econômico and confidential information from SERASA and Gazeta Mercantil. We classify a firm as small when the logarithm of its total assets is below the 30th percentile in all quarters or years of our sampling period and large when the logarithm of its total assets is above the 70th percentile in all quarters or years of our sampling period. We classify a firm using dividends criteria as financially restricted or non financially restricted when the payout ratio is lower than the 30^{th} percentile or above the 70^{th} of the cross section distribution of payout ratio in all quarters or years of our sample period respectively. We consider a firm as non restricted if the predicted KZ is above the 30^{th} percentile and financially restricted if it is above the 70^{th} percentile in all quarters or years of our sample period. We consider a firm to be non financially restricted in the sense of the WW index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. We consider a firm to be non financially restricted in the sense of the EFP index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. Panel A presents the estimation for constrained firms with Quarterly Data. Estimation was performed using two stage least squares, with the second lag of investment in relation to assets as our instrument. We used White cross section to correct for heterocedasticity. Panel A presents the estimation for unconstrained firms with Quarterly Data. Panel C presents the estimation for constrained firms with Annual data. Panel D presents the estimation for unconstrained firms with yearly data. P-values are under parenthesis.

Panel A Constrained Firms Quarterly Data

	Size	Dividends	KZ	WW	EFP
Cash $Flow_{it}/Assets_{it}$	0.18	0.04	0.07	0.13	0.24
	(0.07)	(0.02)	(0.06)	(0.11)	(0.07)
Q_{it}	0.14	0.38	0.36	0.38	0.36
	(0.03)	(0.09)	(0.49)	(0.04)	(0.49)
$Shock_t$	-0.02	-0.02	-0.01	-0.02	-0.03
	(0.05)	(0.05)	(0.04)	(0.01)	(0.02)
$Shock_t$*Cash $Flow_{it}/Assets_{it}$	0.06	0.08	0.06	0.05	0.01
	(0.04)	(0.15)	(0.08)	(0.15)	(0.06)
$BNDES_i$	0.03	0.07	0.02	0.06	0.06
	(0.10)	(0.02)	(0.08)	(0.02)	(0.08)
$BNDES_i$*$CashFlow_{it}/Assets_{it}$	-0.02	-0.01	-0.07	-0.03	-0.04
	(0.01)	(0.13)	(0.14)	(0.18)	(0.26)
<u>Wald Test</u>					
($Shock_t$+$BNDES_i$)	(0.02)	(0.00)	(0.03)	(0.08)	(0.034)
$Shock_t$=$BNDES_i$	(0.03)	(0.02)	(0.01)	(0.00)	(0.04)
Joint Significance	(0.00)	(0.18)	(0.04)	(0.05)	(0.15)
Haussman Test	(0.11)	(0.06)	(0.07)	(0.82)	(0.04)
R2	0.46	0.52	0.35	0.71	0.68
Number of Constrained Firms	181	283	181	103	128
Sample	1994Q3 to 2010Q4				

Panel B Unconstrained Firms Quarterly Data

	Size	Dividends	KZ	WW	EFP
Cash $Flow_{it}/Assets_{it}$	0.14	0.16	0.06	0.02	0.01
	(0.26)	(0.28)	(0.14)	(0.69)	(0.15)
Q_{it}	0.12	0.19	0.24	0.36	0.34
	(0.19)	(0.11)	(0.19)	(0.11)	(0.26)
$Shock_t$	-0.12	-0.04	-0.06	-0.02	-0.01
	(0.23)	(0.03)	(0.06)	(0.17)	(0.08)
$Shock_t$*Cash $Flow_{it}/Assets_i$	0.17	0.03	0.04	0.04	0.04
	(0.12)	(0.14)	(0.02)	(0.10)	(0.02)
$BNDES_i$	0.03	0.05	0.03	0.13	0.19
	(0.01)	(0.02)	(0.04)	(0.05)	(0.06)
$BNDES_i$*$CashFlow_{it}/Assets_{it}$	-0.02	-0.01	-0.03	-0.02	-0.04
	(0.38)	(0.04)	(0.24)	(0.04)	(0.08)
Wald Tests					
($Shock_t$+$BNDES_i$)	(0.03)	(0.09)	(0.11)	(0.10)	(0.02)
$Shock_t$=$BNDES_i$=0	(0.02)	(0.09)	(0.04)	(0.06)	(0.11)
Joint Significance	(0.03)	(0.10)	(0.04)	(0.12)	(0.12)
Hausman Test	(0.15)	(0.51)	(0.42)	(0.31)	(0.25)
R^2	0.48	0.37	0.60	0.31	0.59
Number of Unconstrained Firms	68	127	52	59	65
Sample Period	1994Q3 to 2010Q4				

Panel C Constrained Firms Annual Data

	Size	Dividends	KZ	WW	EFP
Cash Flow$_{it}$/Assets$_{tt}$	0.04	0.01	0.03	0.01	0.03
	(0.08)	(0.06)	(0.05)	(0.02)	(0.05)
Q_{it-1}	0.16	-0.36	0.32	-0.36	0.32
	(0.02)	(0.08)	(0.47)	(0.08)	(0.47)
Shock$_t$	-0.03	-0.04	-0.09	-0.04	-0.09
	(0.03)	(0.02)	(0.08)	(0.02)	(0.08)
Shock$_t$*Cash Flow$_{it}$/Assets$_{it}$	0.07	0.06	0.04	0.05	0.04
	(0.06)	(0.13)	(0.03)	(0.13)	(0.03)
BNDES$_i$	0.09	0.48	0.66	0.48	0.6
	(0.034)	(0.03)	(0.07)	(0.03)	(0.07)
BNDES$_i$*CashFlow$_{it}$/Assets$_i$	-0.03	-0.03	-0.06	-0.04	-0.03
	(0.02)	(0.01)	(0.23)	(0.02)	(0.02)
Wald Tests					
(Shock$_t$+BNDES$_i$)	(0.04)	(0.18)	(0.05)	(0.11)	(0.02)
Shock=BNDES=0	(0.10)	(0.15)	(0.02)	(0.11)	(0.01)
Joint Significance	(0.03)	(0.01)	(0.00)	(0.02)	(0.04)
Hausman Test	(0.12)	(0.14)	(0.23)	(0.31)	(0.45)
R^2	0.21	0.43	0.52	0.31	0.58
Number of Constrained Firms	120	168	105	98	108
Sample	1994Q3 2010Q4				

Panel D Unconstrained Firms Annual Data

	Size	Dividends	KZ	WW	EFP
Cash Flow$_{it}$/Assets$_{it}$	0.22	0.31	0.02	0.11	0.06
	(0.38)	(0.14)	(0.09)	(0.15)	(0.09)
Q_{it}	0.11	0.18	0.24	0.37	0.37
	(0.02)	(0.01)	(0.19)	(0.08)	(0.28)
Shock$_t$	-0.04	-0.02	-0.08	-0.07	-0.02
	(0.07)	(0.01)	(0.01)	(0.17)	(0.05)
Shock$_t$*Cash Flow$_{it}$/Assets$_{it}$	0.09	0.09	0.02	0.06	0.08
	(0.03)	(0.11)	(0.12)	(0.16)	(0.03)
BNDES$_i$	0.15	0.04	0.06	0.03	0.06
	(0.04)	(0.01)	(0.02)	(0.08)	(0.03)
BNDES$_i$*CashFlow$_{it}$/Assets$_i$	-0.03	-0.02	-0.06	-0.04	-0.06
	(0.29)	(0.01)	(0.04)	(0.08)	(0.01)
Wald Tests					
(Shock$_t$+BNDES$_i$)	(0.02)	(0.38)	(0.41)	(0.19)	(0.35)
Shock$_t$=BNDES$_i$=0	(0.02)	(0.00)	(0.16)	(0.14)	(0.07)
F test Joint Signicance	(0.01)	(0.32)	(0.18)	(0.13)	(0.16)
Hausman Test	(0.21)	-0.32	-0.18	-0.13	-0.16
R^2	0.40	0.78	0.75	0.48	0.58
Number of Uncosntrained Firms	181	513	103	98	198
Sample Period		1994 to 2010			

Table 10 Investment of Firms: Lagged Investment Effect

Our sample is composed of 291 non-financial public corporations and 4,735 private firms. Our sample period goes from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information as well as yearly information while all the others disclose yearly information only. The information on the public corporations comes from the Brazilian Securities and Exchange Commission (CVM), and Economatica and the information on the private firms comes from Valor Econômico and confidential information from SERASA and Gazeta Mercantil. Our sample is composed of 291 non-financial public corporations and 4,735 private firms. Our sample period goes from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information as well as yearly information while all the others disclose yearly information only. The information on the public corporations comes from the Brazilian Securities and Exchange Commission (CVM), and Economatica and the information on the private firms comes from Valor Econômico and confidential information from SERASA and Gazeta Mercantil. We classify a firm as small when the logarithm of its total assets is below the 30th percentile in all quarters or years of our sampling period and large when the logarithm of its total assets is above the 70th percentile in all quarters or years of our sampling period. We classify a firm using dividends criteria as financially restricted or non financially restricted when the payout ratio is lower than the 30^{th} percentile or above the 70^{th} of the cross section distribution of payout ratio in all quarters or years of our sample period respectively. We consider a firm as non restricted if the predicted KZ is below the 30^{th} percentile and financially restricted if it is above the 70^{th} percentile in all quarters or years of our sample period. We consider a firm to be financially restricted in the sense of the WW index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. We consider a firm to be financially restricted in the sense of the EFP index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. We eatimate using randon effects and white cross section to correct for heterocedasticity Panel A presents the estimation for constrained firms with Quarterly Data. Panel B presents the estimation with yearly data. P-values are under parenthesis.

Panel A Firms with Quarterly Data

	Size	Dividends	KZ	WW	EFP
$CAPEX_{it-1}/Assets_{it}$	-0.14	-0.28	-0.49	-0.12	0.34
	(0.13)	(0.02)	(0.12)	(0.02)	(0.33)
$Cash\ Flow_{it}/Assets_{i}$	0.03	0.04	0.17	0.13	0.06
	(0.29)	(0.48)	(0.39)	(0.28)	(0.59)
Q_{it}	0.18	0.48	0.39	0.28	0.59
	(0.13)	(0.23)	(0.53)	(0.07)	(0.36)
$Shock_t$	-0.08	-0.01	-0.02	-0.03	0.18
	(0.04)	(0.05)	(0.08)	(0.05)	(0.02)
$FR_i*Shock_t*Cash\ Flow_{it}/Assets_{it}$	0.04	0.08	0.34	0.15	0.28
	(0.02)	(0.14)	(0.02)	(0.05)	(0.03)
FR_i	-0.06	-0.13	-0.07	-0.02	0.23
	(0.051)	(0.04)	(0.04)	(0.19)	(0.04)
$BNDES_i$	0.02	0.16	0.015	0.03	0.18
	(0.29)	(0.17)	(0.09)	(0.01)	(0.09)
$BNDES_i*FR_i*CashFlow_{it}/Assets_{it}$	-0.031	-0.02	-0.04	-0.03	0.17
	(0.01)	(0.02)	(0.06)	(0.14)	(0.12)
$FR_i*Shock_t$	-0.01	-0.15	-0.06	-0.19	0.29
	(0.03)	(0.04)	(0.18)	(0.00)	0.12)
$FR_i*Cash\ Flow_{it}/Assets_{it}$	0.04	0.10	0.11	0.10	0.04
	(0.21)	(0.05)	(0.12)	(0.14)	(0.41)
$BNDES_i*FR_i$	0.001	0.02	0.03	0.04	0.01
	(0.03)	(0.10)	(0.11)	(0.13)	(0.03)
$BNDES_i*CashFlow_{it}/Assets_{it}$	-0.02	-0.13	-0.02	-0.08	0.03
	(0.08)	(0.04)	(0.01)	(0.21)	(0.15)
Wald Tests					
$(FR_i+Shock_t+BNDES_i)$	(0.02)	(0.12)	(0.11)	(0.03)	(0.21)
$(Shock_t+FR_i)$	(0.02)	(0.28)	(0.17)	(0.13)	(0.15)
(Σ $Cash\ Flow_{it}/Assets_{it}$ without BNDES)	(0.11)	(0.13)	(0.21)	(0.28)	(0.17)
(Σ $Cash\ Flow_{it}/Assets_{it}$ with BNDES)	(0.13)	(0.09)	(0.18)	(0.27)	(0.12)
$Shock_t=BNDES_i=0$	(0.10)	(0.03)	(0.01)	(0.08)	(0.15)
F test Joint Significance	(0.02)	(0.00)	(0.04)	(0.03)	(0.14)
Sargan over-identifying restrictions	(0.02)	(0.00)	(0.00)	(0.08)	(0.10)
Hausman Test	(0.02)	(0.03)	(0.14)	(0.01)	(0.35)
Number of Constrained Firms	68	127	108	59	68
R2	0.46	0.59	0.72	0.51	0.38
Total Number of Firms	4735				
Sample		1994Q3 to 2010Q4			

Panel B Firms with Annual Data

	Size	Dividends	KZ	WW	EFP
$CAPEX_{it-1}/Assets_{it}$	-0.12	-0.24	-0.25	-0.12	-0.34
	(0.12)	(0.32)	(0.42)	(0.39)	(0.46)
$Cash\ Flow_{it}/Assets_i$	0.14	0.04	0.05	0.18	0.03
	(0.39)	(0.28)	(0.19)	(0.39)	(0.69)
Q_{it}	-0.14	-0.32	0.38	-0.31	0.32
	(0.01)	(0.02)	(0.43)	(0.15)	(0.54)
$Shock_t$	-0.01	-0.18	-0.05	-0.04	-0.19
	(0.02)	(0.02)	(0.28)	(0.02)	(0.05)
$FR_i*Shock_t*Cash\ Flow_{it}/Assets_{it}$	0.29	0.23	0.24	0.18	0.14
	(0.02)	(0.16)	(0.06)	(0.17)	(0.07)
FR_i	-0.02	-0.14	-0.02	-0.02	-0.02
	(0.04)	(0.01)	(0.02)	(0.04)	(0.06)
$BNDES_i$	0.02	0.05	0.07	0.01	0.07
	(0.01)	(0.01)	(0.04)	(0.07)	(0.02)
$BNDES_i*FR_i*CashFlow_{it}/Assets_{it}$	-0.031	-0.01	-0.06	-0.03	-0.03
	(0.04)	(0.05)	(0.04)	(0.08)	(0.14)
$FR_i*Shock_t$	-0.02	-0.04	-0.01	-0.01	-0.06
	(0.06)	(0.05)	(0.06)	(0.01)	(0.06)
$FR_i*Cash\ Flow_{it}/Assets_{it}$	0.04	-0.18	0.52	0.06	0.27
	(0.01)	(0.07)	(0.15)	(0.18)	(0.42)
$BNDES_i*FR_i$	0.04	0.01	0.07	0.04	-0.02
	(0.02)	(0.35)	(0.18)	(0.19)	(0.01)
$BNDES_i*CashFlow_{it}/Assets_{it}$	-0.03	-0.02	-0.01	-0.01	-0.07
	(0.01)	(0.02)	(0.04)	(0.04)	(0.03)
Wald Tests					
$(FR_i+Shock_t+BNDES_i)$	(0.01)	(0.19)	(0.12)	(0.05)	(0.18)
$(Shock_t+FR_i)$	(0.07)	(0.25)	(0.14)	(0.02)	(0.05)
$(\sum Cash\ Flow_{it}/Assets_{it}$ without BNDES)	(0.15)	(0.08)	(0.56)	(0.24)	(0.27)
$(\sum Cash\ Flow_{it}/Assets_{it}$ with BNDES)	(0.27)	(0.12)	(0.14)	(0.28)	(0.10)
$Shock_t=BNDES_i=0$	(0.01)	(0.06)	(0.02)	(0.05)	(0.03)
F test Joint Significance	(0.01)	(0.00)	(0.03)	(0.01)	(0.10)
Sargan over-identifying restrictions	(0.03)	(0.02)	(0.01)	(0.04)	(0.03)
Hausman Test	(0.01)	(0.08)	(0.16)	(0.02)	(0.38)
Number of Constrained Firms	68	127	108	59	68
R2	0.46	0.59	0.72	0.51	0.38
Total Number of Firms	4735				
Sample		1994Q3 to 2010Q4			

Table 11 Investment of Firms: Using the Table 11 Intersection Classification Criteria

Our sample is composed of 291 non-financial public corporations and 4,735 private firms. Our sample period goes from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information as well as yearly information while all the others disclose yearly information only. The information on the public corporations comes from the Brazilian Securities and Exchange Commission (CVM), and Economatica and the information on the private firms comes from Valor Econômico and confidential information from SERASA and Gazeta Mercantil. We classify a firm as small when the logarithm of its total assets is below the 30th percentile in all quarters or years of our sampling period and large when the logarithm of its total assets is above the 70th percentile in all quarters or years of our sampling period. We classify a firm using dividends criteria as financially restricted or non financially restricted when the payout ratio is lower than the 30^{th} percentile or above the 70^{th} of the cross section distribution of payout ratio in all quarters or years of our sample period respectively. We consider a firm as restricted if the predicted KZ is below the 30^{th} percentile and non financially restricted if it is above the 70^{th} percentile in all quarters or years of our sample period. We consider a firm to be financially restricted in the sense of the WW index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. We consider a firm to be financially restricted in the sense of the EFP index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. The intersection criteria defines a firm restricted (non-restricted) firm only if it restricted (non restricted) in all other criteria. We estimate using randon effects and white cross section to correct for heterocedasticity Panel A presents the intersection classification for Quarterly Data. Panel B presents the intersection classification with yearly data. P-values are under parenthesis.

Panel A Firms with Quartely Data

	Non Restricted (A)				Restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	18	18.04	17.32	3.29	29	17.12	17.01	2.45
Operational revenues/Assets	18	0.27	0.64	0.87	29	0.32	0.12	0.53
Financial Expenses/Assets	18	0.13	0.19	0.32	29	0.1	0.13	0.43
Fixed Assets/ Assets	18	0.42	0.57	0.48	29	0.31	0.33	0.82
Short-term Debt/Assets	18	0.3	0.61	0.92	29	0.4	0.12	0.16
Long-term Debt/Assets	18	0.2	0.12	0.19	29	0.02	0.11	0.12
Capex/Assets	18	0.04	0.02	0.021	29	0.034	0.021	0.031
Q	18	1.08	1.08	0.001	29	1.28	1.39	0.023
Cash Flow/Assets	18	0.143	0.132	0.008	29	0.122	0.134	0.013
BNDES Loans	8				2			

Panel B Firms with Annual data

	Non restricted (A)				Restricted (B)			
Financial Characteristics	N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation
Log(Assets)	27	11.26	11.8	3.21	43	8.39	8.72	4.21
Operational revenues/Assets	27	0.63	0.4	2.62	43	0.34	0.44	0.42
Financial Expenses/Assets	27	0.18	0.07	1.21	43	0.12	0.12	0.22
Fixed Assets/ Assets	27	0.61	0.32	0.44	43	0.43	0.32	0.6
Short-term Debt/Assets)	27	0.42	0.44	0.62	43	0.26	0.13	0.31
Long-term Debt/Assets	27	0.31	0.01	0.3	43	0.21	0.21	0.19
Capex/Assets	27	0.073	0.021	0.001	43	0.021	0.024	0.012
Q	27	1.29	1.075	0.024	43	1.42	1.55	0.023
Cash Flow/Assets	27	0.145	0.166	0.014	43	0.132	0.134	0.014
BNDES Loans	9				2			

Panel C Intersection Criteria

	Quarterly	Annual
$Cash\ Flow_{it}/Assets_{it}$	0.02	0.14
	(0.41)	(0.32)
Q_{it-1}	0.19	0.31
	(0.02)	(0.01)
$Shock_t$	-0.02	-0.01
	(0.05)	(0.09)
$FR_i*Shock_t*Cash\ Flow_{it}/Assets_{it}$	0.01	0.04
	(0.07)	(0.18)
$BNDES_i*FR_i*CashFlow_{it}/Assets_{it}$	-0.04	-0.03
	(0.06)	(0.07)
$FR_i*Shock_t$	-0.02	-0.06
	(0.04)	(0.16)
$Shock_t*Cash\ Flowit/Assets_{it}$	0.13	0.1
	(0.29)	(0.08)
$FR_i*Cash\ Flowit/Assets_{it}$	0.03	0.03
	(0.27)	(0.08)
$BNDES_i*FRi$	0.04	0.06
	(0.01)	(0.18)
$BNDES_i*CashFlow_{it}/Assets_{it}$	-0.25	-0.18
	(0.07)	(0.06)
Wald Tests		
$(FR_i+Shock_t+BNDES_i)$	-0.14	-0.07
($\sum$ $Cash\ Flow_{it}/Assets_{it-1}$ without BNDES)	(0.02)	(0.04)
($\sum$ $Cash\ Flow_{it}/Assets_{it-1}$ with BNDES)	(0.05)	(0.09)
$BNDES_i=Shock_t=0$	(0.04)	(0.07)
F test Joint Significance	(0.01)	(0.03)
R2	0.48	0.56
Hausman Test	(0.00)	(0.00)
Number of Constrained Firms	29	43
Total Number of Firms	393	4735
Sample	1994Q3 to 2010Q4	

Table 12 Investment of Firms and Financial Crisis

Our sample is composed of 291 non-financial public corporations and 4,735 private firms. Our sample period goes from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information as well as yearly information while all the others disclose yearly information only. The information on the public corporations comes from the Brazilian Securities and Exchange Commission (CVM), and Economatica and the information on the private firms comes from Valor Econômico and confidential information from SERASA and Gazeta Mercantil. We classify a firm as small when the logarithm of its total assets is below the 30th percentile in all quarters or years of our sampling period and large when the logarithm of its total assets is above the 70th percentile in all quarters or years of our sampling period. We classify a firm using dividends criteria as financially restricted or non financially restricted when the payout ratio is lower than the 30^{th} percentile or above the 70^{th} of the cross section distribution of payout ratio in all quarters or years of our sample period respectively. We consider a firm as restricted if the predicted KZ is below the 30^{th} percentile and non financially restricted if it is above the 70^{th} percentile in all quarters or years of our sample period. We consider a firm to be financially restricted in the sense of the WW index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. We consider a firm to be financially restricted in the sense of the EFP index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. We eatimate using randon effects and white cross section to correct for heterocedasticity Panel A presents the estimation for constrained firms with Quarter Data. Panel A shows the estimation with quarterly data. Panel B presents the estimation with yearly data. P-values are under parenthesis.

Panel A Firms with Quarterly Data

	Size	Dividends	KZ	WW	EFP
$Cash\ Flow_{it}/Assets_{it-1}$	0.02	0.01	0.14	0.05	0.08
	(0.24)	(0.06)	(0.68)	(0.27)	(0.34)
Q_{it}	0.15	0.34	0.38	0.25	0.46
	(0.06)	(0.07)	(0.49)	(0.06)	(0.29)
$Shock_t$	-0.02	-0.08	-0.05	-0.07	-0.06
	(0.01)	(0.06)	(0.08)	(0.07)	(0.08)
$FR_i*Shock_t*Cash\ Flow_{it}/Assets_{it}$	0.05	0.02	0.04	0.06	0.02
	(0.11)	(0.06)	(0.01)	(0.19)	(0.01)
FR_i	-0.04	-0.02	-0.04	-0.05	-0.01
	(0.01)	(0.18)	(0.02)	(0.03)	(0.04)
FC_t	-0.03	-0.02	-0.02	-0.03	-0.1
	(0.08)	(0.01)	(0.18)	(0.03)	(0.17)
$BNDES_i$	0.04	0.02	0.11	0.18	0.07
	(0.05)	(0.04)	(0.12)	(0.06)	(0.05)
$BNDES_i*FR_i*CashFlow_{it}/Assets_{it}$	-0.04	-0.18	-0.09	-0.18	-0.12
	(0.04)	(0.29)	(0.13)	(0.17)	(0.06)
$FR_i*Shock_t$	-0.07	-0.1	-0.12	-0.04	-0.08
	(0.16)	(0.01)	(0.06)	(0.01)	(0.03)
$FR_i*Cash\ Flow_{it}/Assets_{it}$	-0.03	0.07	0.07	0.08	-0.05
	(0.18)	(0.03)	(0.02)	(0.14)	(0.05)
$Shock_t*Cash\ Flow_{it}/Assets_{it-1}$	0.16	0.05	0.17	0.07	0.07
	(0.27)	-0.04	-0.02	-0.02	(0.04)
$BNDES_i*FR_i$	-0.18	0.06	0.03	-0.08	0.14
	(0.05)	(0.16)	(0.44)	(0.39)	(0.45)
$BNDES_i*CashFlow_{it}/Assets_{it}$	-0.18	-0.02	-0.04	-0.06	-0.02
	(0.25)	(0.06)	(0.08)	(0.03)	(0.14)
Wald Tests					
$(FR_i+FC+Shock_t+BNDES_i)$	(0.05)	(0.02)	(0.04)	(0.02)	(0.04)
$(Shock_t+FC+FR_i)$	(0.09)	(0.03)	(0.10)	(0.07)	(0.16)
Shockt=BNDESi=0	(0.00)	(0.03)	(0.07)	(0.00)	(0.08)
Joint Significance	(0.31)	(0.42)	(0.15)	(0.20)	(0.18)
Haussman Test	0.59	0.44	0.48	0.52	0.82
Number of Constrained Firms	120	168	105	98	108
R2	0.43	0.61	0.72	0.57	0.69
Total Number of Firms	393				
Sample Period		1994Q3 to 2010Q4			

Panel B Firms with Annual Data

	Size	Dividends	KZ	WW	EFP
Cash Flow$_{it}$/Assets$_{it}$	0.14	0.02	0.01	0.06	0.02
	(0.25)	(0.04)	(0.08)	(0.03)	(0.05)
Q_{it-1}	0.16	0.25	0.29	0.34	0.41
	(0.03)	(0.07)	(0.31)	(0.04)	(0.15)
Shock$_t$	-0.02	-0.02	-0.08	-0.09	-0.05
	(0.06)	(0.01)	(0.04)	(0.08)	(0.07)
FR$_i$*Shock$_t$*Cash Flow$_{it}$/Assets$_{it}$	0.03	0.06	0.04	0.08	0.04
	(0.07)	(0.03)	(0.11)	(0.14)	(0.02)
FC$_t$	0.02	0.18	0.01	0.18	0.01
	(0.14)	(0.04)	(0.02)	(0.02)	(0.03)
FR$_i$	-0.07	-0.49	-0.08	-0.26	-0.68
	(0.02)	(0.28)	(0.19)	(0.18)	(0.21)
BNDES$_i$	0.38	0.26	0.18	0.16	0.18
	(0.05)	(0.04)	(0.04)	(0.11)	(0.06)
BNDES$_i$*FR$_i$*CashFlow$_{it}$/Assets$_{it}$	0.01	-0.16	0.06	0.012	0.03
	(0.05)	(0.06)	(0.19)	(0.05)	(0.08)
FR$_i$*Shock$_t$	-0.01	0.02	-0.02	-0.06	-0.02
	(0.01)	(0.08)	(0.04)	(0.07)	(0.07)
FR$_i$*Cash Flow$_{it}$/Assets$_{it}$	0.04	0.13	0.07	0.09	-0.02
	(0.05)	(0.08)	(0.06)	(0.11)	(0.07)
Shock$_t$*Cash Flow$_{it}$/Assets$_{it}$	0.06	0.07	0.07	0.11	0.06
	(0.04)	(0.13)	(0.01)	(0.02)	(0.08)
BNDES$_i$*FR$_i$	0.01	-0.01	0.04	0.03	0.06
	(0.08)	(0.04)	(0.04)	(0.15)	(0.08)
BNDES$_i$*CashFlow$_{it}$/Assets$_{it}$	-0.05	-0.01	-0.03	-0.01	-0.14
	(0.02)	(0.03)	(0.02)	(0.07)	(0.04)
Wald Tests					
(FR$_i$+Shock$_t$+BNDES$_i$+FC$_t$)	(0.04)	(0.16)	(0.02)	(0.01)	(0.15)
(FR$_i$+FC+Shock$_t$)	(0.16)	(0.08)	(0.35)	(0.39)	(0.49)
(∑ Cash Flow$_{it}$/Assets$_i$ without BNDES)	(0.14)	0.22	(0.24)	(0.07)	(0.49)
(∑ Cash Flow$_{it}$/Assets$_i$ with BNDES)	(0.04)	(0.01)	(0.82)	(0.08)	(0.02)
Shock$_t$=BNDES$_i$=0					
F test Joint Significance	(0.05)	(0.14)	(0.09)	(0.06)	(0.05)
Hausman Test	(0.21)	(0.23)	(0.18)	(0.34)	(0.79)
R2	0.51	0.68	0.37	0.28	0.42
Number of Constrained Firms	68	127	108	59	68
Total Number of Firms	4726				
Sample	1994Q3 to 2010Q4				

Table 13 Investment o Firms: Financial Restrictions and Other Control Variables

Our sample is composed of 291 non-financial public corporations and 4,735 private firms. Our sample period goes from the third quarter of 1994 to the fourth quarter of 2010. Of the private firms, 102 disclose quarterly information as well as yearly information while all the others disclose yearly information only. The information on the public corporations comes from the Brazilian Securities and Exchange Commission (CVM), and Economatica and the information on the private firms comes from Valor Econômico and confidential information from SERASA and Gazeta Mercantil. We classify a firm as small when the logarithm of its total assets is below the 30th percentile in all quarters or years of our sampling period and large when the logarithm of its total assets is above the 70th percentile in all quarters or years of our sampling period. We classify a firm using dividends criteria as financially restricted or non financially restricted when the payout ratio is lower than the 30^{th} percentile or above the 70^{th} of the cross section distribution of payout ratio in all quarters or years of our sample period respectively. We consider a firm as restricted if the predicted KZ is below the 30^{th} percentile and non financially restricted if it is above the 70^{th} percentile in all quarters or years of our sample period. We consider a firm to be financially restricted in the sense of the WW index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. We consider a firm to be financially restricted in the sense of the EFP index if its predicted values are above the 70^{th} percentile of the distribution and non financially restricted if it is below the 30^{th} percentile in all quarters or years of our sample period. Panel A presents the estimation for constrained firms with Quarterly Data. We eatimate using randon effects and white cross section to correct for heterocedasticity Panel A shows the estimation with quarterly data. Panel B presents the estimation with yearly data. P-values are under parenthesis.

Panel A Firms with Quarterly Data

	Size	Dividends	KZ	WW	EFP
Cash Flow$_{it}$/Assets $_{it}$	0.12	0.14	0.06	0.01	0.14
	(0.31)	(0.02)	(0.66)	(0.29)	(0.38)
Qit	0.18	0.37	0.34	0.18	0.44
	(0.04)	(0.08)	(0.59)	(0.21)	(0.41)
Shock$_t$	-0.04	-0.02	-0.01	-0.02	-0.01
	(0.08)	(0.03)	(0.09)	(0.06)	(0.09)
FR$_i$*Shock$_t$*Cash Flow$_{it}$/Assets $_{it}$	0.18	0.29	0.12	0.25	0.32
	(0.04)	(0.14)	(0.02)	(0.31)	(0.04)
FR$_i$	-0.03	-0.06	-0.05	-0.07	-0.17
	(0.06)	(0.04)	(0.06)	(0.08)	(0.04)
BNDES$_i$	0.02	0.03	0.06	0.18	0.14
	(0.07)	(0.02)	(0.08)	(0.06)	(0.04)
BNDES*FR$_i$*CashFlow$_{it}$/Assets $_i$	-0.03	-0.04	-0.02	-0.06	-0.08
	(0.08)	(0.05)	(0.07)	(0.08)	(0.12)
Leverage$_{it}$/ Assets $_{it-1}$	-0.13	-0.01	-0.22	-0.41	-0.27
	(0.02)	(0.00)	(0.48)	(0.14)	(0.24)
Sales$_{it}$/ Assets $_{it-1}$	0.29	0.38	0.37	0.17	0.21
	(0.13)	(0.14)	(0.14)	(0.12)	(0.07)
Growth of Sales$_t$/ Assets$_{it}$	0.36	0.19	0.18	0.21	0.23
	(0.13)	(0.21)	(0.15)	(0.06)	(0.09)
Cash$_{it}$/ Assets$_{it-1}$	0.27	0.34	0.12	0.15	0.18
	(0.41)	(0.18)	(0.26)	(0.13)	(0.06)
FR$_i$*Shock$_t$	-0.04	-0.16	-0.12	-0.01	-0.08
	(0.09)	(0.05)	(0.06)	(0.10)	(0.06)
FR$_i$*Cash Flow$_{it}$/Assets$_{it}$	0.04	0.03	0.13	0.12	0.01
	(0.01)	(0.02)	(0.02)	(0.02)	(0.08)
Shock$_t$*Cash Flow$_{it}$/Assets$_i$	0.01	0.04	0.19	0	0.07
	(0.00)	(0.08)	(0.01)	(0.03)	(0.02)
BNDES$_i$*FR$_i$	-0.01	-0.02	-0.08	-0.04	-0.07
	(0.06)	(0.05)	(0.06)	(0.05)	(0.04)
BNDES$_i$*CashFlow$_t$/Assets$_t$	-0.041	-0.032	-0.01	-0.06	-0.04
	(0.08)	(0.03)	(0.06)	(0.08)	(0.05)
Wald Tests					
FR$_i$ +Shock$_t$+BNDES$_i$	(0.04)	(0.15)	(0.03)	(0.10)	(0.34)
(Shock$_t$+FR$_i$)	(0.15)	(0.38)	(0.18)	(0.05)	(0.12)
Σ Cash Flow$_{it}$/Assets $_i$ without BNDES)	(0.14)	(0.48)	(0.03)	(0.18)	(0.02)
Σ Cash Flow$_{it}$/Assets$_{it}$ with BNDES	(0.26)	(0.14)	(0.19)	(0.78)	(0.01)
BNDES$_i$=Shock$_t$=0	(0.01)	(0.04)	(0.01)	(0.02)	(0.18)
Hausman Test	(0.03)	(0.07)	(0.04)	(0.24)	(0.13)
F test Joint Significance	(0.01)	(0.08)	(0.12)	(0.11)	(0.09)
R2	0.41	0.56	0.79	0.81	0.43
Number of Constrained Firms	120	168	105	98	108
Total number of firms	393				
Sample		1994Q3 to 2010Q4			

Panel B Firms with Annual Data

	Size	Dividends	KZ	WW	EFP
Cash Flow$_{it}$/Assets $_{it-1}$	0.12	0.11	0.02	0.22	0.09
	(0.31)	(0.05)	(0.06)	(0.04)	(0.03)
Q$_{it}$	0.14	0.28	0.31	0.34	0.32
	(0.02)	(0.06)	(0.15)	(0.12)	(0.15)
Shock$_t$	-0.01	-0.02	-0.13	-0.05	-0.09
	(0.08)	(0.07)	(0.02)	(0.01)	(0.04)
FR$_i$*Shock$_t$*Cash Flow$_{it}$/Assets $_{it}$	0.07	0.01	0.12	0.01	0.12
	(0.02)	(0.16)	(0.24)	(0.12)	(0.05)
FR$_i$	-0.04	-0.05	-0.02	-0.06	-0.06
	(0.01)	(0.14)	(0.04)	(0.19)	(0.19)
BNDES	0.05	0.18	0.14	0.02	0.09
	(0.01)	(0.04)	(0.05)	(0.04)	(0.18)
BNDES*FR$_i$*CashFlow$_{it}$/Assets $_{it}$	-0.02	-0.21	-0.18	-0.06	-0.14
	(0.04)	(0.11)	(0.19)	(0.17)	(0.06)
Leverage$_{it}$/ Assets $_{it}$	-0.14	-0.12	-0.13	-0.36	-0.34
	(0.29)	(0.08)	(0.19)	(0.26)	(0.16)
Sales$_{it}$/ Assets $_{it}$	0.04	0.08	0.04	0.22	0.05
	(0.03)	(0.04)	(0.01)	(0.00)	(0.07)
Growth of Sales$_{it}$/ Assets $_{it}$	0.28	0.16	0.15	0.05	0.23
	(0.07)	(0.26)	(0.08)	(0.11)	(0.41)
Cash$_{it}$/ Assets $_{it}$	0.26	0.04	0.24	0.12	0.27
	(0.14)	(0.08)	(0.15)	(0.06)	(0.08)
FR$_i$*Shock$_t$	-0.05	-0.18	-0.14	-0.17	-0.24
	(0.01)	(0.15)	(0.18)	(0.02)	(0.34)
FR$_i$*Cash Flow$_{it}$/Assets $_{it}$	0.25	0.19	0.44	0.35	0.12
	(0.06)	(0.04)	(0.38)	(0.06)	(0.06)
Shock$_t$*Cash Flow$_{it}$/Assets $_{it}$	0.18	0.03	0.15	0.02	-0.15
	(0.21)	(0.06)	(0.28)	(0.04)	(0.07)
BNDES$_i$*FR$_i$	0.06	0.02	0.06	0.04	0.08
	(0.18)	(0.15)	(0.17)	(0.16)	(0.21)
BNDES*CashFlow$_{it}$/Assets $_{it}$	-0.023	-0.014	-0.02	-0.04	-0.01
	(0.02)	(0.28)	(0.18)	(0.19)	(0.49)
Wald Tests					
(FR$_i$+Shock$_t$+BNDES)	(0.03)	(0.15)	(0.18)	(0.02)	(0.05)
(Shock$_t$+FR$_i$)	(0.04)	(0.02)	(0.01)	(0.15)	(0.18)
(Σ Cash Flow$_{it}$/Assets $_i$without BNDES	(0.45)	(0.09)	(0.38)	(0.24)	(0.08)
(Σ Cash Flow$_{it}$/Assets $_i$ with BNDES)	(0.24)	(0.07)	(0.19)	(0.11)	(0.15)
BNDES=Shock =0	(0.01)	(0.03)	(0.04)	(0.00)	(0.01)
F test Joint Significance	(0.00)	(0.08)	(0.04)	(0.00)	(0.01)
Hausman Test	(0.34)	(0.04)	(0.09)	(0.50)	(0.12)
R2	0.47	0.18	0.25	0.19	0.1
Number of Constrained Firms	68	127	108	59	68
Total Number of firms	4725				
Sample		1994Q3 to 2010Q4			