The Real Effects of Capital Controls: Credit Constraints, Exporters and Firm Investment

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This paper evaluates the effects of capital controls on firm-level stock returns and real investment using data from Brazil. Theory suggests that the imposition of capital controls can drive up the cost of capital and curb investment. Credit constraints are also more likely to bind for firms that are more dependent on external finance. The data suggest that there is a significant decline in cumulative abnormal returns for Brazilian firms following the imposition of capital controls in 2008-2009 consistent with an increase in the cost of capital. Conditioning on firm-characteristics such as firm size and export status, the data suggest that large firms and the largest exporting firms are less affected by the controls. Firms that are more dependent on external finance are however more adversely affected by the controls. The evidence is consistent with the hypothesis that capital controls increase market uncertainty and reduce the availability of external finance, which in turn lowers investment at the firm-level.

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1. Introduction

There is a renewed debate in academic and policy circles about the merits of international capital mobility. While free capital mobility brings many potential welfare gains, it also entails significant risks. As part of the larger debate about financial globalization, the extent to which policy-makers should allow foreign capital to flow into their economies remains a controversial issue particularly in the context of the massive foreign capital inflows that emerging markets have experienced following the global financial crisis of 2008-2009.

Within this debate, the use of capital controls, in particular controls on inflows, has taken center stage. Several emerging market nations such as Brazil, Indonesia, and South Korea have recently imposed taxes to curb inflows of foreign capital. South Korea has also implemented caps on the percentage of foreign reserves banks can hold. In December of 2012, the IMF released an official statement in favor of the use on capital controls (IMF 2012). "For countries that have to manage the risks associated with inflow surges or disruptive outflows, a key role needs to be played by macroeconomic policies, as well as by sound financial supervision and regulation, and strong institutions. In certain circumstances, capital flow management measures can be useful. They should not, however, substitute for warranted macroeconomic adjustment."

While the case for capital controls rests on promoting prudential controls designed to mitigate the volatility of foreign capital inflows, there is also an implicit aspect of controls that is protectionist in nature aimed at maintaining persistent currency undervaluation. Many policy makers especially from emerging Asia and Latin America have expressed concerns that massive inflows in particular can lead to appreciation of the exchange rate and loss of competitiveness with potential lasting effects on the tradable sector.[1]

[1] In September 2010, the Finance Minister of Brazil, Guido Mantega, used the term 'currency war' to describe the efforts of nations to devalue their currencies in order to augment the competitiveness of their exports in international markets. In particular, Mantega blamed the monetary policies of the world's major central banks, such as the U.S. Federal Reserve and the European Central Bank, for the currency war. While these trends preceded the Great Recession of 2008, following the recovery from the Sub Prime crisis of 2008 low interest rates in developed countries have continued to exacerbate this trend. Jonathan Wheatley and Peter Garnham, "Brazil in 'currency war' alert," Financial Times, September 27, 2010, http://www.ft.com/intl/cms/s/0/33ff9624-ca48-11df-a860-00144feab49a.html#axzz1ld0BHqN4, accessed September 3, 2012.

Although the monetary policy decisions of the U.S. Federal Reserve, European Central Bank, the Bank of England and the Bank of Japan (as well as China) had a primarily domestic focus, they led to substantial spillover effects for emerging market economies. As the interest rates in developed economies remained low, investors were attracted to the higher rates in Brazil, Chile, Taiwan, Thailand, and South Korea. The Governor of Taiwan's central bank, Perng Fai-Nan explained, "The US printed a lot of money, so there's a lot of hot money flowing around. We see hot money in Taiwan and elsewhere in Asia… These short-term capital flows are disturbing emerging economies."

Thus far the extensive empirical literature has focused mostly on characterizing the aggregate effects of capital controls on exchange rates and interest rates.[2] However, aggregate data and macroeconomic analysis do not shed light on the channels through which capital controls can affect the economy at the micro-level. Data the firm- or plant-level offer an opportunity to do so. However studies about the effects of capital controls on firm-activity are relatively scarce[3]; data availability for emerging markets being an obvious constraint.

In this paper we will evaluate the effects of capital controls on firm-level stock returns and real investment using data from Brazil. We focus on Brazil as a case study for various reasons. Brazil has implemented a series of controls on capital flows in the last 5 years.[4] The stock market in Brazil is well developed and the country also has firm-level export data that allow us to examine both the firm-level response to capital flows as well as the impact of capital controls on the competitiveness of exporting firms.

Theory suggests that the imposition of capital controls can drive up the cost of capital and curb investment. Credit constraints at the firm level are also more likely to bind for firms that are more dependent on external finance. While our analysis could be motivated through different theoretical lenses, one hypothesis is based on credit

[2] See Magud, Reinhart and Rogoff (2011) for recent survey on capital controls. The evidence on the effectiveness of controls on reducing the volume of flows is mixed and stronger for effects on the composition of flows.

[3] Forbes (2007a) uses an Euler-equation framework to show that during the Chilean encaje, smaller traded firms experienced significant financial constraints. These constraints decreased as firm size increased. See also Forbes (2007b).

[4] Some previous noteworthy examples include the Unremunerated Reserve Requirements in Chile (1990s), Colombia (1990s, 2007), and Thailand (2006). Arguable, these historical examples do not compare to the level of active experimentation in the recent Brazilian experience.

constraints. If production and exporting are associated with fixed costs and dependent on external finance, credit constraints at the firm level become relevant. Firms with easier access to external finance or greater access to low cost of funds may be able to overcome the barriers associated with these fixed costs leading to increase investment and output.[5] Capital controls on the hand can increase uncertainty while reducing the availability of external finance, which can lower investment at the firm-level.

We use an event study methodology around the dates when the various capital control measures were announced using stock prices and firm level data from Datastream. The evidence points to a significant decline in cumulative abnormal returns for Brazilian firms following the imposition of capital controls on equity flows in 2008-2009 consistent with an increase in the cost of capital. Controls on debt flows, however, are associated with less negative returns suggesting that the market views equity and debt flows as different.

As far as firm-characteristics go the data suggest that large firms are less affected by the controls. We also find that exporting firms are less affected by controls. In particular the largest exporting firms, with receipts of more than $100 million are somewhat shielded from the controls. The evidence suggests that exporting firms may have access to foreign currency proceeds and are therefore not affected by the capital controls to the same extent as non-exporting firms or smaller exporters. Alternatively, if the capital controls are associated with currency depreciation, these firms may experience an increase in profits as their competitiveness improves. We also consider external finance dependence at the firm and sector level and find that firms that are more dependent on external finance are more adversely affected by the imposition of capital controls.

The paper proceeds as follows. Section 2 reviews the macro-economic conditions in Brazil in the 2000s and provides information about the recent use of capital controls measures. Section 3 reviews the literature on capital controls in Brazil and Section 4 describes the event study methodology, presents summary statistics and describes the

[5] If there are fixed costs associated with exporting, liquidity constraints at the firm level will also come into play. An appreciation of the domestic currency, despite potential negative effect on the competitiveness of exporters, may not have a large impact on aggregate exports (see Chaney, 2008).

theoretical underpinnings for the empirical analysis. Section 5 describes the results and Section 6 concludes.

2. Background: Brazil in the 2000s and the Recent Use of Capital Controls

Throughout the 2000s, the Brazilian economy expanded due to the nation's commodity exports and consumer boom, except for a brief recession lasting two quarters at the end of 2008 caused by the global financial crisis. However, the impact of the financial crisis was short-lived, and Brazil's economy swiftly returned to growth by the second quarter in 2009. The commodity boom, paired with increased inflows of foreign capital, placed upward pressure on the Brazilian currency, the Real.[6] In 2008, the Real reached R$1.6 per U.S. dollar from a low of R$3.1 per U.S. dollar in 2004.[7]

In an attempt to prevent an excessive inflow of foreign capital, stabilize the exchange rate and reduce the upper trend on inflation, Brazil's Central government adopted a system of capital controls on inflows from abroad.[8] In March 2008, the central government established the *Imposto Sobre Operações Financeiras* (IOF), a financial transaction tax of 1.5% placed on incoming foreign fixed-income investments, as a means of quelling the flow of capital into the national economy. However, by October of that year, the wide reaching effects of the international financial crisis were becoming clear. Foreign direct investment in Brazil nearly halved from US$45.1bn in 2008 to US$25.9bn in 2009.[9] In an effort to quell the outflow of investment, the government eliminated the IOF.

Brazil recovered quickly from the economic downturn, and during the first nine months of 2009, approximately US$20bn of foreign investments entered the Brazilian equities market.[10] With the resumption of massive capital inflows, capital inflows were

[6] The International Institute of Finance estimated that foreign capital inflows increased from US$11.2bn in 2006 to US$79.5bn in the following year. Brazil emerged as the biggest recipient of foreign capital in Latin America.
[7] Banco Central Do Brasil, accessed November 29, 2012.
[8] Capital controls are defined as any policy that is designed to reduce or redirect transactions into the capital account of a given nation. Capital controls are divided into administrative or direct controls, such as required approvals for transactions, and market-based or indirect controls, such as taxes. Such controls can be placed inflows or outflows of capital.
[9] Economist Intelligence Unit, EIU Country Data, accessed September 2012.
[10] "Brazil Increases Tax on Foreign Exchange Transactions Related to Foreign Investments in the Financial and Capital Markets," Memorandum, Simpson Thatcher & Bartlet LLP, October 22, 2009.

imposed again as early as February of 2009. On October 20, 2009, Brazilian authorities expanded the IOF tax to a 2% rate on fixed income, in addition to portfolio and equity investments. The IOF did not apply to inflows of direct investment.[11] Since its re-introduction in October of 2009, the IOF became a means for the Brazilian government to control the influx of capital into the nation, and the tax has repeatedly been both raised and expanded to include other forms of investments (see Table 1).

By late 2010, the Real continued to appreciate, emerging as one of the strongest performing currencies in the world. On October 5, 2010, Mantega announced that the IOF on fixed-income instruments was to be raised to 4%; less than two weeks later the tax was raised to 6%.

Throughout early 2011, the exchange rate continued to remain at R$1.6 against the U.S. dollar, and Mantega, who continued as Minister of Finance under the Rousseff administration, targeted the blame for Brazil's currency appreciation on incoming foreign capital originating in developed markets. The government decided to raise the IOF to 6% on foreign loans with a minimum maturity of up to 360 days in March 2011. By early April, the IOF was extended to loans with a maturity of up to two years. The increase in tax rate represented a shift away from a dependency on high interest rates to combat the growing levels of inflation in Brazil.

The decision to place capital controls on incoming investments was not unanimously supported. Edemir Pinto, Chief Executive of the Brazilian Stock Exchange, called the government to remove some of the existing capital controls on the grounds that the IOF was damaging the equity market. Over half of the money raised by Brazilian companies from IPOs originated from foreign investors, and Pinto claimed the tax on financial transactions was choking foreign inflows of capital. In early December 2011, the 2% IOF tax on equities was removed.

As the economy continued to be unresponsive to the government's stimulus spending, the Central Bank began aggressively cutting its overnight rate, known as the Selic rate, in an attempt to push down the Real. Copom, the monetary policy board at the Central Bank, had voted to cut the Selic rate eight consecutive times over a ten month

[11] "Brazil Increases Tax on Foreign Exchange Transactions Related to Foreign Investments in the Financial and Capital Markets," Memorandum, Simpson Thatcher & Bartlet LLP, October 22, 2009.

period, reducing the Selic rate from 12.5% in late August 2011 to 8% in July 2012. The Copom decided to reduce the Selic rate, despite inflation measuring 6.5% in 2011, above the set 4.5% target.[12] The first week of June 2013, Brazil removed the tax on foreign investments in local debt and the 1% tax charged currency derivatives.[13,14] In July 1st they further eliminated reserve requirements on short dollar positions held by local banks.[15]

3 The Recent Literature on Capital Controls in Brazil

In advancing the theoretical rationale for prudential capital controls, some economists have focused on boom-bust cycles in capital inflows to identify and prescribe policies to mitigate externalities generated by an amplified build-up in external debt during capital-inflow booms which in turn lead to costly deleveraging if there is a sudden stop in these flows. Others have voiced macro management concerns associated to the controlling inflation rates though higher interest rates in a world capital mobility (the "irreconcilable trilogy") and on the macro prudential side, the fueling consumption booms and asset price bubbles instead of productive investment. The case for counter-cyclical prudential controls is the same as for the macro-prudential regulation of the financial sector. Its objective is to design measures that make agents internalize their contributions to systemic risk to curb the destabilizing impact of capital inflow booms and busts.

It must be noted that the models generally develop the case for prudential controls all rely on external debt to generate excessive leverage build-ups during capital inflow booms. There is a general consensus that the distinction between debt and equity is an extremely important one when discussing the benefits of capital account openness. Since debt does not embody the risk-sharing aspects of international equity flows, excessive reliance on external debt (especially foreign-currency denominated bank loans that generate currency mismatches on balance sheets) can cause financial distress as we have

[12] Gerald Jeffris and Tom Murphy, "Brazil Keeps 4.5% Inflation Target for 10th Year," Wall Street Journal, June 28, 2012, http://online.wsj.com/article/BT-CO-20120628-714026.html, accessed September 6, 2012.
[13] http://www.bloomberg.com/news/2013-06-13/brazil-dismantles-capital-control-as-real-drops-to-four-year-low.html.
[14] http://www.reuters.com/article/2013/06/05/brazil-tax-iof-idUSL1N0EG23E20130605.
[15] http://www.bloomberg.com/news/2013-06-25/brazil-eliminates-reserve-requirement-on-bets-against-the-dollar.html.

seen in many an emerging-market crisis. It is also important to observe that in contrast to the sharp reversal in debt flows during recent emerging-market crises, net portfolio equity inflows remained more stable.

Several papers have studied the effects of capital controls in Brazil. Golfajn and Minella (2005) provide several stylized facts regarding the evolution of capital flows and controls in Brazil in the last three decades. The authors conclude that, notwithstanding the financial crises and macroeconomic volatility of the recent past, capital account liberalization and the floating exchange regime have led to a more resilient economy and recommend further liberalization of the capital account is warranted and should be accompanied by a broad range of reforms to improve and foster stronger institutions.

Carvalho and Garcia (2008) show strong evidence that the controls had been bypassed during the first years after the end of hyperinflation (1994), when a combination of controlled exchange rate with extremely high interest rates attracted much carry-trade. More recently, Chamon and Garcia (2013) find that "the controls were effective in the sense of creating distortions in the pricing of financial assets, i.e., making the domestic assets more expensive." Therefore, controls were effective in partially segmenting the Brazilian financial market from the international market. However, the controls do not seem to have been effective to deter the appreciation of the *real* when capital inflows were strong, a stated objective of the Brazilian authorities."

Forbes, Fratzscher, Kostka, Straub (2012) use changes in Brazil's tax on capital inflows from 2006 to 2011 to test for direct portfolio effects and externalities from capital controls on investor portfolios. The analysis is based on information from investor interviews. The authors find that an increase in Brazil's tax on foreign investment in bonds causes investors to significantly decrease their portfolio allocations to Brazil in both bonds and equities. Investors simultaneously increase allocations to other countries that have substantial exposure to China and decrease allocations to countries viewed as more likely to use capital controls. Much of the effect of capital controls on portfolio flows appears to occur through signaling—i.e. changes in investor expectations about future policies—rather than the direct cost of the controls. This evidence of significant externalities from capital controls suggests that any assessment of controls should consider their effects on portfolio flows to other countries.

4. Event Study Methodology and Summary Statistics

We use an event-study methodology to examine the reaction of investors to positive and negative events (strengthening or weakening the capital controls).[16] If capital markets are semi-strong form efficient with respect to public information, stock prices will quickly adjust following an announcement, incorporating any expected value changes (Andrade et al, 2001). We analyze several windows (two, three, five, eleven, and twenty one days) but present results for the two day windows in our main specifications as this is the most stringent test we can apply to capture the announcement effect of the capital controls with less concern about other confounding news events.

As a first step, we examine the abnormal stock return around various different windows of time surrounding the announcement of the capital control policy. Stock prices are from Datastream. The market returns used in the estimations is BOVESPA (the most commonly quoted index in Brazil). We also analyze different broad indices available for different sectors or classes of firms. All returns are estimated using a symmetric corresponding day event window around the announcement date.

We calculate the mean cumulative return of the target stock price within the different windows of the announcement dates. We assume that stock prices follow a single factor market model. Our estimation period is 280 days before and up until 30 days preceding the event date. Cumulative abnormal returns (CARs) sum the abnormal returns over the event window, with abnormal returns estimated using a market model with Scholes-Williams betas that make adjustments for the noise inherent in daily returns data. In particular, nonsynchronous trading of securities introduces a potentially serious econometric problem of errors in variables to estimate the market model with daily returns data (Scholes and Williams, 1977). To address this problem, Scholes-Williams betas provide computationally convenient and consistent estimators for the market model. Using a standardized value of the cumulative abnormal return, we test the null hypothesis that the return is equal to zero.

Data about firm characteristics are taken from Worldscope. Our main analysis uses firms listed in Bovespa. In the robustness section we use other indices such as

[16] For more details, see MacKinlay (1997).

IBRA. We use quarterly data from Q1 2006-Q4 2012. These include the (log) of total assets, as a proxy for size and debt to total assets and short term debt to total debt as proxies of liquidity.[17] The firm level information was matched to export status and the range of exports using data from the Brazilian Secretary of External Trade (Secretaria de Comercio Exterior, Secex). The export range is in US$ (FOB) and includes firm exporting less than $1million, between $1 million and $100 million, and above $100 million.

4.1 Summary Statistics

Figure 1 depicts the evolution of the Bovespa index (the most commonly quoted index) corresponding to the different capital control announcements in Table 1. The table includes the date the capital control measure was announced, whether the control affected inflows of debt or equity, the change in the market return on the BOVESPA index in the two day post-announcement period and a description of the event.

Table 2 shows summary statistics for Brazil's Bovespa. The data are divided into different sub-periods that correspond to different round of capital control policies. The first period is Q1 2008-Q4 2008 when capital controls were announced and subsequently reduced on 10/23/2008. Q1 2009-Q3 2009 is a time of no new announcements about controls. In the period between Q4 2009-Q3 2011 new controls were introduced and changed eight times over this period. From Q4 2011 onwards while controls on longer term debt instruments were introduced, they were removed for all but a few instruments. Table 2 shows both nominal and real returns on the aggregate BOVESPA index which shows that in the immediate aftermath of the global financial crisis the BOVESPA showed strong positive returns corresponding to the surge in foreign capital inflows.

Table 3 presents firm level summary statistics for the firms in the Bovespa index for different sub-periods. Information includes firm size, and exporter status, liquidity, and leverage measures.

[17] Data availability varies across firms.

4.2 Theoretical Underpinnings

The focus of this paper is on the imposition of capital controls. Theory predicts that the direction of the change in expected returns in response to the imposition of capital controls will be firm specific. Expected returns will rise for firms whose exposure to systematic risk increases and fall for those whose exposure decreases following capital controls announcements. The change in expected returns will be reflected in stock prices. For example, a rise in a firm's expected return will cause a decrease in its stock price.

As an analogous thought experiment consider the liberalization of stock markets as countries went from financial autarky to financial openness in the late eighties and early nineties in many emerging markets including Brazil. Here the expected return changes could be decomposed into two components—a change in the risk free rate and a change in the firm-specific risk premium. Moving from financial autarky to openness constitutes a change in the relevant benchmark for the firm-specific expected return.

To see this, notice that the benchmark for the risk-free rate changes from the country-specific risk-free rate in autarky to the world risk free rate. If the risk free rate under autarky is greater than the world risk-free rate (not an unreasonable hypothesis given that emerging-markets are capital-scarce in comparison to advanced countries) then we expect the risk-free rate to fall as countries liberalize their stock markets and experience inflows of foreign capital.

Similarly, if the benchmark for measuring a firm's exposure to systematic risk changes from the domestic market to the world market, we expect that the firm-specific risk premium will fall if a firm's returns are more correlated with the domestic market than with the world market. Here a firm's exposure to systematic risk that determines the risk premium term in the firm's expected return depends on the covariance of the firm's cash flows with the domestic relative to the world market. The higher the systematic risk, the greater the expected return or cost of capital for a given firm. Taken together the expected return (or cost of capital) can fall due to the risk-free rate (or average cost of capital) effect and the diversification (or systemic risk) effect as countries move from financial autarky to openness. Concomitantly, if expected future cash flows remain unchanged stock prices will rise as the expected returns fall.

Indeed Chari and Henry (2004) show that when countries liberalize their stock markets, firms that become eligible for foreign purchase (investible), experience an average stock price increase of 15.1 percent. Since the historical covariance of the average investible firm's stock return with the local market is roughly 200 times larger than its historical covariance with the world market, liberalization reduces the systematic risk associated with holding investible securities. Consistent with this fact the average effect of the reduction in systematic risk is roughly two fifths of the total increase in stock prices and the firm-specific increases are directly proportional to the firm-specific changes in systematic risk.

The imposition of capital controls in contrast constitutes a move away from financial openness to financial autarky. As a consequence, the risk-free and the firm-specific systematic risk may rise following the imposition of capital controls, and the expected return (or cost of capital) may go up and stock prices fall. Therefore negative cumulative abnormal returns following capital control policy announcements would suggest that, all else equal, stock prices fall as the market imputes an increase in expected returns or the firm-specific cost of capital.

Following the analysis in Stulz (1999) and Chari and Henry (2004), assume a small country whose equity market is completely integrated into world equity markets.[18] Also assume that all investors in the world are risk averse and care only about the expected return and variance of their investment. In an integrated world capital market the small country's equity market becomes part of the global equity market and expands the diversification opportunities for foreign investors. Since foreign investors can invest in the country's stock market and domestic investors can invest abroad, the risks associated with domestic production are borne by both foreign and domestic investors.

With completely open capital markets, the relevant source of systematic risk becomes the world market. Therefore, if global investors care only about the expected return and volatility of their portfolio, it follows that the capital asset pricing model (CAPM) will hold for the world market and the risk premium on any risky asset is proportional to its world beta. Let $E[\tilde{R}_i^*]$ be the required rate of return on firm i in the

[18] For a detailed analysis of international asset pricing models see Obstfeld and Rogoff (1996, Chapter 5).

integrated capital market equilibrium. It follows that:

$$E[\tilde{R}_i^*] = r_f^* + \beta_{iW}(E[\tilde{R}_W] - r_f^*) \quad (1)$$

where β_{iW} denotes firm i's beta with the world market, $E[\tilde{R}_W]$ denotes the required rate of return on the world equity market portfolio, and r_f^* the world risk-free rate. Under our assumptions, the aggregate risk premium on the world market portfolio is $\gamma\sigma_W^2$, where σ_W^2 is the variance of the return on the world portfolio.

Now consider the impact on firm $i's$ required rate of return when the country imposes capital controls effectively segmenting the country's stock market from the rest of the world. Assume also for now that that the expected value and variance of the profits from domestic production activities are unaltered by the controls.

After the imposition of controls, market segmentation albeit varying in degree depending on the range and magnitude of the controls will reduce the diversification opportunities for foreign investors. Similarly, the effects will be magnified if domestic investors are also circumscribed in their ability to invest abroad. By hampering the ability of foreign investors to access the domestic stock market, the relevant pool of investors will tilt towards domestic investors. It follows that in the now segmented equity market for any individual stock we have:

$$E[\tilde{R}_i] = r_f + \beta_{iM}(E[\tilde{R}_M] - r_f) \quad (2)$$

where $E[\tilde{R}_i]$ is the required rate of return on firm $i's$ stock, r_f is the risk-free rate in the domestic market, β_{iM} is the beta coefficient of firm i with the domestic market portfolio before liberalization, and $E[\tilde{R}_M]$ is the expected return on the domestic market.

Admittedly, equation (2) represents the extreme case of complete segmentation. Depending on the scope or extensiveness of the controls the expected return benchmark will range between the complete segmentation and full integration cases. The controls may alternatively be thought of as creating a price wedge in the expected returns or a tax that drives up the expected return relative to the benchmark return under full integration. Indeed a number of studies about capital controls take this analytical tack.

To recap there are two channels through which capital controls can affect firm-level required rates of return. The first effect, a change in the risk-free rate, is common to all firms—capital controls can drive up the domestic interest rate if they are effective in keeping foreign capital out or driving foreign capital outflows. The second effect of liberalization is idiosyncratic to firm *i* and depends on the systemic risk associated with of firm *i*'s stock return with the domestic market relative to the systemic risk of firm *i*'s stock return with the world market. If risk-free rates and the firm specific risk premium both rise following the imposition of capital controls, the required rate of return for a given firm will go up and its stock price will fall. In mapping the theory to the data, an increase in required rates of return and a fall in stock prices will be reflected in negative cumulative abnormal returns in the event windows surrounding capital control announcements.

Note that if the expected value or variance of the domestic production activities are altered as a consequence of the controls, the impact on the stock price will depend on two effects—the expected cash flow effect and the required rate of return effect. A priori if some firms benefit from the protectionist variety of capital controls, it is possible that expected cash flows could increase more than the rise in the required rate of return such that stock prices rise and cumulative abnormal returns are positive following the imposition of capital controls. For example, exporting firms may benefit from protectionist capital controls if the exchange rate depreciates and expected future cash flows go up.

5. Results

5.1.1 Abnormal Returns and Firm Characteristics

Table 4 presents evidence of the stock market's response to capital control events using an event-study framework. The basic regression specification is as follows:

$$CAR_{it} = Constant + FirmControls_{it} + \varepsilon_{it} \quad (3)$$

where CAR_{it} is the cumulative abnormal return for firm *i* over the event window *t*. The constant term captures the impact of the announcement on average returns and firm controls include a set of firm-specific characteristics such as size, leverage, and so on. The specification includes robust standard errors.[19]

Measures of cumulative abnormal returns using Scholes-Williams betas suggest a significant decline in stock returns surrounding the capital control announcements consistent with an increase in the cost of capital for firms listed on the BOVESPA (Column 1). Quantitatively cumulative abnormal returns fall by about -0.43% on average over a two day window. The effect is statistically significant at the 1% level. Column 2 includes a proxy for firm size in terms of log total assets lagged by one quarter.

Controlling for size, the coefficient on the constant term suggests that the cumulative abnormal returns fall on average by a quantitatively significant -3.39% at the 1% level which is an order of magnitude higher than the simple regression in Column (1) that does not control for firm-size and suggests that firm-size captures an important dimension of underlying heterogeneity at the firm level. The size variable measured by the lagged value of total firm assets has a positive and significant effect on abnormal returns also at the 1% level. However the magnitude of this effect is outweighed by the magnitude of the decline in average cumulative abnormal returns. The results from the specification in Column (2) therefore suggest that large firms were somewhat shielded from the imposition of capital controls but on average the market imputes a significantly negative value to the announcement of the controls.

[19] Appendix A presents results using two-way clustered errors.

Including controls for leverage such as debt to total assets in Column 3 and short term debt to total debt does not appear to have a significant effect on the abnormal returns. Columns 3 and 4 corroborate that on average cumulative abnormal returns are significantly negative at the 1% level while firm size serves to somewhat mitigate the negative effect on abnormal returns in the immediate aftermath of capital control announcements.[20]

Column 6 includes a variable that takes into account a firm's exporter status. The evidence suggests that the average effect of the capital controls announcement is negative and significant at the 1% level the coefficient on exporter status is positive and significant. The finding is consistent with two explanations.

First, exporting firms may have access to foreign currency proceeds and therefore not affected by the capital controls to the same extent as purely domestic firms. Second, if the capital controls are designed to reduce foreign capital inflows and as a result prevent the domestic currency from appreciating, exporters could be in an improved competitive position internationally which drives up their expected cash flows and hence abnormal returns. The second explanation is consistent with the argument that as a by-product of prudential capital controls designed to mitigate the volatility of foreign capital inflows and manage endogenous systemic risk, a depreciated currency may benefit exporting firms in the country imposing the controls. Indeed Column 6 which includes controls for firm-size and exporter status suggests that large, exporting firms are likely to be less negatively affected by the capital controls policy.

Column 7 further explores the impact of the capital controls announcement on exporting firms by size groups. It is interesting to note that smaller exporters in the <$1 million and $1-$100 million revenue bins do not experience significant returns, the coefficient on exporting firms with the largest revenues, i.e., in the >$100 million in revenues is positive and significant at the 5% level suggesting controlling for firm size, the magnitude of the export revenues also matter. The evidence suggests that large firms with large export revenues are somewhat shielded from the negative effects of capital controls announcements.

[20] Detailed information on the source of debt financing by firms (from banks for example) was more limited in our data set. We obtain similar results when controlling by the share of debt from banks.

5.1.2 Debt versus Equity Events

The recent Brazilian capital controls distinguish between debt and equity related measures. Table 5 displays regression specifications that separate the results between debt and equity measures.[21] A very similar pattern of results holds with highly significant negative cumulative abnormal returns when capital control measures are announced with slightly muted effects when we control for firm size. The overall announcement effect however remains negative and statistically significant.

Two patterns are worth noting. First controls on debt flows in Panel A display a less negative announcement effect (Columns 2-4, 6-7) compared to controls on equity flows in Panel B that appear to have a more negative announcement effect. The decline in average cumulative abnormal returns in response to announcements regarding controls on debt ranges from -2.9% to -3.47% over the two day window in Columns 2-4 and 6-7 (Panel A). The effects are significant at least a 5% level of significance. Note that consistent with the specifications in Table 4 these regressions control for firm size measured by total assets. The magnitude of the decline in announcement returns in response to controls on equity flows in contrast ranges from a significant -3.64% to -4.31% which is roughly 25% more negative. The result suggests that the market views controls on debt and equity as distinct and controls on equity flows are assessed more negatively than controls on debt flows.

The second piece of evidence that is worth noticing from this table is that for equity related announcements the short term debt ratio is negative and significant. The data suggest that for firms with higher levels of short-term debt, controlling for firm-size abnormal returns decline by an additional -1.4% leading to an overall average decline of -4.8% over the two day event window (Column 4, Panel B). The result suggests that controls on equity flows more adversely affect firms with higher levels of short-term debt. The evidence is perhaps consistent with the hypothesis that firms with higher levels of short-term debt also are more dependent on external finance in the form of short-term debt or equity and therefore the imposition of controls on equity flows has an even more

[21] Table 5 presents results using robust standard errors. Appendix A presents results using two-way clustered errors.

negative effect on firm returns. We examine the hypothesis of credit constraints and external finance dependence in the next subsection.

5.1.3 Credit Constraints and Abnormal Returns

Moving beyond the cost of capital per se, there is another factor to consider in the context of liquidity or credit constrained firms. Here the distinction between the differential cost of external and internal finance can also play a role. By affecting the cost of external finance, the imposition of capital controls could affect firms that are more dependent on external finance to fund their investment opportunities. The test then is whether firms (or industries) dependent on external finance are more adversely affected by capital controls as measured by the market's reaction to the policy announcement. Consistent with arguments in Rajan and Zingales (1998) there are two advantages to this simple test in that it focuses on mechanism by which the cost of finance affects firms growth prospects thus providing a stronger test of causality. Second, it can correct for industry effects.

Moreover, liquidity constraints at the firm level may depend on external finance dependence, firm-size and export status. If production and exporting are associated with fixed costs, liquidity constraints at the firm level become relevant. Firms with easier access to external finance or greater access to low cost of funds may be able to overcome the barriers associated with these fixed costs.

To proxy for a firm's dependence on external finance, we measure the extent of investment expenditures that cannot be financed through internal cash flows generated by the firm. Therefore, consistent with the measure in Rajan and Zingales (1998) a firm's dependence on external finance is defined as capital expenditures minus cash flow from operations divided by capital expenditures. Table 6 presents the results.

Column 1 of Table 6 shows the benchmark regression which includes controls for firm-size, exporter status and external finance dependence. Consistent with the hypothesis that firms that are more dependent on external finance may be affected adversely by capital controls, the coefficient on the external finance dependence variable is negative and significant at the 1% level. Average cumulative abnormal returns are

negative and significant while consistent with results in previous tables, firm-size and exporter status have positive and significant coefficients.

Columns 2 and 3 disaggregate exporting firms by the size of their exporting revenues. External finance dependence continues to have a negative and significant effect on abnormal returns. The evidence also suggests that while the smallest exporters (with revenues less than $1 million) are negatively affected, the larger exporters appear to be somewhat shielded. Note that Columns 2 and 3 have clustered and robust standard errors, respectively.

Columns 4-7 consider different measures for external finance dependence. Columns 4 and 5 include a dummy variable to distinguish between firms with high and low finance dependence relative to the mean. Columns 6 and 7 restrict the sample to manufacturing firms and classify them according to high and low external finance dependence following the Rajan and Zingales (1998) classification. The result that external finance dependence has a negative and significant effect of abnormal returns is robust to these alternative measures.

Rajan and Zingales (1998) make the case that there is a technological reason why some industries or sectors depend more on external finance than others. They argue that the initial project scale, gestation periods, cash harvest periods, and the need for continuing investment can differ substantially between industries. To test whether external finance dependence is also industry-dependent in the Brazilian context in the aftermath of the controls, the specifications in Columns 8-9 include sector fixed effects. The coefficient on external finance dependence continues to be negative and statistically significant.

If capital controls increase policy uncertainty while reducing the availability of external finance investment at the firm-level can fall. The next subsection explores the effects of capital controls on firm-level investment.

5.2 Capital Controls and Firm Investment

An advantage of firm-level data is that detailed balance sheet and incorporation information allow us to analyze the role of firm characteristics in explain the impact of the capital controls and to identify the transmission mechanisms of policy shocks more directly on to real variables. Theory suggests that there ought to be significant cross-

sectional variation in the stock price and real investment declines by firm-type (see Chari and Henry, 2004 and 2008). For example, the adverse effects on stock prices and investment may be stronger for small firms that are more dependent on external finance. The effects on investment may also be particularly adverse for exporting firms that are more dependent on external finance with a decline in the number of products and markets they serve following the imposition of capital controls. Imports of capital goods can also adversely affected by the policy.

Next we examine the cross-sectional variation in the stock price and real investment declines by firm-type to see if the observed patterns are consistent with the reduction in investment observed in this period (see Figure 2). We examine the impact on investment one year following the announcement of a capital control by event and find that investment falls for the BOVESPA firms for different announcements. Table 7 presents very preliminary evidence with and without firm-fixed effects by event. We will also examine whether the effects on investment are particularly negative for exporting firms that are more dependent on external finance as measured by leverage ratios and other measures of external finance dependence. The data will allow us to examine whether there is a decline in the number of products and markets they serve following the imposition of capital controls[22] and whether imports of capital goods are also adversely affected by the policy.

5.3 Robustness Checks and Additional Tests

We conduct a number of tests to ensure the robustness of these preliminary findings:

1. The firm and stock market regressions are estimated for different windows and different methodologies for computing returns (raw returns, CAPM) obtaining similar results. Note that the correlations between the betas (Scholes-Williams, standard CAPM and so on are very high.

[22] A vast literature on the importance of liquidity constraints includes Stiglitz and Weiss (1981), Fazzari, Hubbard and Peterson (1988) study the importance of financing constraints for investment among others and Holmstrom and Tirole (1997) work on the role of the lending channel.

2. We also use two-way clustered standard errors (firm and event) and the results are robust.
3. We estimate the initial regression specifications for firms listed on the alternative IBRA stock exchange.
4. We also run the estimations dropping the event with the most negative abnormal returns on 10/22/2008 which also coincides with the global financial crisis. The results remain robust. Results are not driven by the IPO of OGX (June-2008) or this firm in particular.
5. We run quantile (median) regressions for our main specifications. The results remain robust.

6. Conclusion

This paper examines the effects of capital controls on firm-level stock returns and real investment using data from Brazil. Theory suggests that the imposition of capital controls can drive up the cost of capital and curb investment. In particular, capital controls can increase uncertainty while reducing the availability of external finance.

We use an event study methodology around the dates when the various capital control measures were announced using stock prices and firm level data. There is a significant decline in cumulative abnormal returns for Brazilian firms following the imposition of capital controls on equity flows in 2008-2009 consistent with an increase in the cost of capital. Controls on debt flows, however, are associated with less negative returns suggesting that the market views equity and debt flows as different.

The data also suggest that large firms and exporting firms are less affected by the controls. In particular the largest exporting firms, with receipts of more than $100 million are somewhat shielded from the controls. However, in terms of magnitude the evidence suggests that the decline in average returns swamps the advantages that firm size and export status offer. Moreover, firms that are external finance-dependent are more adversely affected by the imposition of capital controls.

The rationale for capital controls policy measures range from macro-prudential efforts to reduce the volatility of foreign capital inflows to a protectionist stance to

maintain the competitiveness of the external sector. However, the evidence in this paper suggests that capital controls can increase market uncertainty and reduce the availability of external finance, which in turn can lower investment at the firm-level.

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Table 1. Capital Controls in Brazil: 2008-2012

Date	Change in Bovespa (%) 2 days after	Debt Event	Equity Event	Event
3/12/2008	-0.30%	1	0	IOF tax=1.5% on fixed income investments made by non-residents
10/22/2008	-10.23%	1	0	IOF tax=0% on fixed income investments following the collapse of Lehman Brothers
10/19/2009	-2.61%	1	1	IOF tax=2% introduced on equities and fixed income securities
11/18/2009	0.44%	0	1	Tax=1.5% on American Depositary Receipts (ADRs) converted into local stocks
10/4/2010	0.22%	1	0	IOF tax=4% on fixed income bonds and derivatives; 2% for equities
10/18/2010	-1.86%	1	0	IOF tax=6% on fixed income bonds and derivatives; 2% for equities
3/28/2011	1.20%	1	0	IOF tax=6% on overseas loans and bonds with maturities up to 1 year
4/6/2011	-0.46%	1	0	IOF tax to overseas bonds and bonds with maturities up to 2 years
7/26/2011	-1.06%	0	1	Tax of 1% on foreign exchange derivatives; legislation allow tax to be increased up to 25%
12/1/2011	1.32%	0	1	IOF tax=0% on variable income instruments traded on the exchange and certain debentures
2/29/2012	2.99%	1	0	IOF tax to cover overseas loans and bonds with maturities up to 3 years
3/9/2012	2.53%	1	0	IOF tax to cover overseas loans and bonds with maturities up to 5 years
5/21/2012	-3.48%	1	0	IOF tax=1.5% for individual borrowers (from 2.5%)
6/13/2012	0.82%	1	0	IOF tax to overseas loans and bonds with maturities up to 2 years
12/4/2012	0.16%	1	0	IOF tax to overseas loans and bonds with maturities up to 1 year

Source: Adapted from Brittany A. Baumann and Kevin P. Gallagher, "Navigating Capital Flows in Brazil and Chile," Initiative for Policy Dialogue Working Paper Series, Columbia University, June 2012. Note: IOF (*Imposto Sobre Operações Financeiras) is a tax placed on financial transactions.*

Table 2. Summary Statistics: Stock Market Index Returns (Percentage Changes)
Bovespa: Nominal and Real Index (Deflated by Consumer Price Index-CPI)

	Bovespa Index	Bovespa Index/CPI
Q1 2008-Q4 2008	-12.19	-15.67
Q1 2009-Q3 2009	-12.46	-16.15
Q4 2009-Q3 2011	35.41	26.07
Q4 2011	-13.83	-19.34
Q1 2012	13.97	12.35
Q2 2012-Q4 2012	-9.66	-11.89

Notes. Percentage Changes of Index Returns: Real Variables: Bovespa Index divided by the Consumer Price Index (x100). Source: Datastream.

Table 3. Summary Statistics: Firm Level Variables in Real Terms (Reais)
Q4-2007-Q4-2012 (Deflated by Consumer Price Index)

	Observations	Mean	Std. Dev	Median
Log Total Assets	862	16.838	1.692	16.625
Debt/Assets	855	32.575	14.946	31.240
Short-term Debt/Debt	851	0.285	0.228	0.216
(CE-CF)/CE	980	-65.855	899.734	-10.081
Log Plant, Prop., Equi	886	14.820	2.283	15.380
Exports	1000	0.410	0.492	0.000
Export < $1 mil	1000	0.045	0.207	0.000
Export $1 mil -$100 m	1000	0.145	0.352	0.000
Export > $100 mil	1000	0.220	0.414	0.000

Notes. Financial figures from Q4 2007 (last quarter prior to announcement regarding the introduction of capital controls on 3/12/2008). Nominal variables divided by the Consumer Price Index (x 100). Source: Datastream.

Table 4. Post Capital Control Announcement Returns are Significantly Negative.
Firms in Bovespa: All Events
Cumulative Abnormal Returns—2 day window

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Scholes-Williams						
	All Events						
Constant	-0.00428***	-0.0339***	-0.0347***	-0.0300**	-0.00613***	-0.0348***	-0.0354***
	(0.00118)	(0.0115)	(0.0120)	(0.0124)	(0.00136)	(0.0113)	(0.0108)
Log Total Assets		0.00177***	0.00168**	0.00159**		0.00169**	0.00173***
(lag 1y)		(0.000661)	(0.000671)	(0.000712)		(0.000672)	(0.000640)
Debt/Assets			7.58e-05				
(lag 1y)			(7.26e-05)				
Short-term Debt/Debt				-0.00413			
(lag 1y)				(0.00486)			
Exporter					0.00452*	0.00508*	
					(0.00250)	(0.00262)	
Export < $1 mil							-0.00570
							(0.00509)
Export $1 mil -$100 mil							0.00823+
							(0.00548)
Export > $100 mil							0.00532**
							(0.00234)
Observations	1,000	941	931	854	1,000	941	941
R-squared	0.000	0.006	0.006	0.005	0.004	0.0103	0.0152

Notes: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15. Cumulative Abnormal returns using Scholes-Williams betas. Log Assets, Debt to Assets and Short Term Debt to Total Debt all correspond to lagged values (to the closest year) taken from Worldscope. Exporting data (dummy variables) matched from Secex.

Table 5. There is a Distinction Between Controls on Debt and Equity.
Firms in Bovespa
Cumulative Abnormal Returns (2 day window)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Scholes-Williams						
	Panel A: Debt Events						
Constant	-0.00368***	-0.0328**	-0.0330**	-0.0290**	-0.00608***	-0.0340**	-0.0347***
	(0.00139)	(0.0135)	(0.0141)	(0.0147)	(0.00156)	(0.0133)	(0.0126)
Log Total Assets		0.00174**	0.00162**	0.00152*		0.00165**	0.00169**
(lag 1y)		(0.000778)	(0.000793)	(0.000844)		(0.000793)	(0.000746)
Debt/Assets			6.85e-05				
(lag 1y)			(8.31e-05)				
Short-term Debt/Debt				-0.00199			
(lag 1y)				(0.00565)			
Exporter					0.00584*	0.00634**	
					(0.00298)	(0.00306)	
Export < $1 mil							-0.00689
							(0.00603)
Export $1 mil -$100 mil							0.0101+
							(0.00652)
Export > $100 mil							0.00668**
							(0.00267)
Observations	797	776	768	692	797	776	776
R-squared	0.000	0.005	0.005	0.004	0.005	0.011	0.00178
	Panel B: Equity Events						
Constant	-0.00781***	-0.0387**	-0.0428**	-0.0364*	-0.00987***	-0.0401**	-0.0431**
	(0.00177)	(0.0188)	(0.0201)	(0.0192)	(0.00245)	(0.0185)	(0.0187)
Log Total Assets		0.00185*	0.00192*	0.00199*		0.00175+	0.00193*
(lag 1y)		(0.00108)	(0.00109)	(0.00111)		(0.00106)	(0.00107)
Debt/Assets			9.19e-05				
(lag 1y)			(0.000135)				
Short-term Debt/Debt				-0.0138*			
(lag 1y)				(0.00759)			
Exporter					0.00503+	0.00707*	
					(0.00349)	(0.00380)	
Export < $1 mil							0.00619
							(0.00643)
Export $1 mil -$100 mil							0.00916+
							(0.00612)
Export > $100 mil							0.00584+
							(0.00395)
Observations	268	224	222	220	268	224	224
R-squared	0.000	0.012	0.015	0.025	0.007	0.027	0.028

Notes: Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15. Cumulative Abnormal returns using Scholes-Williams betas. Log Assets, Debt to Assets and Short Term Debt to Total Debt all correspond to lagged values (to the closest year) taken from Worldscope. Exporting data (dummy variables) matched from Secex.

Table 6. Abnormal Returns for External Finance-Dependent Firms are Negatively Impacted by Capital Controls.
Firms in Bovespa: All Events
Cumulative Abnormal Returns (2 day window)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Scholes-Williams								
	Panel A: All Events							Panel B: All Events-Sector F.E.	
Constant	-0.0335**	-0.0346***	-0.0346***	-0.0229+	-0.0234**	-0.0260	-0.0368+	-0.00736	-0.0157
	(0.0157)	(0.0127)	(0.0109)	(0.0139)	(0.0102)	(0.0264)	(0.0226)	(0.0229)	(0.0212)
Log Total Assets	0.00162*	0.00168**	0.00168***	0.00127+	0.00129*	0.00185	0.00258*	0.000428	0.000892
(lag 1y)	(0.000903)	(0.000758)	(0.000641)	(0.000837)	(0.000673)	-0.0015	(0.00134)	(0.00139)	(0.00128)
(CE-CF)/CE	-7.96e-07***	-7.97e-07***	-7.97e-07***					-5.27e-07***	-6.00e-07***
(lag 1y)	(2.98e-07)	(2.98e-07)	(2.23e-07)					(1.39e-07)	(1.37e-07)
CE-CF/CE>mean				-0.00681**	-0.00662**				
(dummy variable)				(0.00292)	(0.00313)				
High Ext. Fin. (Manuf)						-0.00571***	-0.00546***		
(dummy variable)						-0.00186	(0.00160)		
Exporter	0.00535*			0.00724**		-0.00274		-0.00947***	
	(0.00317)			(0.00366)		(0.0033)		(0.00302)	
Export < $1 mil		-0.00570*	-0.00570		-0.00397		-0.00908**		-0.0100***
		(0.00343)	(0.00510)		(0.00364)		(0.00400)		(0.00318)
Export $1 mil -$100 mil		0.00895*	0.00895+		0.0102**		-0.00214		0.00137
		(0.00496)	(0.00548)		(0.00511)		(0.00386)		(0.00318)
Export > $100 mil		0.00537	0.00537**		0.00759+		-0.00693		-0.0137***
		(0.00438)	(0.00236)		(0.00505)		(0.00491)		
Observations	926	926	926	921	921	457	462	926	926
R-squared	0.0106	0.0116	0.012	0.014	0.019	0.009	0.010	0.003	0.009
S.E.	Two-way clust. err.	Two-way clust. err.	Robust std. err.	Two-Way Clust. err.	Two-Way Clust. err.	Two-Way Clust. err.	Two-Way Clust. err.	Robust std. err.	Robust std. err.

Notes: Two-way clustered standard errors in parenthesis in (1)-(2) and (4)-(7) and robust standard errors in (3) and (8)-(9). *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15. Cumulative Abnormal returns using Scholes-Williams betas. Sector f.e. in (8)-(9). Log Assets, Debt to Assets and Short Term Debt to Total Debt all correspond to lagged values (to the closest year) taken from Worldscope. CF: Cash flow; CE: capital Expenditure. Exporting data (dummy variables) matched from Secex.

Table 7. Capital Controls and Investment
Firms in Bovespa: All Events
One Year Effects

	(1)	(2)
VARIABLES	log_delta_ppen	log_delta_ppen
event_Q12008_1y	0.0240	0.0178
	(0.0230)	(0.0190)
event_Q42008_1y	-0.0394**	-0.0382*
	(0.0169)	(0.0216)
event_Q42009_1y	-0.0111	-0.0136
	(0.0141)	(0.0238)
event_Q42010_1y	-0.0343**	-0.0420
	(0.0171)	(0.0285)
event_Q12011_1y	0.0128	0.0472
	(0.0365)	(0.0520)
event_Q22011_1y	0.0377	-0.00404
	(0.0482)	(0.0844)
event_Q32011_1y	-0.185	-0.171
	(0.148)	(0.120)
event_Q42011_1y	0.125	0.115
	(0.161)	(0.185)
event_Q12012_1y	0.0354	0.0740
	(0.0631)	(0.0747)
event_Q22012_1y	-0.0176	-0.0706
	(0.0658)	(0.115)
event_Q42012_1y	-0.0993**	-0.0531
	(0.0451)	(0.100)
Trend		0.00211
		(0.00187)
Constant	0.0444***	0.571*
	(0.00816)	(0.335)
Firm Controls	No	Yes
Observations	2,141	1,912
R-squared	0.009	0.031
Number of company_id	69	69

Notes: Robust Standard Errors in Parenthesis. *** p<0.01, ** p<0.05, * p<0.1. PPE corresponds to Plant, Property and Equipment. Firm Controls include Assets, Debt to Assets and Short Term Debt to Total Debt from Worldscope.

Table 8: Robustness: Capital Controls (All Events, Debt Events), Bovespa and IBRA (Various Windows)

	BOVESPA			IBRA		
	Scholes-Williams	CAPM	RAW	Scholes-Williams	CAPM	RAW
	CAR			CAR		
	Panel A: All Events					
2 day	-0.00428***	-0.00348***	-0.0121***	-0.00574***	-0.00459***	-0.00902***
	(0.00118)	(0.00116)	(0.00154)	(0.000855)	(0.000828)	(0.00106)
2 day (prior)	-0.000726	-0.00218*	0.00396**	-0.000349	-0.00214***	0.00529***
	(0.00121)	(0.00117)	(0.00155)	(0.000829)	(0.000800)	(0.00101)
3 day	-0.00240‡	-0.00300**	-0.00270	-0.00342***	-0.00411***	-0.000785
	(0.00154)	(0.00152)	(0.00196)	(0.00107)	(0.00104)	(0.00131)
Observations	1,000	1,000	1,000	1,867	1,867	1,867
	Panel B: Debt Events					
2 day	-0.00368***	-0.00261*	-0.0123***	-0.00534***	-0.00391***	-0.00930***
	(0.00139)	(0.00137)	(0.00184)	(0.000996)	(0.000960)	(0.00126)
2 day (prior)	-0.000680	-0.00177	0.00261	0.000194	-0.00106	0.00446***
	(0.00138)	(0.00134)	(0.00179)	(0.000946)	(0.000916)	(0.00116)
3 day	-0.00132	-0.00154	-0.00299	-0.00236*	-0.00251**	-0.00108
	(0.00180)	(0.00177)	(0.00230)	(0.00124)	(0.00120)	(0.00151)
Observations	797	797	797	1484	1484	1484

Notes: Robust standard errors in parenthesis. ***p<0.01, **p<0.05, *p<0.1, ‡p<0.15. Cumulative Abnormal returns using Scholes-Williams betas and CAPM and Raw returns.

Appendix A. Firms in Bovespa: Capital Controls (All Events)
Cumulative Abnormal Returns—2 day window

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Scholes-Williams						
	All Events						
Constant	-0.00428**	-0.0339**	-0.0347**	-0.0300*	-0.00613**	-0.0348**	-0.0354***
	(0.00205)	(0.0159)	(0.0151)	(0.0171)	(0.00260)	(0.0156)	(0.0124)
Log Total Assets		0.00177**	0.00168*	0.00159*		0.00169*	0.00173**
(lag 1y)		(0.000901)	(0.000882)	(0.000953)		(0.000895)	(0.000746)
Debt/Assets			7.58e-05+				
(lag 1y)			(5.25e-05)				
Short-term Debt/Debt				-0.00413			
(lag 1y)				(0.00441)			
Exporter					0.00452+	0.00508*	
					(0.00299)	(0.00308)	-0.0057*
Export < $1 mil							-0.0035
							0.00823*
Export $1 mil -$100 mil							(0.00494)
							0.00532
Export > $100 mil							(0.00434)
							0.00173**
Observations	1,000	941	931	854	1,000	941	941
R-squared	0.000	0.006	0.006	0.005	0.004	0.0103	0.0152

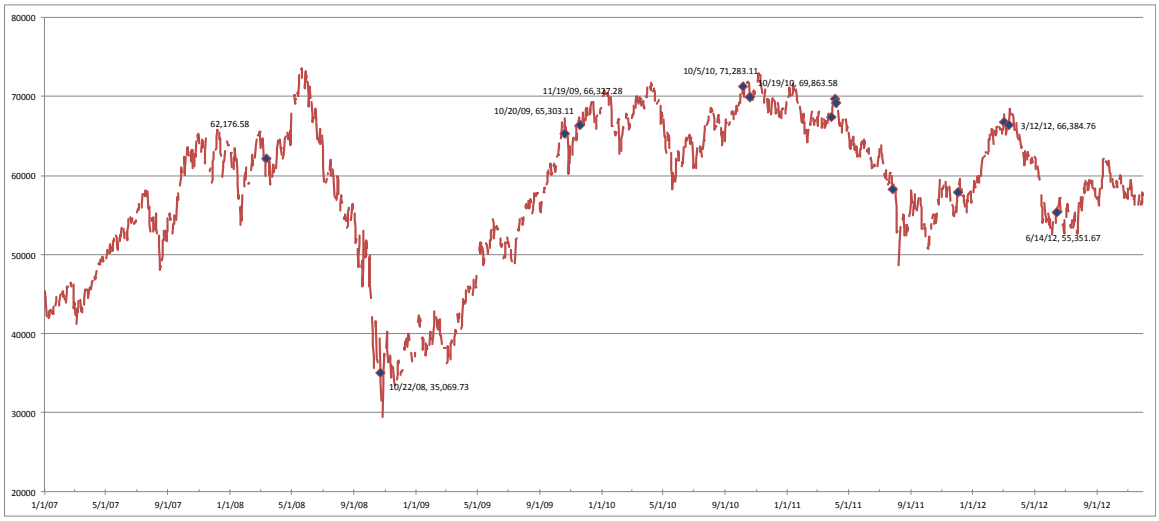
Notes: Two-way clustered errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15. Cumulative Abnormal returns using Scholes-Williams betas. Log Assets, Debt to Assets and Short Term Debt to Total Debt all correspond to lagged values (to the closest year) taken from Worldscope. Exporting data (dummy variables) matched from Secex.

Table Appendix B. Firms in Bovespa: Capital Controls (Debt Events and Equity Events)
Cumulative Abnormal Returns (2 day window)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Scholes-Williams						
	Panel A: Debt Events						
Constant	-0.00368+	-0.0328*	-0.0330**	-0.0290+	-0.00608*	-0.0340*	-0.0347**
	(0.00244)	(0.0178)	(0.0168)	(0.0193)	(0.00319)	(0.0176)	(0.0140)
Log Total Assets		0.00174*	0.00162*	0.00152		0.00165*	0.00169**
(lag 1y)		(0.00100)	(0.000982)	(0.00106)		(0.000992)	(0.000824)
Debt/Assets			6.85e-05				
(lag 1y)			(6.39e-05)				
Short-term Debt/Debt				-0.00199			
(lag 1y)				(0.00533)			
Exporter					0.00584*	0.00634**	
					(0.00298)	(0.00306)	
Export < $1 mil							-0.00689
							(0.00511)
Export $1 mil -$100 mil							0.0101*
							(0.00550)
Export > $100 mil							0.00668
							(0.00518)
Observations	797	776	768	692	797	776	776
R-squared	0.000	0.005	0.005	0.004	0.005	0.011	0.00178
	Panel B: Equity Events						
Constant	-0.00781***	-0.0387	-0.0428*	-0.0364	-0.00987**	-0.0401+	-0.0431*
	(0.00268)	(0.0274)	(0.0259)	(0.0264)	(0.00478)	(0.0261)	(0.0229)
Log Total Assets		0.00185	0.00192	0.00199		0.00175	0.00193
(lag 1y)		(0.00160)	(0.00154)	(0.00159)		(0.00159)	(0.00138)
Debt/Assets			9.19e-05				
(lag 1y)							
Short-term Debt/Debt				-0.0138**			
(lag 1y)				(0.00685)			
Exporter					0.00503	0.00707	
					(0.00684)	(0.00791)	
Export < $1 mil							0.00619
							(0.00636)
Export $1 mil -$100 mil							0.00916
							(0.00939)
Export > $100 mil							0.00584
							(0.00733)
Observations	268	224	222	220	268	224	224
R-squared	0.000	0.012	0.015	0.025	0.007	0.027	0.028

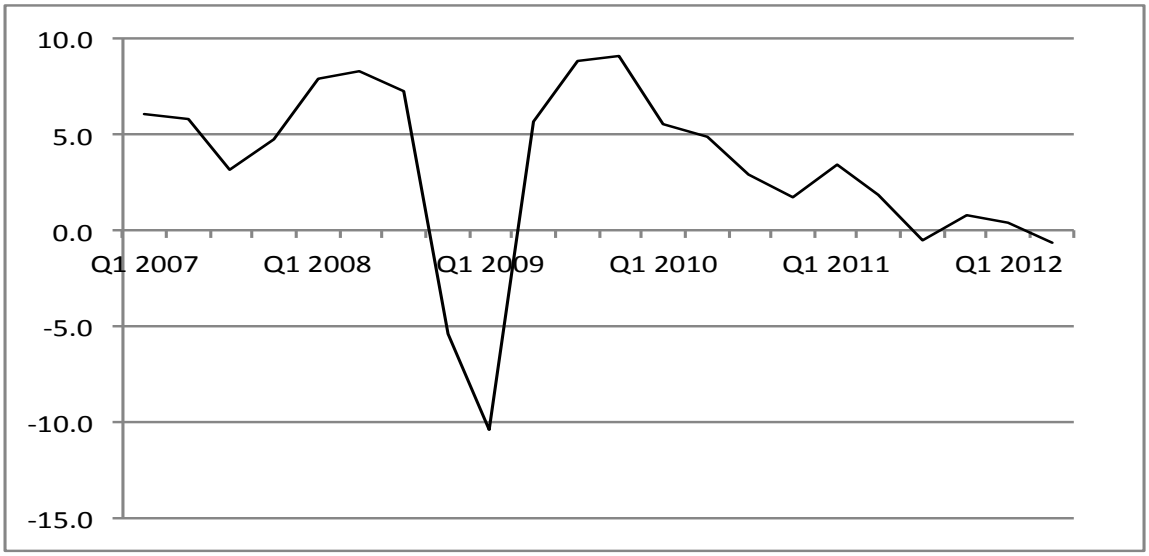
Notes: Two-way clustered errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15. Cumulative Abnormal returns using Scholes-Williams betas. Log Assets, Debt to Assets and Short Term Debt to Total Debt all correspond to lagged values (to the closest year) taken from Worldscope. Exporting data (dummy variables) matched from Secex.

Figure 1: Bovespa Index and Capital Controls



Source: Datastream

Figure 2: Gross Fixed Capital Formation, Seasonally Adjusted (Quarterly Percent Change)



Source: OECD.