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

The data show a statistically significant drop in cumulative abnormal returns for Brazilian firms following recent capital control announcements. Large firms and the largest exporting firms appear less negatively affected compared to external-finance-dependent firms, and capital controls on equity inflows have a more negative announcement effect on equity returns than those on debt inflows. The controls increase the cost of capital for Brazilian firms and real investment falls in the three years following the controls. Overall, the results are consistent with capital controls as discriminatory taxation of foreign investors.

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1. Introduction

The massive surge of foreign capital to emerging markets in the aftermath of the global financial crisis of 2008–2009 has led to a renewed debate about the merits of the free flow of international capital (Fratzscher, Lo Duca, and Straub 2013). International capital mobility has many benefits such as reducing the cost of capital, increasing investment and economic growth (Chari and Henry 2004, 2008; Bekaert, Harvey, and Lundblad 2003, 2005), and international diversification gains for foreign investors (French and Poterba 1991, Adler and Dumas 1983). It also poses significant risks for the recipient economies when the flows are volatile, show reversals, or are subject to sudden stops (Forbes and Warnock 2012).

Although the monetary policy decisions of the U.S. Federal Reserve, European and other developed-market central banks had a primarily domestic focus during the crisis, there were substantial spillover effects for emerging-market economies (Fratzscher, Lo Duca, and Straub 2013). As interest rates in developed economies remained low, investors were attracted to the higher rates in Brazil, Chile, Taiwan, Thailand, South Korea, and many other emerging markets (Fratzscher 2012). 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." [1] Similarly, Reserve Bank of India (RBI) Governor Raghuram Rajan warned of the risk of a global market "crash" should investors start bailing out of risky assets created by the loose monetary policies of developed economies.[2]

To stem the flow of capital and manage the attendant risks several emerging markets have recently imposed taxes or controls to curb inflows of foreign capital. In December of 2012, the International Monetary Fund (IMF) released an official statement endorsing a limited use of capital controls (IMF 2012).[3] The case for capital controls primarily rests on prudential measures

[1] See http://www.theguardian.com/business/2010/oct/06/expert-views-currency-wars for a list of central banker views on the destabilizing effects of portfolio flows to emerging markets in the aftermath of the global financial crisis.

[2] http://in.reuters.com/article/2014/08/06/india-rbi-markets-idINKBN0G61M220140806

[3] "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."

designed to mitigate the volatility of foreign capital inflows. However, controls also have an implicitly protectionist aspect aimed at maintaining persistent currency undervaluation. Policy makers from emerging Asia and Latin America expressed concerns that massive foreign capital inflows can lead to an appreciation of the exchange rate and loss of competitiveness, with potentially lasting effects on the export sector.[4]

Our paper is the first to provide direct empirical evidence of the costs of controls on foreign capital inflows using firm-level data from Brazil seen as a poster child for the recent policy changes (Jeanne, Subrahmanian and Williamson 2013). Previous research shows that a variety of barriers can segment international capital markets (Karolyi and Stulz 2003). Legal constraints, foreign ownership restrictions, discriminatory taxes, and transaction costs such as information asymmetries affect international portfolio choice. Stulz (1981) directly relates to the type of international investment barrier we study in this paper—namely, the effects of discriminatory taxation of foreign investors. The Brazilian Imposto Sobre Operações Financeiras (IOF) constitutes such a discriminatory tax as it contributes explicitly to the direct costs of foreigners investing in Brazilian financial markets.

Focusing on Brazil has several advantages. First, Brazil applied a series of capital controls measures that ranged across debt, equity and derivative instruments between 2008-2013. We have detailed information about the policy changes as they relate to specific instruments and magnitudes. Second, we have a precise set of announcement dates that facilitate a clean identification strategy to quantify the market's reaction to the capital control announcements. Third, stock market data and comprehensive firm-level financial statement data provide us with a rich and unique setting to examine the impact of these policy changes on Brazilian firms.[5] The data offer valuable cross-sectional variation to test for (a) cost of capital and exchange rate effects; (b) the impact of external finance dependence and credit constraints in the aftermath of the controls and (c) the impact of the controls on real firm-level investment. Importantly, firm-level data have the advantage that they can shed light on the channels through which capital

[4] Jonathan Wheatley and Peter Garnham in "Brazil in 'currency war' alert," *Financial Times*, September 27, 2010.
[5] The stock market in Brazil is well developed. The value of gross domestic product (GDP) that is spanned by the stock market in Brazil averaged more than 40% between 2007 and 2012 (stocks traded, total value % GDP, WDI, World Bank), and the market capitalization of listed firms more than 65% (market capitalization of listed companies % GDP, WDI, World Bank).

controls affect Brazilian firms. Fourth, we have access to proprietary export data from the Brazilian export authority (Secex) for the listed Brazilian firms. The firm-level export data 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.

We hypothesize that when a country imposes capital controls taxes, expected returns on the risky assets subject to the tax will increase. In other words, by imposing an international investment barrier, capital controls taxes segment international capital markets and create a price wedge that drives up the expected return relative to the benchmark return under full integration (Stulz 1981). Further, 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 (Rajan and Zingales 1998). We test whether external finance dependent firms (or industries) are more adversely affected by capital controls. Finally, we also hypothesize that reduced capital access following capital controls impedes the funding of projects when internally generated funds are insufficient to meet the needs of an investment program. Capital controls taxes could, therefore, reduce firm-level investment. To test the hypotheses, we conduct an event-study analysis around capital control announcement dates using stock prices and firm-level data from Datastream, Worldscope, and Secex.

The key results are as follows. First, there is a significant decline in cumulative abnormal returns for Brazilian firms following the imposition of capital controls on foreign portfolio inflows in 2008–2009 consistent with an increase in expected returns or the cost of capital. Evidence about the mechanism by which the cost of capital rises suggests that on average one-year, two-year, and five-year market interest rates increase significantly in the aftermath of the controls. It is worth noting that these interest rates increase against the backdrop of quantitative easing in the US and other developed countries that put downward pressure on the world interest rate. We also use Hail and Leuz's (2009) imputed cost of capital methodology and the evidence corroborates that the cost of capital goes up significantly following capital control announcements.

Second, the data suggest that large firms are less affected by the controls and may be consistent with large firm access to internal capital markets. Third, we find that exporting firms

are less adversely affected by controls. The coefficient estimates suggest that the larger exporting firms, in particular, are somewhat shielded—while the overall impact on cumulative abnormal returns is negative the positive coefficient on exporter status mitigates the impact. Compared to purely domestic firms, exporting firms may be better able to overcome the financial constraints imposed by capital controls. Alternatively, if the capital controls lead to currency depreciation, these firms may experience increased profits as their competitiveness improves. Large exporters may also have access to internal capital markets.

Fourth, controls on debt flows are associated with less negative returns, suggesting that the market views equity and debt flows as different. Historically, Brazil experimented with the IOF tax exclusively on debt flows, extending the purview to include equity instruments was done for the very first time in October 2009 (see Goldfajn and Minella 2007). The market's reaction may, therefore, be capturing the element of surprise or unexpected nature of the policy change to include equity flows. We also examine 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. Finally, real investment at the firm level falls significantly in the aftermath of the controls.

A number of studies examine the international portfolio choice and asset pricing implications of international investment barriers (Eun and Janakiramanan 1986; Errunza and Losq 1985; Hietala 1989; Bailey and Jagtiani 1994). These studies primarily focus on foreign ownership restrictions where either a subset of domestic assets or certain share classes are made available to foreign investors. In contrast, our paper provides systematic evidence on the impact of discriminatory taxation of foreign investors via the IOF on both the stock market valuation and investment decisions of Brazilian firms.

A related paper, Forbes, Fratzscher, Kostka, and Straub (2012), shows 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 decrease allocations to countries viewed as more likely to use capital controls. Similarly, Forbes (2007a) studies the impact of Chilean Encaje experiment with Tobin taxes in the 1990s on the financial constraints that small, traded firms face. (See also Forbes 2007b.)

More generally, a growing theoretical macro literature has emerged positing the benefits of capital controls albeit focusing exclusively on debt rather than equity to motivate the model frameworks (Bianchi and Mendoza 2010, Farhi and Werning 2014, Korinek 2010). On the empirical side, with data that differentiates between capital controls on different categories of assets, Klein (2012) finds that, with a few exceptions, there is little evidence of the efficacy of capital controls on the growth of financial variables, the real exchange rate, or GDP growth casting doubts about assumptions behind recent calls for a greater use of episodic controls on capital inflows. Similarly, Fernandez, Rebucci, and Uribe (2013) find that capital controls in the period 2005-2011 have not been implemented as a prudential tool as prescribed by a growing recent theoretical macro literature.

The paper proceeds as follows. Section 2 reviews the macroeconomic conditions in Brazil in the 2000s and provides information about the recent use of capital controls measures. Section 3 provides a brief theoretical motivation and Section 4 discusses the empirical methodology and summary statistics. Section 5 presents the results and additional tests to ensure the robustness of our findings. Section 6 concludes.

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

Except for a brief recession during the last two-quarters of 2008, caused by the global financial crisis, the Brazilian economy expanded throughout the 2000s due to a commodity exports and consumer boom. The impact of the financial crisis was short lived, and Brazil's economy swiftly returned to growth by the second quarter of 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 appreciated by 50% to 1.6 R$/US$ from a low of 3.1 R$/US$ in 2004.[7]

In an attempt to prevent an excessive inflow of foreign capital, stabilize the exchange rate, and reduce the upward trend in inflation, Brazil's government adopted a system of capital controls on inflows from abroad. In March 2008, the government established the *Imposto Sobre*

[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 and the second highest among emerging markets after China.
[7] Banco Central Do Brasil accessed November 29, 2012.

Operações Financeiras (IOF), a financial transaction tax of 1.5% placed on incoming foreign fixed-income investments effectively immediately, as a means of quelling the flow of capital into the economy.

Note that the IOF is a tax that can be levied on a range of financial operations including foreign credit, foreign exchange, securities, and so on. Also, it is a tax over which the executive branch has very broad powers regarding triggering events and applicable rates.[8] Under the Brazilian Constitution most taxes can only be increased by law approved by the National Congress and usually take effect after ninety days. However, the IOF is an exception— a "policy decree" can modify the tax that ranks below a law and does not require Congressional ratification. The IOF tax can be easily changed overnight at the discretion of the Finance Ministry and becomes effective immediately from its enactment date. Using data from investor interviews, Forbes, Fratzscher, Kostka, and Straub (2012) document that investors did not anticipate the controls. Appendix A provides specific details about the IOF tax legislation.

By October of 2008, the wide-reaching effects of the international financial crisis were becoming clear. Net foreign capital inflows dropped from US$88.3 billion in 2007 to US$28.3 billion in 2008. In particular, net foreign portfolio investments of debt and equity fell from US$48.1 billion in 2007 to –US$0.77 billion in 2008. To stem the outflow of investment the government eliminated the IOF.

However, Brazil recovered quickly from the economic downturn, and during the first nine months of 2009, approximately US$20 billion of primarily US-led foreign investments entered the Brazilian equities market.[9] With the resumption of massive capital inflows, capital controls were 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.

Since its re-introduction in October of 2009, the IOF tax was repeatedly raised and expanded to include other forms of investments by the Brazilian government to control the influx of foreign capital (see Table 1 for a detailed list). By late 2010, the Real continued to appreciate,

[8] See www.receita.fazenda.gov.br/aliquotas/impcresegcamb.htm.
[9] "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.

emerging as one of the strongest performing currencies in the world. On October 5, 2010, the IOF on fixed-income instruments was raised to 4%; less than two weeks later the tax was raised to 6%.

In early 2011, the exchange rate remained at R$1.6 against the U.S. dollar, and the blame for Brazil's currency appreciation was targeted on incoming foreign capital originating in developed markets with US flows accounting for the largest fraction of these flows. 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. In an attempt to depreciate the value of the Real, the Central Bank also aggressively cut its overnight rate (Selic). Over a ten-month period, the Selic rate was cut eight consecutive times, from 12.5% in late August 2011 to 8% in July 2012.[10]

In early December 2011, however, the 2% IOF tax on equities was removed. In the first week of June 2013, Brazil removed the tax on foreign investments in local debt and the 1% tax charged currency derivatives.[11,12] One July 1st, the government further eliminated reserve requirements on short dollar positions held by local banks.[13]

Details about the implementation procedure for the IOF tax (Appendix A) suggest that the capital controls announcements surprised most market participants. A candidate explanation for the element of surprise is also that the set of instruments that were included under the umbrella of capital controls was extended to equity and other instruments previously not been subject to them. Previous experiments were restricted to debt instruments. Now the purview was broadened to include equity, ADRs, derivative contracts and other instruments. Moreover, the rates were changed in an ad hoc fashion. It is possible that after the first controls had been

[10] Chamon and Garcia (2013) show that the while controls were effective in partially segmenting the Brazilian financial market from the international markets, they do not seem to have deterred the appreciation of the *real* when capital inflows were strong.

[11] http://www.bloomberg.com/news/2013-06-13/brazil-dismantles-capital-control-as-real-drops-to-four-year-low.html.

[12] http://www.reuters.com/article/2013/06/05/brazil-tax-iof-idUSL1N0EG23E20130605.

[13] http://www.bloomberg.com/news/2013-06-25/brazil-eliminates-reserve-requirement-on-bets-against-the-dollar.html.

announced in March 2008, the market might have anticipated that the economy was in a new capital controls regime. However, these controls were quickly removed in light of the Lehman collapse and the GFC. Subsequently the controls were reintroduced in October 2009 and implemented with a widening reach in the two and a half years that followed.

It is nevertheless important to acknowledge that any policy change that results in winners and losers would be subject to media attention as various constituents in a democracy express their views about an impending change or trend in policy direction. If capital controls were expected to drive up the cost of capital, external finance dependent firms and smaller firms would stand to lose and be opposed to the controls. Similarly, if there was an unprecedented move to implement controls on equity flows, firms listed on the stock market or stock exchange executives may voice their opposition to the controls. For example, the decision to place capital controls on incoming foreign investments was not unanimously supported. Edemir Pinto, chief executive of the Brazilian Stock Exchange, called on the government to remove some of the existing capital controls because 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.[14]

On the other hand, as a result of the massive capital inflows the constituent firms most likely to be hurt by a Real appreciation are exporters whose competitiveness would be adversely affected in world markets. Exporting firms would, therefore, stand to gain if the implementation of capital controls led to a reversal of the Real appreciation. To assess whether different constituents expressed opinions in the media, we undertook a detailed survey of Brazilian newspapers, business journals, and other press sources. Appendix B presents a sample of these articles. Please note that most of these articles are in Portuguese.

The next section provides a brief theoretical motivation for the empirical analysis that follows.

[14] Robert Cookson and Joe Leahy, "Call to ease Brazil's capital controls" *Financial Times,* October 25, 2011.

3. Theoretical Underpinnings

It is worth noting that in addition to offering domestic investors an expanded opportunity set for portfolio diversification purposes, international investment entails two unique dimensions that are not particularly relevant in the context of purely domestic investments namely exchange rate risk and the problem of market segmentation. A number of papers address these issues (see Karolyi and Stulz 2003 for an extensive survey). With respect to market segmentation, a number of international asset pricing models incorporate capital flow restrictions (for instance, Black 1974; Stulz 1981; Lessard et al. 1983; Errunza and Losq 1985; Cooper and Kaplanis 1986; and Eun and Janakiramanan 1986) and analyze the pricing effects of investment barriers.

Barriers to international investment may take many forms such as exchange and capital controls by governments, which restrict the access of foreigners to the local capital markets, reduce their freedom to repatriate capital and dividends, and limit the fraction of a local firm's equity that foreigners may own (Eun and Janakiramanan, 1986). Foreign investors may face a lack of information, expropriation fears, or more importantly subject to discriminatory taxation (Karolyi and Stulz, 2003). It follows that the existence of such barriers will constrain portfolio choice by affecting the de facto international investment opportunity set facing investors. Therefore, the resulting optimal international portfolio allocation could well be very different from that under perfect integration. In other words, barriers such as discriminatory taxation of foreign investments can segment international financial markets by constraining portfolio choice.

Given the variety of barriers to international investment (Stapleton and Subrahmanyam 1977), the challenge for researchers is, therefore, to isolate and quantify important barriers and then investigate their impact on portfolio behavior and on asset pricing relationships (Solnik, 1974). For instance, Black (1974) and Stulz (1981) construct models of international asset pricing where it is costly for domestic investors to hold foreign securities due to discriminatory taxation. Theoretically, these models come closest to the Brazilian IOF differential taxation imposed on foreign investors. Note that in the two models the barrier may represent a transaction cost, information cost, or differential taxation. Both of these papers assume that proportional taxation can represent this cost and use a two-country, single-period model for analysis. In the Black model, the tax is on an investor's net holdings (long minus short) of risky foreign assets.

Stulz (1981) models taxes on the absolute value of an investor's long and short holdings of risky foreign assets. Both models show that the world market portfolio will not be efficient for any investor in either country. Stulz also shows that the domestic investor's portfolio may not comprise some of the foreign securities at all.

A modified outline of the model in Stulz (1981) helps fix ideas and motivate our empirical analysis. Assume there are two countries: the domestic country D and the foreign country F. Also assume that investors in both countries are risk averse and care only about the expected return and variance of their investment. In an integrated world capital market with no barriers to international investment the two countries comprise the global equity market and expand the diversification opportunities for all investors. Since investors can invest in each other's stock markets, both foreign and domestic investors bear the risks associated with domestic production.

Investor k is a domestic (foreign) investor if we write $k \in D$ ($k \in F$). An asset i is a domestic (foreign) asset if we write $i \in D$ ($i \in F$). Also, assume that domestic investors pay a capital controls tax θ on their risky international investments whereas foreign investors face no barriers to international investment. If a domestic investor k holds a foreign risky asset i long, the return is $R_i - \theta$, where R_i is the return of asset i for a foreign investor and θ, the capital controls tax rate, represents barriers to international investment.

With the assumption of mean-variance optimization, investors act to minimize the variance of their portfolios subject to the constraint that the expected portfolio return is greater than an exogenously given return R^k. There are N risky assets of which n are domestic assets and $N - n$ are foreign assets. R is the N x 1 column vector of expected returns and Σ is an $N \times N$ variance-covariance matrix of returns on risky assets. Let Let x^k denote the $N \times 1$ vector of shares of wealth investor k holds in risky assets. If $x_i^k = 0$, investor k does not hold a positive amount of risky asset i. If e is an $N \times 1$ vector which has zeros in the first n rows (domestic) and ones in the remaining N-n rows, investor k pays capital controls taxes in the amount of $x^{k\prime} e \theta W^k$ where W^k is the investor's total wealth. Define $\mathbf{1}$ as an $N \times 1$ column vector of ones.

The investor's problem is to minimize the variance of the portfolio subject to the constraint on the expected return of the portfolio and the non-negativity constraint on $x^k$and can be written as:

$$Min\ \frac{1}{2} x^{k\prime} \Sigma\, x^k$$

s.t.

$$x^{k\prime} R - x^{k\prime} e\theta + \left[1 - x^{k\prime}\mathbf{1}\right] R_f \geq R^k \qquad (1)$$

$$x^k \geq 0 \qquad (2)$$

The left-hand side of equation (1) is the expected return of the portfolio of investor k, which is defined as the sum of:

(a) the expected return of the investor's holdings of risky assets in the absence of capital controls taxes $(x^{k\prime} R)$ less

(b) the capital controls tax on the investor's holdings which is proportional to the absolute value of the investor's holdings of foreign risky assets $(x^{k\prime} e\theta)$ plus

(c) the returns on holdings of safe bonds $(\left[1 - x^{k\prime}\mathbf{1}\right] R_f)$.

If L^k is the Lagrangean function which corresponds to the investor's optimization problem and if λ^k is the Lagrange multiplier associated with the constraint given by (1), then the domestic investor's portfolio has to satisfy the following first-order conditions:

$$\frac{\partial \mathrm{L}^k}{\partial x_I^k} = \Sigma . x^k - \lambda^k \left\{ R - R_f . \mathbf{1} - \theta e \right\} \geq 0 \qquad (3)$$

$$x^{k\prime} \frac{\partial \mathrm{L}^k}{\partial x_I^k} = 0 \qquad (4)$$

Note that for the first order conditions of the foreign investor, we set θ=0 in (3) and (4).

If we use Σ_i for the i-th row of Σ, equation (3) can be written as:

$$\Sigma_i x^k \geq \lambda^k \{R_i - R_f - \theta\} \qquad (5)$$

where $\Sigma_i x^k$ is the covariance between the return on asset i, $R_i$and the return on the investor's portfolio of risky assets R Equation (5) has to be satisfied for all $R_i \geq 0$, for all risky foreign assets in the portfolio of the domestic investor, k. For θ=0, Equation (5) must be satisfied for all domestic assets i for all investors, domestic and foreign. If θ=0, (5) reduces to:

$$\Sigma_i x^k \geq \lambda^k \{R_i - R_f\} \qquad (6)$$

Equation (6) shows that the excess return on domestic assets which are not subject to the tax θ on foreign risky assets is proportional to the covariance of the return on asset i with respect to the portfolio of risky assets. Equations (5) and (6) also represent the intuition that the share of wealth invested in asset i is proportional to its Sharpe ratio. Note that in (5) the excess return on foreign assets is subject to the capital controls tax θ.

Equation (5) completely characterizes asset demands in the model. Further, from (5) Stulz (1981) shows that domestic investors hold risky assets in identical proportions and this implies that a foreign asset that is not held (non-traded) by one domestic investor is non-traded for all domestic investors. The theoretical result that if the tax rate θ is positive, non-traded assets can exist implies that the world market portfolio is not an efficient portfolio for all investors. In other words, in the presence of capital controls taxes, the world market portfolio does not belong in the set of linear combinations of portfolios that yields an efficient portfolio for domestic investors.

We can now present a version of the Sharpe-Litner pricing relationship modified to account for the capital controls tax θ.[15] Since domestic stocks can be held by both domestic and foreign investors and θ=0 for domestic stocks, for domestic risky assets we can write:

$$\beta_i^m [R_m - R_f - \theta_m + q_m] = R_i - R_f \text{ for } i \in D \qquad (7)$$

[15] See Stulz (1981) for a detailed derivation.

where β_i^m is the covariance of the a stock i with the world market portfolio. Note that the world market portfolio includes all risky assets traded in the two countries irrespective of whether domestic investors hold all or a subset of them in their individual portfolios. R_m is the return on the world market portfolio. R_f is the rate on the risk-free asset. θ_m is the weighted average of the value of taxes that domestic investors would have to pay on one dollar invested in the world market portfolio. q_m is a constant chosen to ensure that (5) holds with equality (i.e. the constraint is binding)[16] multiplied by the world market portfolio weights, x^m.[17] Note that foreign investors do not face the capital controls tax on their investments in domestic or foreign assets.

The asset pricing relationship for foreign risky assets can be written as:

$$\beta_i^m[R_m - R_f - \theta_m + q_m] - \gamma^d\theta + \gamma^d q_i^d = R_i - R_f \text{ for } (i \in F) \quad (8)$$

For risky foreign assets held by domestic investors, i.e. they are not in the subset of non-traded foreign stocks, q_i^d =0. Equation 8 shows that the expected returns on two foreign stocks held in domestic investor portfolios will differ in the cross-section to the extent that they have different betas with the world market portfolio. $\gamma^d\theta$ is the weighted average of taxes paid by investors on their portfolio of risky assets. Since some risky assets are non-traded, the individual portfolios can differ from the world market portfolio. When there are no capital controls taxes (7) and (8) reduce to the usual Sharpe-Litner pricing relationship.

Comparing (7) and (8) also shows that all risky foreign assets held in domestic investor portfolios will plot on a security market line which lies above the security market line for domestic investors shifted up by $\gamma^d\theta$ since q_i^d =0 for all foreign stocks actually held. Also, note from (7) and (8) that a foreign stock with the same world market beta as a domestic stock will have a higher expected return. Alternatively, if a country switches regimes from having no capital controls taxes to one where capital controls taxes are imposed, expected returns on foreign risky assets subject to the tax will go up (eg. a move from 1 to 2 in Figure 1).

[16] Specifically, q_m is a constant, which is a weighted average of unobservable non-negative numbers, q^ks chosen such that (5) holds with equality.

[17] $x^m$is an $N\times1$vector whose element x_i^m is the fraction of world wealth W^w supplied in the form of risky asset i.

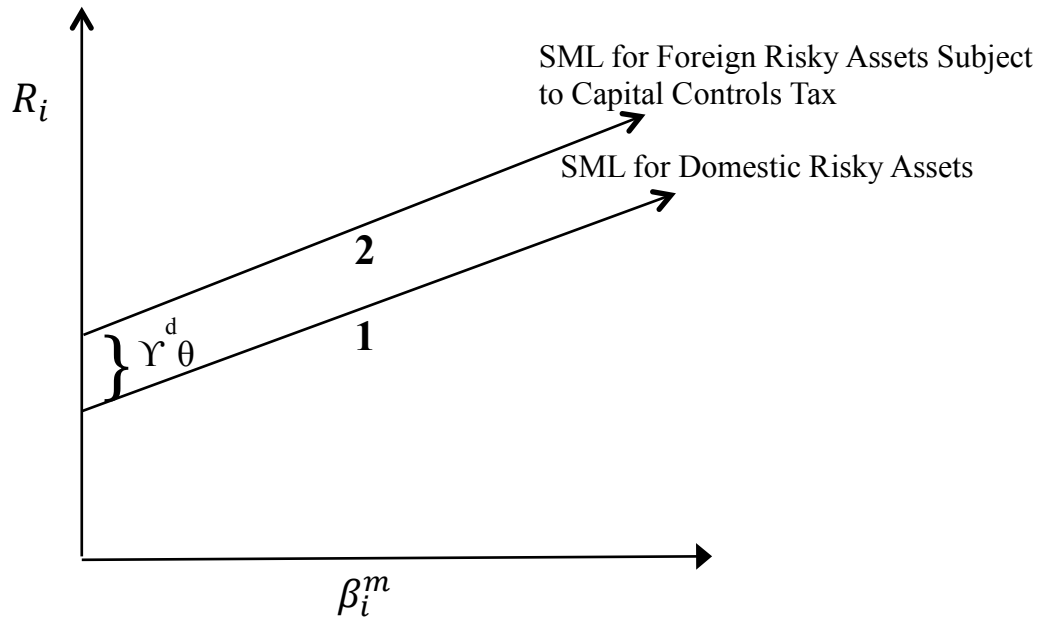

Figure 1

We can think of the controls 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. An increase in expected returns will result in falling stock prices. In mapping the theory to the data, an increase in expected returns and a fall in stock prices will be reflected in negative CARs in the event windows surrounding capital control announcements.

Note that if the controls alter the expected value or variance of the domestic production activities, the impact on a firm's stock price will depend on two effects: the expected cash flow effect and the required rate of return or cost of capital effect. A priori, some firms can benefit from the protectionist variety of capital controls. It is possible therefore that for these firms expected cash flows increase more than the rise in the required rate of return such that stock prices rise, and CARs 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.

4. Empirical Methodology and Summary Statistics

We use an event-study methodology to examine investors' reaction to the strengthening or weakening of capital controls.[18] 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. 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.[19]

We examine the firm-level abnormal stock return adjusted for clustering around windows of time surrounding the announcement of the capital control policy. Stock prices are from Datastream. The market returns used in the benchmark estimations uses the BOVESPA return (the most commonly quoted index in Brazil). We also analyze different broad indices available for different sectors or classes of firms such as the IBRA index. 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.[20] Given that the some of the events are close in time making their estimation windows overlapping in time, we also conduct the analysis using the estimation window prior to the Lehman event as the benchmark return in the CAR calculations for all the following events.

Data about firm characteristics are from Worldscope and the sample consists of 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 for liquidity.[21] In addition, we construct a

[18] For more details, see MacKinlay 1997.

[19] Foerester and Karolyi (1999) and Hou, Karolyi and Kho (2011) propose an alternative approach in the form of a multi-factor model based on both covariance risk as well as firm characteristics as the benchmark. We incorporate controls for firm characteristics to examine whether the capital controls announcements affect firms differentially in the cross-section.

[20] 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.

[21] Data availability varies across firms.

number of measures of external finance dependence beginning with the Rajan and Zingales (1998) measure using time-series Brazilian data. We use the consumer price index (CPI) index to deflate the data. The firm-level information is 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 U.S. dollars (FOB) and includes firms exporting less than $1 million, between $1 million and $100 million, and more than $100 million. Given that coverage of foreign sales data is very poor in the widely used Worldscope data, access to the proprietary Secex data for exports is a key differentiator of our study.

4.1 Summary Statistics

Figure 2 depicts the evolution of the BOVESPA index corresponding to the different capital controls announcements in Table 1. The table includes the capital controls announcement dates, 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 presents firm-level summary statistics for the firms in the BOVESPA index that includes prices for the more actively traded and better representative stocks of the Brazilian stock market. In the robustness analysis, we also examine the stock price reaction for firms listed on the alternative IBRA index. Information includes firm size, PP&E (property, plant, and equipment), investment rates, exporter status, liquidity, and leverage measures. We report firm size, operating revenue, and PP&E figures in real terms, i.e., the nominal values deflated by the CPI. The data show that the average firm size regarding total assets and in real terms is R$67 million (Panel A). In nominal terms, this roughly translates to US$48 million at an average exchange rate of 1.845 R$/US$ over the sample period. The median firm size for the full sample in nominal terms is approximately US$9 million.

The average leverage ratio (debt/assets) is 33% while short-term debt (of less than one year) on average accounts for about 28% of total debt. About 41% of the firms in the sample are exporters. Panel B reports summary statistics for exporting firms and suggests that exporting firms are on average smaller than non-exporting firms in Panel C. Non-exporting firms include

large utilities and financial services firms such as large banks. Hence, it is not surprising that the average size of the non-exporting or purely domestic firms is larger than the exporting firms that are primarily in the manufacturing sector.[22] The median exporting firm, however, is almost double the size of the median non-exporting firm, suggesting that a few large firms may be driving the average firm size in the non-exporting subsample. Also, the largest exporting firms (those exporting more than $100 million) are on average larger than the non-exporting firms with average assets of US$66 million in nominal terms. Table 2 also reports summary statistics for PP&E, investment rates, and operating revenues for the full sample, exporting, and non-exporting firms.

5. Results

5.1.1 Abnormal Returns and Firm Characteristics

Before turning to the regression analysis, a visual inspection of our results is useful. To do so Figures 3a and 3b graphically present the stock market's response to capital control announcements. The horizontal axis is in event time for four days before and four days after the capital controls announcement dates. Figure 3a shows the abnormal returns averaged across firms by event. The abnormal returns were first averaged across firms for each event in event time [t = -4, t = +4] and then averaged across events. Figure 3b presents the results cumulated across firms by event and then averaged across events also in event time. Both figures visually confirm that on average capital controls announcements are accompanied by negative abnormal returns.

The formal regression analysis in Table 3 uses panel data (by firm and event) where the dependent variable is the firm-specific two-day cumulative abnormal return. The basic regression specification is:

[22] Karolyi and Wu (2012) differentiate firms between those that are globally accessible versus purely domestic firms. In Brazil, with the exception of media firms, all firms are available to foreign investors. While the government retains some shares in state-owned firms that were privatized such as Petrobras, foreign investment is allowed in these firms.

$$CAR_{it} = Constant + FirmControls_{it} + \varepsilon_{it} \ , \qquad (9)$$

where CAR_{it} is the cumulative abnormal return for firm *i* over the event window *t*. We use a two-day event window as our benchmark specification. The constant term captures the impact of the announcement on average returns, and firm controls include an observable set of firm-specific characteristics such as size, leverage, and so on.

Our methodology is as follows. We construct a CAR for each firm around each event date. We stack the firms to create a panel of firm-event observations. In the benchmark estimation we use both tightening and loosening announcements. Subsequent estimations include a loosening dummy to see if the market responds differentially depending on the direction of the change in capital controls. We also conduct the estimations by including event dummies.

The usual assumption that the error term is random and uncorrelated across firms requires further discussion. Equation (9) is estimated using a panel regression. When aggregating abnormal returns, typical event studies assume that abnormal returns are not correlated across firms. Assuming no correlation across firms means that the covariance between individual firm abnormal returns is zero. Therefore, standard distributional results may be used to calculate the variance of aggregated abnormal returns. The assumption is reasonable only if the event dates for individual firms do not overlap in calendar time.

In the case of a capital controls event, however, all Brazilian firms share identical event dates. Given that the capital control announcement dates are clustered in time, cross-sectional correlation of returns may result in biased standard errors and potentially incorrect inferences (Sefcik and Thompson 1986; Bernard 1987). Standard event study methodology is therefore not appropriate for capital control announcements, since the announcement events are not independent across firms, and the errors from the estimation of the expected returns are correlated with one another (Schwert, 1981). The covariances between individual firm abnormal returns may be non-zero, in which case the standard distributional results no longer obtain.

Moreover, there is often more than one capital control announcement to consider. To overcome this issue, Schipper and Thompson (1983, 1985) propose a methodology that takes into account the correlation in errors across firms and the possibility for several announcements.

They use this methodology to test the effect of merger-related regulations on acquiring firms. We base our test on their methodology and that of Petersen (2009) who provides guidance about how to address the issue of residuals that may be correlated across firms or across time in panel data sets, yielding biased OLS standard errors. In particular, we use two-way clustering by relaxing the assumption that abnormal returns are not correlated across firms and time. Specifically, we allow the off-diagonal (covariance) elements in the variance–covariance matrix to be different from zero. In short, the clustering procedure produces standard errors that are appropriately adjusted to reflect the cross-firm and cross-time correlation of abnormal returns. The estimation procedure also corrects for potential heteroskedasticity across firms.

Also, the association between abnormal returns and firm characteristics could be explained by other documented regularities (Zhang, 2007). Therefore, we also compute bootstrapped p-values of the OLS regression using the method proposed in Lo (2003) and Busee and Green (2002). Table 11 reports the OLS bootstrapped one-tailed p-values and shows similar qualitative and quantitative effects of capital control announcements on CARs.

Measures of two-day CARs 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 (Table 3, Column 1). Quantitatively CARs fall by about -0.43% on average over a two-day window for the full sample of events in Table 1. 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 CARs 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. This 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 5% level. However, the magnitude of the size coefficient (0.00177) is offset by the magnitude of the coefficient on the constant (-0.0339) which measures the decline in average CARs. For the average firm, the magnitude of the size effect is outweighed by the magnitude of the decline in average CARs. The results from the specification

in Column 2, therefore, suggest that large firms were somewhat shielded from the imposition of capital controls, perhaps due to access to internal capital markets. However, the market imputes an overall significantly negative value to the announcement of the controls.

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, CARs are significantly negative at the 1% and 5% levels, respectively, while firm size somewhat mitigates the negative effect on abnormal returns in the immediate aftermath of capital control announcements.

Column 5 and 6 include 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 while the coefficient on exporter status is positive and significant in both specifications. Two factors namely internal capital markets and improved competitiveness could have shielded exporting firms from the adverse impact of the controls.

First, there could be cross-sectional variation in the cost of capital impact as well as credit constraints depending on firm characteristics. For instance, we saw earlier that large firms may be somewhat shielded from the adverse cost of capital impact. This may be because large firms can rely on internal capital markets or other sources of financing to fund their operations in the aftermath of controls. Similarly, exporting firms, especially the larger firms, may have access to internal capital markets or foreign currency proceeds and therefore, less reliant on foreign capital investments.

Further, to the extent that the controls can curb the currency appreciation and improve the competitiveness of exporting firms, the expected future cash flows of the exporting firms can improve in the aftermath of the controls.[23] Exporters could be in an improved competitive position internationally, which drives up their expected cash flows and 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

[23] Note that although the policy can in principle tax trade credits, the IOF was set to zero. See https://www.receita.fazenda.gov.br/Legislacao/Decretos/2008/dec6339.htm

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 revenue bin do not experience significant returns. The coefficients on exporting firms in the $1-$100 million revenue bin and the largest revenues, i.e., in the >$100 million in revenues are positive and statistically significant suggesting that 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.

A potential concern that arises is that thus far we treat capital control events of different magnitudes equally. However, the magnitudes of the changes vary across events. For example, the October 2010 event increased the IOF tax by 33% more than the March 2008 event. To see if the effects are stronger for the events in which the changes are larger, Column 8 adds event dummies to our baseline pooled regression specification. The constant measures the market's reaction to the first event in March 2008, i.e., the intercept gives the estimated value of the response to the base category (excluded event). We see that the coefficient is negative and significant. The event dummy coefficients are evaluated relative to the constant to get the event specific CARs. The specification includes standard errors clustered by event to account for potential cross-firm return correlations within each event.

The event dummies show that the easing of capital controls coinciding with the GFC is negative and significant consistent with returns worldwide in the throes of the crisis. Beginning in October of 2009, however, we see that almost all tightening events are associated with negative and significant coefficients. While the increase in the magnitude of the tax on fixed income instruments to 4% on 10/4/10 is associated with a positive event dummy coefficient, the overall effect remains negative and significant. The further increase of the tax to 6% on fixed income investments on 10/18/10 is associated with a negative and significant event dummy coefficient. The extension of the tax to overseas loans and bonds of longer maturities and to FX derivatives (3/28/11, 4/6/11, & 7/26/11) are all associated with negative and significant coefficients. Interestingly when we conduct a pooled regression with event dummies rather than

separating out tightening and loosening events in separate regressions we find that easing events are almost all associated with positive and significant event dummies (5/21/12,6/13/12, & 12/4/12). Note however that the overall effect when the event dummy is added to the constant remains negative and significant.

5.1.2 Debt Versus Equity Events

The recent Brazilian capital controls differentiate between debt and equity related measures. Table 4 displays regression specifications that separate the results between debt and equity measures. A very similar pattern of results holds with highly significant negative CARs 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.

Note that firms rely on both debt and equity financing. The overall cost of capital embodies the risk-free rate (based on debt instruments) and the equity premium. If the tax on debt instruments drives up the risk-free rate or implicitly the average cost of capital, the cost of capital increases and holding expected future cash flows constant, drives down the stock price manifested in negative firm-level CARs. We, therefore, expect that the stock market could react to controls on debt instruments.

The following patterns are worth noting. First, controls on debt flows in Panel A display a less negative announcement effect compared to controls on equity flows in Panel B that appear to have a more negative announcement effect. The decline in average CARs 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 the 5% or 1% levels 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. Two-sample t-tests with both equal and unequal variances show that the coefficients on debt in Panel A (Column 1) and equity in Panel B (Column 1) are statistically significantly different at the 1% level with t-statistics of 39.13 and 34.76,

respectively. The result suggests that the market views controls on debt and equity as distinct and that controls on equity flows are assessed more negatively than controls on debt flows. The OLS bootstrapped one-tailed p-values are reported in Table 11 (Panels B and C) and show similar significant effects of capital control announcements on CARs for debt and equity events separately.

There are two explanations that can help interpret the result that controls on equity are associated with significantly more negative CARs than controls on debt. The first explanation relates to the fact that while Brazil historically experimented with the IOF tax exclusively on debt flows such as in the 1990s, extending the purview to include equity instruments was done for the very first time in October 2009 (see Goldfajn, and Minella 2007). The market's reaction may, therefore, be capturing the element of surprise or unexpected nature of the policy change to include equity flows.

Second, controls on debt flows may serve to reduce financial vulnerability given that debt is a non-contingent claim that can generate systemic risk. 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 seen in many an emerging-market crisis. Therefore, the market may perceive controls on debt as a desirable means to curb systemic risk or perform a macro-prudential function with respect to the stability of the financial system.

Also, note that in November 2009, a tax of 1.5% was imposed on American Depositary Receipts (ADRs) converted into local stocks. We also examine the impact of capital control announcements for firms that issue ADRs on the NYSE since a large fraction (approximately 40%) of Bovespa constituents are secondarily listed for trading in New York. The coefficient on the constant is -0.0574 and is significant at the 1% level (Table 10, Panel A, Column 7). The magnitude of the response for firms with ADRs in New York is significantly more negative than the baseline coefficient of -0.0335 in Column 1 of Table 5. Both specifications include controls for firm size, exporter status and external finance dependence. This suggests that the market viewed the inability to bypass the controls via the ADR route significantly more negatively than the controls on local equity transactions.

To identify a mechanism of impact, the ADR result is also related to the focus on debt and equity stakeholders in the firm via the well-established "bonding" hypothesis of Stulz (1999), Coffee (1999) and developed in Doidge, Karolyi and Stulz (2004). This literature considers global exposures measured through overseas equity issuance and trading rather than the export channel. By imposing a capital controls tax on ADRs converted into local stocks, the controls may have introduced an additional distortion in the ADR market thereby interfering with the benefits of bonding to markets with strong institutions via listing and trading ADRs.

The results in Tables 3 and 4 perhaps also suggest that the market views the implementation of capital controls as being in a different or new "capital-controls regime". Given the variation in the instruments that fell under the purview of these controls, the fact that they were put on (March 2008), taken off (October 2008), put on again (October 2009) and taken off again (2012) and the consistently robust negative and significant CARs across a broad range of specifications suggests that the market overall views these policy changes negatively. In light of these findings, even the total effect for loosening events (constant plus event dummy coefficient) in Table 3 are associated with negative CARs suggesting perhaps the market may view these changes as temporary and subject to policy uncertainty.

5.1.3 Credit Constraints and Abnormal Returns

A piece of evidence worth noticing from Table 4 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 finding is consistent with the high rollover risk associated with short-term debt contracts (He and Xiong 2012). The result suggests that controls on equity flows more adversely affect firms with higher levels of short-term debt. Moreover, t-tests of means show that the abnormal returns for equity events are significantly lower than for debt events. 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 negative effect on their returns. Next, we examine the hypothesis of credit constraints and external finance dependence.

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: it focuses on the mechanism by which the cost of finance affects a firm's growth prospects, thus providing a stronger test of causality, and it can correct for industry effects.

Moreover, liquidity constraints at the firm level may depend on external finance dependence, firm size, and export status. Firms with easier access to external finance or greater access to low-cost funds may be able to overcome the barriers associated with any fixed costs of production (Chaney 2013). 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 using time-series Brazilian data. In other words, we construct the Rajan and Zingales (1998) external finance dependence measure at the firm level. Accordingly, a firm's dependence on external finance is defined as capital expenditures minus cash flow from operations divided by capital expenditures. Table 5 presents the results.

Column 1 of Table 5 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 CARs are negative and significant, but firm size and exporter status—consistent with results in previous tables—have positive and significant coefficients.

Column 2 disaggregates 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.

Columns 3–6 examine different measures for external finance dependence. Columns 3 and 4 include a dummy variable to distinguish between firms with high and low finance dependence relative to the mean. Columns 5 and 6 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 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, we also estimated specifications with sector fixed effects (Table 5, Columns 7-8). The coefficient on external finance dependence continues to be negative and statistically significant.

Also, note that in the economy, some firms rely more on equity financing (relative to debt financing) than others. This is reflected, for example, in the substantial degree of variation in leverage across sectors. Given that some events impose controls on debt inflows while other events impose control on equity inflows, it is interesting to analyze whether firms that rely more on equity financing are affected more by equity controls, and firms that rely more on debt financing are affected more by debt controls.

To do so, we constructed a measure of equity dependence following the Rajan and Zingales measure as the amount of common equity as a fraction of total capital expenditures. The results suggest that the cumulative abnormal returns are inversely correlated with the equity finance dependence (Table 5, Columns 9 and 10). We also implemented regression specifications (not reported) with (i) an equity event dummy, external finance dependence and an interaction term between equity finance dependence and the equity event dummy and (ii) a debt event dummy, debt finance dependence measured by leverage as well as a debt financing as a fraction of capital expenditures and an interaction term. While the coefficient on the equity finance

dependence continues to be negative and significant, the interaction term is not significant. In contrast for debt dependence, the debt finance measure is not significant while the interaction term is negative and significant.

We interpret these results as providing corroborative evidence for our main results about the inverse relationship between CARs surrounding capital control announcements and the external finance dependence characteristic of firms. However, these additional results must be interpreted with caution, for, given the number of events, the power of these tests is not very high. An additional caveat is that some events were applied to both debt and equity instruments and, therefore, may be interfering with clean identification when the dummy variables (equity event, debt event) are included in a pooled regression setting.

5.1.4 Identifying the Mechanism

The evidence suggests that the decline in CARs following the capital control announcements is consistent with an increase in the cost of capital. To provide corroborating evidence we examine the change in the market interest rates in response to capital controls announcements as a mechanism through which there is an increase in the economy-wide cost of capital. Data on daily interest rates for the one-year, two-year and five-year interest rates are from Bloomberg.

Table 6, Panel A presents pooled regressions across the events to quantify the impact on interest rates over a two-day and three day window relative to the day before the announcement. While we find evidence of an increase in market rates (17.3 basis points) at the one-year horizon the effects are much stronger in magnitude for the two-year and five-year interest rates. The regression estimates suggest that on average two-year and five-year market interest rates rise by 23 and 25 basis points respectively. The increase is statistically significant at the 10 percent level of significance. The more muted response of the one-year rate may be the result of it being a direct instrument of monetary policy or the policy rate. The term-structure effects are however more direct measures of the market's response to the unexpected capital controls announcements. It is worth noting that these interest rates increase against the backdrop of

quantitative easing in the US and other developed countries that put downward pressure on the world interest rate.

Additionally, Hail and Leuz (2009) present an implied cost of capital methodology using various techniques of accounting-based models of the clean-surplus relation. We follow their methodology and use the modified price-earnings growth (PEG) ratio model by Easton (2004) as the basis for analysis. Here,

$$P_t = \frac{\hat{x}_{t+2} + r_{PEG} * \hat{d}_{t+1} - \hat{x}_{t+1}}{r_{PEG}^2}$$

Where:

P_t is each firm's stock price on the day of the event, obtained from Datastream
$\hat{x}_{t+1}$ is each firm's forecasted EPS for the year after the event, obtained from IBES.
$\hat{x}_{t+2}$ is each firm's forecasted EPS for two years after the event, obtained from IBES.
$\hat{d}_{t+1}$ is each firm's forecasted DPS (dividends per share) for the year after the event, obtained from IBES.
r_{PEG} is each firm's estimated cost of capital, for which we solve.

Since our data varies by firm and by event, we have a maximum of 69*15 = 1,035 unique observations. We obtained data from IBES calculated EPS forecasts for three different-length windows both before and after the event, leading to six different observations per firm-event. Post-event windows, we have 14, 21, and 28-day windows. All forecasts that were made on the event date or up to 14, 21 or 28 days after the event are considered in our analysis. If there are multiple forecasts for a firm-event, they are averaged. For the pre-event window estimates, forecasts made on the day of the event are not considered, but those made up to 14, 21, or 28 days before the event are considered. Once again, if there are multiple forecasts for a firm-event, they are averaged. Separate results were also calculated deflating the forecasts by the CPI of the quarter the forecast is for. Brazilian CPI data were collected from the Brazilian Central Bank.

To solve for estimated cost of capital, we use the quadratic formula:

$$P_t * r_{PEG}^2 = \hat{x}_{t+2} + r_{PEG} * \hat{d}_{t+1} - \hat{x}_{t+1}$$

$$P_t r_{PEG}^2 - \hat{d}_{t+1} r_{PEG} + (\hat{x}_{t+1} - \hat{x}_{t+2}) = 0$$

$$r_{PEG} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a},$$

$$a = P_t,$$

$$b = -\hat{d}_{t+1},$$

$$c = (\hat{x}_{t+1} - \hat{x}_{t+2})$$

Since the quadratic equation yields two roots, roots were classified into two groups: minimum and maximum. Both were used in the estimation.

We conduct the analysis in two steps. First, we compute the cost of capital before and after the event using the earnings forecasts from IBES for 14, 21, 28 day windows before and after the event. We conducted a simple t-test of means and find that the cost of capital is significantly higher at the 10% level in the 14-day window for both the maximum and minimum root values.

Second, to test whether the cost of capital increases after the event, we ran a series of regression specifications with the cost of capital as the dependent variable calculated with data from the 14, 21, 28-day windows with both maximum and minimum root values. Table 6, Panel B shows the results. The results in Columns 1 to 8 show that in all the specifications for the 14 and 21-day windows, the post-event dummy is positive and statistically significant at the 5% to 15% level of significance depending on the specification. The specifications control for both firm size and exporter status and suggest that the cost of capital goes up significantly following capital control announcements. The post-event dummy is positive but not statistically significant in the 28-day window.

The evidence also suggests that the effects of announcements are smaller for exporting firms. To see how the exchange rate reacts to the capital control announcements we use daily Real/dollar exchange rate data from Bloomberg. Columns (7) and (8) of Table 6, Panel A show

the results. The coefficients on the exchange rate variable are negative but not statistically significant. A negative coefficient suggests exchange rate depreciation consistent with the motivation behind capital controls to curb currency appreciation by stemming the inflow of foreign capital. However, the lack of statistical significance precludes us from drawing robust inference from the result.

It is worth noting from Figure 4 that over the sample period during which the capital controls were imposed, the Real steadily appreciated between January 2007 and July 2008 and, despite a brief period of depreciation during the onset of the Global Financial crisis, continued to appreciate between January 2009 and July 2011. By the first quarter of 2011, the exchange rate stood at R$1.6 against the U.S. dollar, and Mantega, Brazil's finance minister, blamed the currency appreciation on incoming foreign capital originating in developed markets. In particular, he focused his criticism on the United States, citing that quantitative easing spurred an excessive influx of foreign capital into Brazil. Mantega stated, "The advanced countries are still running expansionist monetary policies… The developed world is taking longer to recover than expected and this means their currencies are still devaluing, which is causing the overvaluation of the Real."

An alternative view amongst international policy makers conjectured the onset of the "currency wars" on China's undervalued currency that had an adverse impact on the export prospects of other countries. For example, the Western Hemisphere Director for the IMF, Nicholas Eyzaguirre suggested, "There is a correlation [between] the fact that China pegs its currency and pressures on the exchange rate of Brazil or Peru." The preceding arguments suggest that while the imposition of controls may have been motivated by trying to stem the appreciation of the Real by curbing the inflow of foreign capital from developed countries such as the United States, alternative international economic forces such as the undervalued Remimbi may have rendered such attempts unsuccessful.

5.2 Capital Controls and Firm Investment

If capital controls increase the cost of capital while reducing the availability of external finance, investment at the firm level can fall. This subsection explores the effects of capital controls on firm-level investment. An advantage of firm-level data is that detailed balance sheet and incorporation information allow us to analyze the role of firm characteristics to explain the impact of the capital controls and to identify the transmission mechanisms of policy shocks more directly onto real variables.[24]

In this section, we hypothesize that reduced capital access following capital controls would impede the funding of projects when internally generated funds are insufficient to meet the needs of an investment program. However, a concern in the context of our investment analysis is our ability to disentangle what may be happening around these capital control changes with the aftermath of the crisis – what one might call a "contaminating" event. To address this concern we inspect the behavior of real investment in Brazil following the Global Financial Crisis. Real GDP growth data suggest while Brazil was affected by the crisis, the economy bounced back by 2009. During this period foreign capital inflows also surged, leading the government to adopt a series of capital control measures beginning in late 2009.

Figure 3 shows the real investment rates and the change in real investment for the firms in our sample between 2007 and 2013. The data suggest that for the firms in our sample real investment defined as the change in real log PP&E rose steadily during the crisis from 18% to 25% between 2007 and 2009. By contrast real investment in the United States collapsed by 32% between 2007 and 2009 and started recovering in 2010. In Brazil, for the firms in our sample, investment declines to 15% in 2010, turns negative (-8%) only in 2011, recovers mildly in 2012 (1%) and is -10% in 2013.

The timing of the investment decline for the firms in our sample therefore appears to coincide with the change in the capital controls regime and not during the upheaval of the financial crisis. Similarly, the rate of decline in investment commences in 2010 (-38% decline) and continues through 2013. Of course it can be argued that real investment with adjustment

[24] 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.

costs and "time to build" features can display delayed adjustment. Therefore, while the effects of the crisis cannot be ruled out definitively, it is worth noting that the timing of the decline in investment immediately follows the imposition of capital controls and not during or in the immediate aftermath of the financial crisis.

To formally examine whether external capital constraints bind following the imposition of capital controls, we follow the approach in Lins, Strickland and Zenner (2005) and more recently in Foucault and Fresard (2012) who examine the real side response around quasi-liberalization events. Lins, Stickland, and Zenner (2005) examine the effect of a cross-listing on the sensitivity of investment to cash flows and find that this sensitivity declines after a cross-listing because a cross-listing relaxes constraints on access to capital for firms. Foucault and Fresard (2012) examine the price-sensitivity in investment and find that it increases following cross listing. In this paper we examine whether real investment declines following the imposition of capital controls and whether this is related to fundamental factors such as free cash flows, the market to book ratio as well as firm-characteristics such as size and exporter status.[25]

Prior to the formal regression analysis, we take a brief look at the data. Table 7 presents summary statistics about real investment through the lens of different firm-characteristics. 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.

Table 7 looks at the before-after investment picture for two and three year windows beginning in 2009. For the full sample, while investment drops in magnitude following the 2009 date, the difference is not statistically significant. Controlling for size, we see a dramatic fall in

[25] To examine the change in the sensitivity of investment to free cash flow, these papers use regressions based on the Fazzari, Hubbard and Petersen (1988) methodology, which is also discussed in detail by Hoshi, Kashyap, and Scharfstein (1991), Whited (1992), and Kaplan and Zingales (1997), among others.

the investment for firms that lie below the mean firm size and the difference is statistically significant in both panels. The simple summary statistic suggests that while large firms were relatively unaffected, small firms experienced a significant fall in their investment rates. In fact, in the two-year period following 2009, small firm investment fell to an average of 1.74% relative to an average rate of 8.89% in the two-year prior period. The difference is statistically significant.

Similarly, non-exporting firms appear to have borne the brunt of the impact with investment contracting to -1% average rate in the two years after 2009 compared to an average of 7.94% in the two years before. Exporting firms on the other hand saw a statistically significant rise in their investment rates. Lastly, firms with an above median score for external finance dependence saw a fall in their investment rate while firms that were less dependent on external finance increased investment. In sum, the data suggest that there is substantial heterogeneity in the firm-level investment response in the aftermath of capital controls. Small, non-exporting and external finance dependent firms saw significant drops in their real investment rates in the two to three year window following the imposition of controls.

Turning to the formal analysis, we adjust the model to accommodate certain characteristics of our data and to test for pre- and post-capital controls effects. The regression specifications take the following form,

$$Investment_{it} = Constant + Firm\_Controls_{it} + Post\_Controls\ Dummies_t + \varepsilon_{it},$$

Table 8 presents the regression results. Our findings suggest that Brazilian firm investment was adversely affected following capital controls suggesting reduced access to external capital markets. The dependent variable in column (1) is the first difference of the natural log of property, plant and equipment (PP&E) for firm *i* in year *t*. In columns (2) to (4) the dependent variable is the ratio of PP&E to lagged total assets for firm *i* in year *t*. The regression includes controls for firm-characteristics and year dummies for the three years following the controls. Reported robust standard errors incorporate clustering around each firm to account for a lack of independence between the time-series observations of each firm. Columns (1) and (2)

include all firms in the sample while column (3) restricts the sample to the firms with above median level of assets and column (4) to those with below the median level of assets.

Consistent with the previous literature, the specifications in columns 1 and 2 show that the ratio of free cash flows to total assets and the market to book ratio are positively and significantly correlated with real investment. Further the ratio of cash to total assets is also significantly correlated with real investment. The coefficients on the post-controls dummies for the years 2010, 2011 and 2012 are negative for all three years and significant for the years 2010 and 2012 in column 1 and 2012 in column 2. The coefficients on the dummies suggest that real investment falls significantly following the imposition of controls. Comparing columns (2) to (4) we see that while investment fell following the imposition of controls, it is the larger firms for which free cash flow is positively and significantly correlated with investment. The result corroborates that large firms may have access to internal capital markets whereas the coefficient on free cash flows while positive is not significant for the below-median sized firms.

We caution that these are results about broad patterns in terms of the effects on real investment and the real economy. Unlike the analysis of announcement effects measured by the CARs in tightly specified event windows that are precisely identified, when we examine investment data over a two-three year window other factors could be driving the real investment patterns. Nevertheless the collapse in investment is noteworthy especially if the motivation for the controls was to boost the competitiveness of domestic firms by counteracting the real appreciation of the exchange rate.

5.3 Robustness Checks and Additional Tests

We conduct a number of tests to ensure the robustness of our results. The firm and stock market regressions are estimated for different windows and different methodologies for computing returns (raw returns, CAPM) obtaining similar patterns (Table 9) and for firms listed on the alternative IBRA stock exchange (Table 9). Note that the correlations between the betas such as Scholes-Williams, standard CAPM, and so on are very high. The results remain robust.

To examine whether the source of external financing matters, we control for the share of debt from banks (Table 10, Panel A, Column 1). The coefficient on the variable measuring the

share of debt by banks was negative and significant. Column 2 in Table 10, Panel A reports the results for operating revenue as a proxy for size. The result is robust, and the coefficient on operating revenues is negative and significant.

The specification in Column 3 of Table 10, Panel A tests whether outliers matter by dropping the event with the most negative abnormal returns on October 22, 2008, which also coincided with the global financial crisis. The constant remains negative and significant, and the pattern of coefficients is similar for total assets, exporter status, and external finance dependence. The results are also not driven by the IPO of OGX Petróleo e Gás Participações S.A. or this firm in particular (not reported).

In Column 4, we run a specification with an invariant estimation window prior to the controls that were implemented in October 2009 following that a series of controls were put into place on a wide range of instruments. Average CARs are -3.56% and significant at the 1% level.

In Column 5, we differentiate between tightening and loosening events using a loosening event dummy. The coefficient on the dummy is negative but not significant. The overall effect on the CARs remains negative and significant. Section 5.1.1 discusses that including event dummies directly may provide a cleaner identification strategy. The evidence is, however, consistent with the notion that policy predictability and legal certainty matter with regard to foreign investment. Frequent changes in the rules entail policy uncertainty and policy reversibility, which in turn undermine investor confidence. Further, the negative returns are consistent with increased administrative costs for firms and investors that frequent rule changes entail.

We also looked at a sample of firms that are subsidiaries of multinational companies either Brazilian-owned (headquarters in Brazil) or foreign owned (headquarters abroad), obtaining a similar pattern of results (Column 6). We also examined a subsample of firms that issue on the New York Stock Exchange (ADRs) in Column 7 discussed in detail in Section 5.1.2 and another subsample of firms that issued bonds abroad during the period of study in Column 8. The data are from Bloomberg and company reports. The pattern of results is robust in these alternative specifications.

Additionally, in Table 4 we estimate the regressions for debt and equity events in separate panels as there are some events that involve controls on both debt and equity. Examining the two sets of events separately therefore provides a cleaner identification and a simple interpretation of the coefficient on the constant. Nevertheless, in Table 10 Panel B Columns (1) to (4) we run a pooled regression for debt and equity events along with an equity events dummy. The results remain the same qualitatively, and the coefficient on the equity dummy is negative and significant.

Finally, an additional concern is one of market frictions. Brazil's market, even amongst Bovespa constituents, can be quite illiquid. The validity of standard CARs can therefore be questioned due to market illiquidity along with different market rules governing trading. Asynchronous trading implies that information is differentially incorporated into shares for larger and smaller stocks, which we interpret as globally exposed versus purely local.

Griffin, Kelly and Nardari (2010) point to potential problems when gauging functional efficiency through the lens of weak or semi-strong-form efficiency in emerging markets. For example, they suggest that for the same level of information a firm with slow information incorporation can have an efficiency measure similar to a firm with rapid information incorporation. The authors also argue that if firms in emerging markets have less public information, this could bias researchers toward finding greater measured efficiency in emerging markets even if they were actually less efficient. This argument suggests that the significance of our measured CARs in response to public capital control announcements may simply be masking underlying inefficiency whilst giving the appearance of efficiency.

However, it is hard to explain how CARs that are pure noise would be systematically related in a cross section of Brazilian firms to observable firm characteristics. It is plausible that that large-exporting firms may be more efficient at incorporating information than small non-exporters. Having said that, the finding of magnitude of significant CARs is consistent with both (i) attenuation bias (i.e. we are underestimating the hypothesized effects because of market inefficiency) and (ii) the appearance of efficiency is masking underlying inefficiency. Therefore the two explanations (attenuation bias and the "appearance" of efficiency) are observationally equivalent in the absence of a precise measure of the information environment and cross-

sectional differences in it. While imperfect, we use liquidity measures as a proxy for transaction costs and asynchronous trading.

Table 10 Panel B, Columns (5) to (7) include three measures of liquidity from Datastream: (i) VO/NOSH which is turnover by volume divided by the number of shares outstanding; (ii) The share turnover ratio (VO*P)/MV which is the turnover by volume multiplied by the stock price (as a proxy for turnover by value) divided by the market value; and (iii) (VO*P)/MC which is the turnover by volume multiplied by the stock price divided by the market capitalization. Please note that for Brazilian firms, Datastream carries turnover by volume traded (VO) but not turnover by value traded (VA). We multiplied VO by the stock price (P) to get a proxy for VA. The results remain robust to the inclusion of the liquidity measures.

6. Conclusion

This paper examines the effects of capital controls on firm-level stock returns and real investment using data from Brazil. We focus on Brazil because it has taken center stage as a country that has implemented a series of extensive controls on capital flows between 2008 and 2013.

Unlike previous capital controls episodes during emerging market financial crises designed to hinder capital flight, Brazil's capital controls were devised as a macro-prudential measure to stem foreign capital inflows in the aftermath of the GFC. Brazil also implemented the controls to forestall currency appreciation whereas historically emerging market countries implemented capital controls policies to prevent currency depreciation.[26,27]

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

[27] In contrast to Brazil, other countries, primarily in East Asia, that also applied capital controls measures to stem the inflow of foreign capital in the aftermath of the GFC did so in somewhat of a piecemeal manner and primarily focused on the bond market and to some extent the banking sector. For instance, Taiwan implemented a tax on foreign investment in time deposits. Korea implemented restrictions on FX derivatives trading, foreign-currency denominated lending by banks, and curbed the foreign currency liquidity ratio of banks, Indonesia applied one-month time limit on domestic bond investing, Thailand removed an exemption 15% tax on foreign investors income from domestic bonds and finally Korea again applied a 14% tax on foreign income on government bonds.

We employ an event-study methodology using stock price and financial statement data to examine CARs and real investment in the aftermath of capital controls announcements. The evidence suggests that there is a significant decline in CARs for Brazilian firms following the imposition of capital controls on equity flows, consistent with an increase in the cost of capital. The data also suggest that large firms and exporting firms are less affected by the controls. However, regarding magnitude, the data show that the decline in average returns swamps the advantages that firm size and export status offer. Moreover, external finance dependent firms are more adversely affected by the imposition of capital controls. Notably, controls on debt flows are associated with less negative returns, suggesting that the market views controls on equity and debt flows differently. Finally, real investment declines significantly in the three years following the imposition of capital controls.

The findings in the paper have implications for macro-finance models that focus exclusively on aggregate variables to examine the optimality of macro-prudential regulation and abstract from heterogeneity at the firm level. In particular, the evidence in this paper suggests that capital controls disproportionately affect small, non-exporting firms, especially those more dependent on external finance.

A challenge for tackling the long-standing question of the benefits and costs of open international capital markets is the tension between generalizable empirical studies based on cross-country data and the availability of precisely identifiable policy shocks. Our paper has the advantage that we can cleanly identify the implemented capital controls by type and magnitude for Brazil. The paper also considers a set of measurable outcome variables–namely CARs and real investment. We take a step in furthering our understanding of the effects of capital controls on the real economy. Future research could bring us yet nearer.

References

Adler, Michael, and Bernard Dumas. 1983. "International Portfolio Selection and Corporation Finance: A Synthesis." *Journal of Finance* 38(3): 925–984.

Bailey, W. and J. Jagtiani, 1994. "Foreign Ownership Restrictions and Stock Prices in the Thai Capital Market." *Journal of Financial Economics* 36(1): 57-87.

Bekaert, Geert and Harvey, Campbell R. 2000. "Foreign Speculators and Emerging Equity Markets" *The Journal of Finance* 55(2): 565-613.

Bekaert, Geert, Campbell R. Harvey, and Christian T. Lundblad. 2003. "Equity Market Liberalization in Emerging Markets." *Review.* Federal Reserve Bank of St. Louis, July, 53–74.

Bekaert, Geert, Campbell R. Harvey, and Christian T. Lundblad. 2005. "Does Financial Liberalization Spur Growth?" *Journal of Financial Economics* 77(1): 3–55.

Benigno, G., H. Chen, C. Otrok, A. Rebucci, and E. Young. 2011. "Revisiting Overborrowing and its Policy Implications." In *Monetary Policy under Financial Turbulence*, edited by. Luis Cespedes, Roberto Chang, and Diego Saravia. Banco Central de Chile, Volume 16.

Benmelech, Efraim and Eyal Dvir. 2013. "Does Short-term Debt Increase Vulnerability to Crisis? Evidence from the East Asian Financial Crisis." *Journal of International Economics* 89(2): 485–494.

Bernard, V. L. 1987. "Cross-sectional Dependence and Problems in Inference in Market-Based Accounting Research." *Journal of Accounting Research* 25(1): 1-48.

Bianchi Javier and Enrique Mendoza. 2013. "Optimal Time-Consistent Macroprudential Policy," NBER Working Papers 19704.

Black. F. 1974. "International Capital Market Equilibrium with Investment Barriers." *Journal of Financial Economics* 1(4): 337-352.

Brown, Stephen. J., and Jerold B. Warner. 1985. "Using Daily Stock Returns: The Case of Event Studies." *Journal of Financial Economics* 14(1): 3–31.

Busse, Jeffrey A. and T. Clifton Green. 2002. "Market Efficiency in Real Time." *Journal of Financial Economics* 65(3): 415–437

Calvo, Guillermo and Carmen Reinhart. 2000. "When Capital Inflows Come to a Sudden Stop: Consequences and Policy Options." MPRA Paper 6982, University Library of Munich, Germany.

Chamon, Marcos and Marcio Garcia. 2013. "Capital Controls in Brazil: Effective?" Working paper.

Chaney, Thomas. 2013. "Liquidity Constrained Exporters." NBER Working Paper No. 19170.

Chari, Anusha and Peter Blair Henry. 2004. "Risk Sharing and Asset Prices: Evidence from a Natural Experiment." *Journal of Finance* 59(3): 1295–1324, 06.

Chari, Anusha and Peter Blair Henry. 2008. "Firm-specific Information and the Efficiency of Investment." *Journal of Financial Economics* 87(3): 636–655.

Coffee, J. 1999. "The future as history: the prospects for global convergence in corporate governance and its implications." *Northwestern University Law Review* 93(3): 641–707.

Cooper, I.A, and E. Kaplanis. 1986. "Costs of Crossborder Investment and International Equity Market Equilibrium." *Recent Advances in Corporate Finance* J Edwards (ed): 209 – 240.

Doidge, Craig & Karolyi, G. Andrew & Stulz, Rene M. 2004. "Why are Foreign Firms Listed in the U.S. Worth More?," *Journal of Financial Economics* 71(2): 205-238.

Easton, Peter D. 2004. "PE Ratios, PEG Ratios, and Estimating the Implied Expected Rate of Return on Equity Capital." *The Accounting Review* 79(1): 73-95.

Errunza, Vihang and Etienne Losq. 1985. "International Asset Pricing under Mild Segmentation: Theory and Test." *The Journal of Finance* 40(1): 105-124.

Eun, C.S. and S. Janakiramanan. 1986. "A Model of International Asset Pricing with a Constraint on the Foreign Equity Ownership." *Journal of Finance* 41(4): 897–914.

Fazzari, Steven M., R. Glenn Hubbard, and Bruce C. Petersen. 1988. "Financing Constraints and Corporate Investment." *Brookings Papers on Economic Activity* 1988(1): 141-206.

Fernández, Andrés, Alessandro Rebucci, and Martín Uribe, 2013. "Are Capital Controls Prudential? An Empirical Investigation," *Journal of Monetary Economics* 76, 2015, 1-14.

Farhi, Emmanuel and Ivan Werning. Forthcoming. 2014 "Dilemma not Trilemma? Capital Controls and Exchange Rates with Volatile Capital Flows," *IMF Economic Review*, forthcoming.

Foerster, S. R. and G.A. Karolyi. 1999. "The Effects of Market Segmentation and Investor Recognition on Asset Prices: Evidence from Foreign Stocks Listing in the United States." *The Journal of Finance* 54(3): 981–1013.

Forbes, Kristin, Marcel Fratzscher, Thomas Kostka, and Roland Straub. 2012. "Bubble Thy Neighbor: Portfolio Effects and Externalities from Capital Controls." NBER Working Paper No. 18052, May.

Forbes, Kristin J. and Francis E. Warnock. 2012. "Capital Flow Waves: Surges, Stops, Flight, and Retrenchment." *Journal of International Economics* 88(2): 235–251.

Forbes, Kristin J. 2007a. "One Cost of the Chilean Capital Controls: Increased Financial Constraints for Smaller Traded Firms." *Journal of International Economics* 71(2): 294–323.

Forbes, Kristin J. 2007b. "The Microeconomic Evidence on Capital Controls: No Free Lunch." In *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices, and Consequences*, edited by S. Edwards. Chicago: University of Chicago Press.

Foucault, Thierry and Laurent Frésard. 2012. "Cross-Listing, Investment Sensitivity to Stock Price, and the Learning Hypothesis." *Review of Financial Studies, Society for Financial Studies* 25(11): 3305-3350.

Fratzscher, Marcel, Marco Lo Duca, and Roland Straub. 2013. "On the International Spillovers of US Quantitative Easing." Working Paper Series 1557, European Central Bank.

Fratzscher, Marcel. 2012. "Capital Flows, Push Versus Pull Factors and the Global Financial Crisis." *Journal of International Economics* 88(2): 341–356.

French, Kenneth R. and James M. Poterba. 1991. "Investor Diversification and International Equity Markets." *American Economic Review* 81(2): 222–226.

Jeanne, Olivier, Arvind Subramanian, and John Williamson. 2012. "Who Needs to Open the Capital Account?" Peterson Institute for International Economics, Washington D.C.

Goldfajn, Ilan and André Minella. 2007. "Capital Flows and Controls in Brazil: What Have We Learned?" In *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices, and Consequences*, edited by S. Edwards. Chicago: University of Chicago Press.

Hail, L. and Christian Leuz. 2009. "Cost of Capital Effects and Changes in Growth Expectations around U.S. Cross-Listings." *Journal of Financial Economics* 93(3): 428–454.

He, Z. and Wei Xiong. 2012. "Rollover Risk and Credit Risk." *The Journal of Finance* 67(2): 391–430.

Henry, Peter Blair. 2000. "Stock Market Liberalization, Economic Reform, and Emerging Market Equity Prices." *The Journal of Finance* 55(2): 529-564.

Henry, Peter Blair. 2007. “Capital Account Liberalization: Theory, Evidence and Speculation.” *Journal of Economic Literature* 45(4): 887–935.

Hietala, Pekka T. 1989. “Asset pricing in partially segmented markets: Evidence from the Finnish market.” *Journal of Finance* 44(3): 697–718.

Hoshi, Takeo, Anil Kashyap and David Scharfstein. 1991. "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups." *Quarterly Journal of Economics* 106(1): 33-60.

Hou, Kewei, Karolyi, G. Andrew and Kho, Bong-Chan. 2011. “What Factors Drive Global Stock Returns?” *The Review of Financial Studies* 24(8): 2527-2574.

Karolyi, A., and R. Stulz. 2003. “Are Financial Assets Priced Locally or Globally?” *Handbook of the Economics of Finance* 1(1): 975-1020.

Karolyi Andrew and Ying Wu. 2014. “The Role of Investability Restrictions on Size, Value, and Momentum in International Stock Returns," Working Paper Cornell University.

Klein, Michael. 2012. “Capital Controls: Gates Versus Walls.” NBER Working Paper No. 18526.

Korinek, Anton. 2010. “Regulating Capital Flows to Emerging Markets: An Externality View.” Working Paper.

Lessard, D.R. 1983. “Principles of International Portfolio Selection.” in I.H. Giddy and A.M. George (eds.), International Finance Handbook, Wiley, New York.

Lins, Karl V., Deon Strickland and Marc Zenner. 2005. “Do Non-U.S. Firms Issue Equity on U.S. Stock Exchanges to Relax Capital Constraints?” *The Journal of Financial and Quantitative Analysis* 40(1): 109-133.

Lo, K. 2003. “Economic Consequences of Regulated Changes in Disclosure: the Case of Executive Compensation.” *Journal of Accounting and Economics* 35(3): 285–314.

Magud, Nicolas, Carmen Reinhart, and Kenneth Rogoff. 2011. “Capital Controls: Myth and Reality —A Portfolio Balance Approach.” NBER Working Paper No. 16805.

MacKinlay, A. Craig. 1997. “Event Studies in Economics and Finance,” *Journal of Economic Literature* XXXV: 13–39.

Petersen, Mitchell A. 2009. “Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches.” *Review of Financial Studies* 22(1): 435-480.

Rajan, Raghuram G. and Luigi Zingales. 1998. "Financial Dependence and Growth." *American Economic Review* 88(3): 559–586.

Schipper, Katherine and Rex Thompson. 1983. "Evidence on the Capitalized Value of Merger Activity for Acquiring Firms." *Journal of Financial Economics* 11(1): 85-119.

Schipper, Katherine and Rex Thompson. 1985. "The Impact of Merger-Related Regulations Using Exact Distributions of Test Statistics." *Journal of Accounting Research* 23(1): 408-415.

Scholes, Myron and Joseph Williams. 1977. "Estimating Betas from Nonsynchronous Data." *Journal of Financial Economics* 5(3): 309–327.

Sefcik, Stephan E. and Rex Thompson. 1986. "An Approach to Statistical Inference in Cross-Sectional Models with Security Abnormal Returns As Dependent Variable." *Journal of Accounting Research* 24(2): 316-334.

Solnik, Bruno H. 1974. "Why Not Diversify Internationally Rather Than Domestically?" *Financial Analysts Journal* 51(1): 89-94.

Stapleton, R.C. and Marti G. Subrahmanyam. 1977. "Market Imperfections, Capital Market Equilibrium and Corporation Finance." *Journal of Finance* 32(2): 307-19.

Stulz, Rene M. 2005. "The Limits of Financial Globalization." *Journal of Finance* 60(4): 1595–1638.

Stulz, Rene M. 1999. "Globalization of Equity Markets and the Cost of Capital." Working paper. Dice Center, Ohio State University.

Stulz, Rene M. 1981. "On the Effects of Barriers to International Investment." *Journal of Finance* 36(4): 923-934.

Tornell, Aaron and Frank Westermann. 2005. *Boom-Bust Cycles and Financial Liberalization.* Cambridge, MA: MIT Press.

Whited, Toni M. 1992. "Debt, Liquidity Constraints, and Corporate Investment: Evidence from Panel Data." *Journal of Finance* 47(4): 1425 – 1436.

Zhang, Ivy Xiying. 2007. "Economic consequences of the Sarbanes–Oxley Act of 2002." *Journal of Accounting and Economics* 44(1): 74-115.

Appendix A

The IOF ("imposto sobre operacoes financeiras", how capital controls have been enacted and changed) is a "decree". Under Brazilian system, a decree ranks below a law and does not require Congress approval. The Executive can enact and change a decree, and thus the IOF taxes (up to a maximum established by the law), at any time by the Minister of Finance.

In Brazil, some taxes, which in principle have a regulatory intent (regulatory taxes) such as the IOF, gasoline tax, taxes on industrialized products, can be changed by decree. Other taxes such as the income tax (IR) have revenues as the main objective, have to be changed by law, ie, require Congressional approval. The Tax code ("Codigo tributário") law 5172 passed in October 25th, 1966) distinguishes between taxes that can be changed by decree and those by law.

The tax code can be found at: http://www.planalto.gov.br/ccivil_03/leis/L5172.htm

The links below show the subsequent reforms to the law:

(i) The IOF was created by LEI No 5.143, October 20th, 1966.
http://www.planalto.gov.br/ccivil_03/leis/L5143.htm

(ii) Ammendment June 21st, 1994.
http://www.planalto.gov.br/ccivil_03/leis/L8894.htm

(iii) There were some revisions to the IOF in 2011 (e.g. giving a broader definition of derivatives, tax treatments) and to include that the rates of the IOF could be changed (within the maximum limits allowed by decree) considering the fiscal and monetary goals of the authorities.

"O Poder Executivo, obedecidos os limites máximos fixados neste artigo, poderá alterar as alíquotas tendo em vista os objetivos das políticas monetária e fiscal. (Incluído pela Lei nº 12.543, de 2011)"

Appendix B

A sample of opinions from different constituents about capital controls is listed below. Please note that most of these articles are in Portuguese.

1. The Institute of International Finance (the IIF) criticizes measures to control capital inflows. Banks complain and criticize the capital controls policy as short sighted.
http://economia.estadao.com.br/noticias/geral,iff-critica-medidas-para-controlar-entrada-de-capital-imp-,703364

2. The industry chamber FIESP hopes that the measures will contain appreciation. They argue that the Real appreciation has "devastated" the industry. They also worry that the market will find ways to evade the measures used to contain appreciation.
http://www1.folha.uol.com.br/poder/951113-mercado-vai-burlar-medidas-para-contencao-do-cambio-diz-fiesp.shtml

3. The head of Bovespa criticizes the tax as Brazilian firm stock prices lose US$ 55 billion in market value after the IOF announcement.
http://www1.folha.uol.com.br/mercado/2009/10/641080-empresas-brasileiras-perdem-us-55-bi-no-pregao-apos-anuncio-do-iof.shtml

4. Exporters repatriate dollar earnings from abroad. Interestingly, the article talks about exporters bringing back dollar earnings from exports to Brazil. Before the controls the earnings were kept abroad. This may reflect the difficulties in repatriating earnings and the fact that exporting firms could repatriate their earnings without paying the IOF tax.
http://www1.folha.uol.com.br/mercado/2009/12/671425-exportador-traz-mais-dolar-e-segura-real.shtml

5. Article discusses that the government attitude towards containing dollar appreciation is more relevant than its results.
http://www1.folha.uol.com.br/mercado/2008/03/381611-atitude-do-governo-em-conter-dolar-e-mais-importante-que-resultados-diz-fiesp.shtml

6. Industry associations are once again in favor of the policy to regain competitiveness eroded by the Real appreciation. The article suggests that the capital control measures will not have immediate impact on the exchange rate. This article makes it clear that exporters don't pay the IOF tax.
http://www1.folha.uol.com.br/folha/dinheiro/ult91u381325.shtml

7. Interview with Edemir Pinto, Head of Bovespa against capital controls highlighting foreign investor dependence and the importance of the stock market especially for small and medium size companies.
http://www.ft.com/cms/s/0/3734fa98-0a32-11e1-85ca-00144feabdc0.html#ixzz3lwzLBX8x

8. Edemir Pinto, chief executive officer of BM&FBovespa, met with Finance Minister Guido Mantega last month in Brasilia to lobby for a removal of the IOF tax. Pinto said Nov. 6 the tax had been "harmful" to Brazilian markets.
http://www.bloomberg.com/apps/news?pid=newsarchive&sid=a1mzHH17Ezbo

9. Brazilian private equity funds are lobbying the government for an exclusion to the recently increased IOF tax.
http://www.abvcap.com.br/sala-de-imprensa/noticias-abvcap.aspx?c=en-US&id=510

10. Brazilian private equity funds, known as FIPs, are lobbying the government for an exclusion to the recently increased IOF tax.
http://www.latinfinance.com/Article/2698320/Brazil-Private-Equity-Hopes-to-Dodge-New-Tax.html#.VZVs1_lVhBc

11. "Brazil's largest commodities exporters are now lobbying the government to roll back the so-called IOF tax, which is applied to foreign credit and exchange operations...."We are going to have to find some solution,"" said Luiz Carlos Carvalho, president of Brazil's Agribusiness Association, which is pressing the government to remove or alter the tax."
http://www.reuters.com/article/2012/03/30/us-exports-brazil-financeidUSBRE82T0CV20120330

12. International investors are outraged over Brazil's "currency war" with the US and Europe, after Brazil's latest attempt to manage its currency – by extending the IOF tax on all foreign borrowings – fanned speculation it will pursue a tighter control over capital inflows in its economy. …"If Brazil wants to be a real-world country, it should do real-world things and that includes not jerry-rigging your currency," says Jim Craige, international fixed-income investor in Brazil and manager of EM fixed income funds at New York's Stone Harbor Investment Partners.

http://www.euromoney.com/Article/2988821/Category/1/ChannelPage/0/Investors-accuse-Brazilofjerryriggingcurrency.html?type=CategoryArticle&ArticleId=2988821&CategoryID=1&PageID=0

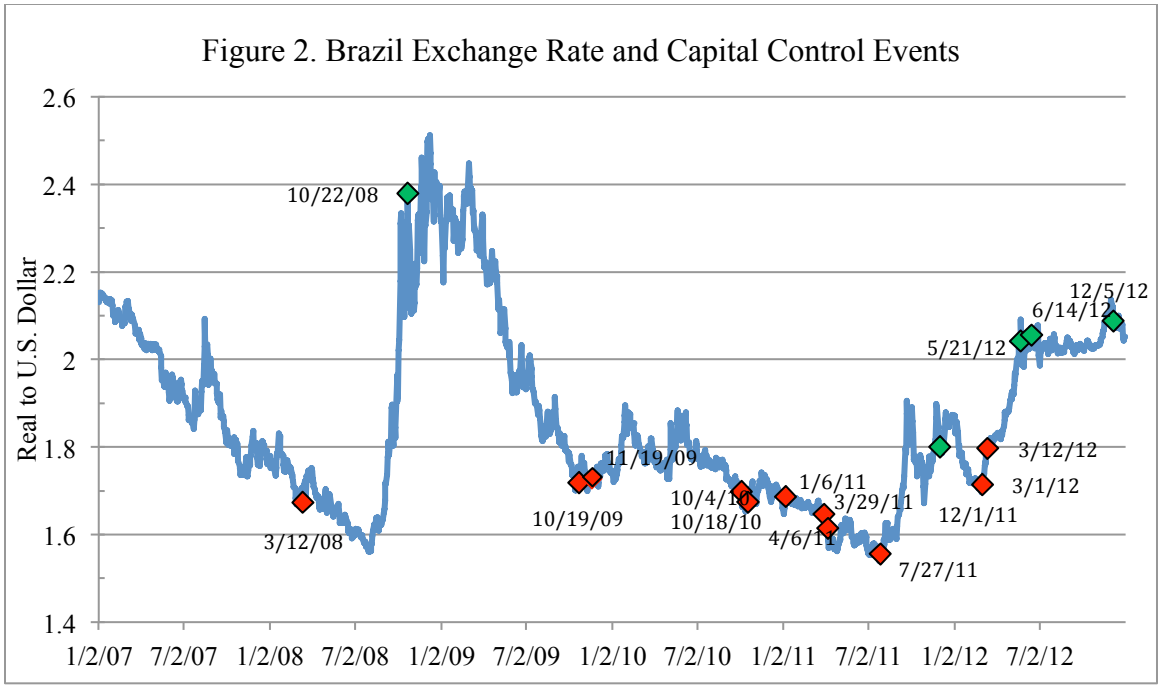
Figure 2. Brazil Exchange Rate and Capital Control Events
Real to U.S. Dollar
2.6
2.4
2.2
2
1.8
1.6
1.4
1/2/07
7/2/07
1/2/08
7/2/08
1/2/09
7/2/09
1/2/10
7/2/10
1/2/11
7/2/11
1/2/12
7/2/12
10/22/08
3/12/08
10/19/09
11/19/09
10/4/10
10/18/10
1/6/11
3/29/11
4/6/11
7/27/11
12/1/11
3/12/12
3/1/12
5/21/12
6/14/12
12/5/12

Figure 3a: Capital Control Announcements: Abnormal Returns in Event Time

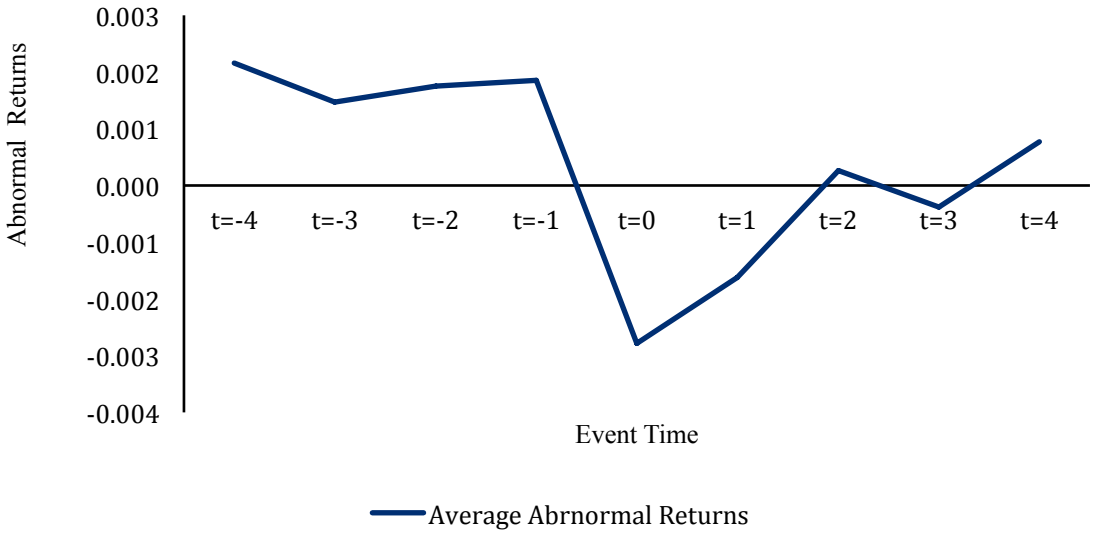

Figure 3b: Capital Control Announcements: Average Abrnormal Returns (Cummulated Across Firms by Event)

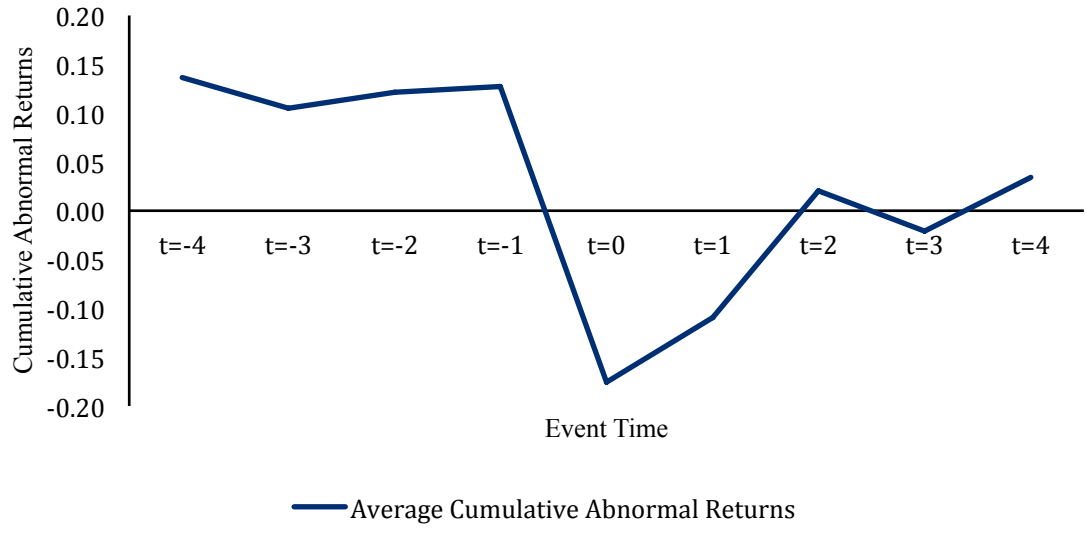

Figure 4. Investment (Year to Year Change)
2007-2012

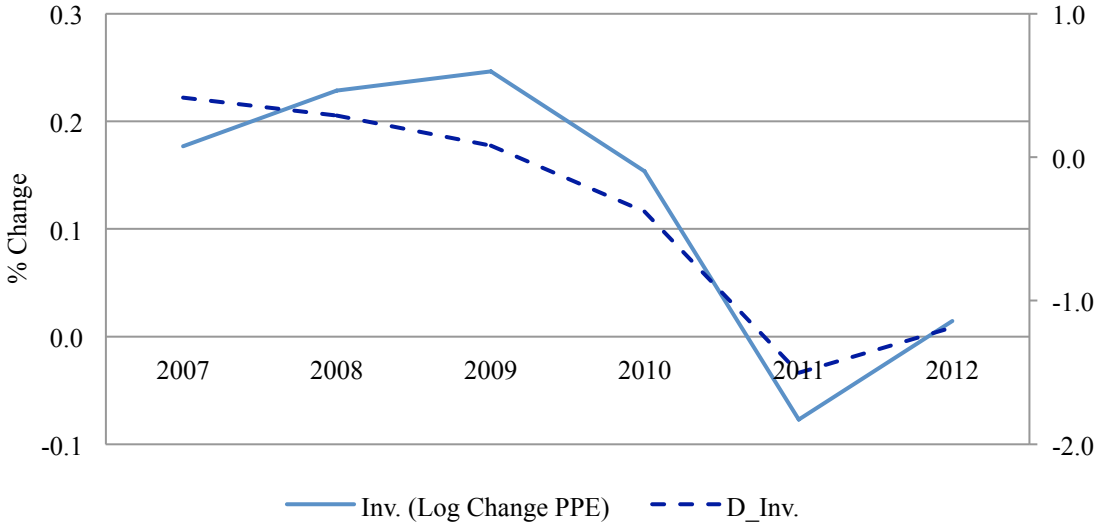

Table 1. Capital Controls in Brazil: 2008-2012

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*.

Annoucement Date	Event	Debt Event	Equity Event	Effective Date
3/12/08	IOF tax=1.5% on fixed income investments made by non-residents	1	0	3/17/08
10/22/08	IOF tax=0% on fixed income investments	1	0	10/23/08
10/19/09	IOF tax=2% introduced on equities and fixed income securities	1	1	10/20/09
11/18/09	Tax=1.5% on American Depositary Receipts (ADRs) converted into local stocks	0	1	11/19/09
10/4/10	IOF tax=4% on fixed income bonds and derivatives; 2% for equities	1	0	10/5/10
10/18/10	IOF tax=6% on fixed income bonds and derivatives; 2% for equities	1	0	10/19/10
3/28/11	IOF tax=6% on overseas loans and bonds with maturities up to 1 year	1	0	3/29/11
4/6/11	IOF tax to overseas bonds and bonds with maturities up to 2 years	1	0	4/7/01
7/26/11	Tax of 1% on foreign exchange derivatives; legislation allow tax to be increased up to 25%	0	1	7/27/11
12/1/11	IOF tax=0% on variable income instruments traded on the exchange and certain debentures	0	1	12/2/11
2/29/12	IOF tax to cover overseas loans and bonds with maturities up to 3 years	1	0	3/1/12
3/9/12	IOF tax to cover overseas loans and bonds with maturities up to 5 years	1	0	3/12/12
5/21/12	IOF tax=1.5% for individual borrowers (from 2.5%)	1	0	5/22/12
6/13/12	IOF tax to overseas loans and bonds with maturities up to 2 years	1	0	6/14/12
12/4/12	IOF tax to overseas loans and bonds with maturities up to 1 year	1	0	12/5/12

Table 2. Summary Statistics

Notes: Financial figures are from Q4 2007 which is the last quarter prior to the announcement regarding the introduction of capital controls on 3/12/2008. Nominal variables at the firm-level are divided by the Consumer Price Index (x 100). The sample period is Q4-2007-Q4-2012. Total Assets and Property, Operating Revenues, and Plant & Equipment are in real terms deflated by the CPI. Investment is the percentage change in real property, plant & equipment(PP&E). External Finance Dependence is measured as (CE-CF)/CE which is the difference between capital expenditures and cash flows divided by cash flows as in Rajan and Zingales (1998). The average USD/Reais exchange rate from 2008-2012 was 1.845 R$/US$. Sources: Datastream for firm-level data and Secex for export data.

	Observations	Mean	Std. Dev	Median
		Panel A: All Firms		
Total Assets (Millions of R$)	862	66.78	142.09	12.66
Debt/Assets (%)	855	32.58	14.95	31.24
Short-term Debt/Debt (%)	851	28.50	22.80	21.60
External Finance Dependence	980	-65.86	899.73	-10.08
PP&E (Millions of R$)	886	16.02	43.79	3.72
Investment	854	0.05	0.51	0.02
Operating Revenues (Millions of R$)	888	0.81	2.19	0.23
Exporter Dummy	1000	0.41	0.49	0.00
		Panel B: Exporting Firms		
Total Assets (Millions of R$)	370	57.01	106.90	19.11
External Finance Dependence	410	-0.95	2.63	-0.43
PP&E (Millions of R$)	370	30.32	62.95	7.06
Operating Revenues (Millions of R$)	370	1.28	2.96	0.23
		Panel C: Non-Exporting Firms		
Total Assets (Millions of R$)	492	74.13	163.37	9.55
External Finance Dependence	570	-112.54	1177.97	-2.37
PP&E (Millions of R$)	492	5.27	10.65	2.18
Operating Revenues (Millions of R$)	518	0.48	1.29	0.22

Table 3. Post Capital Control Announcement Returns are Significantly Negative

Notes: The sample includes all events and the firms on the Bovespa exchange. Cumulative Abnormal Returns are measured over a two-day window using Scholes-Williams betas. Log Total Assets, Debt to Assets, and Short Term Debt to Total Debt all correspond to one year lagged values and are from Worldscope. Export data are matched from Secex. Clustered standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Cumulative Abnormal Returns (Scholes-Williams)							
	All Events							
Constant	-0.00428**	-0.0339**	-0.0347**	-0.0300*	-0.00613**	-0.0348**	-0.0354***	-0.0262+
	(0.00205)	(0.0159)	(0.0151)	(0.0171)	(0.00260)	(0.0156)	(0.0124)	(0.0151)
Log Total Assets		0.00177**	0.00168*	0.00159*		0.00169*	0.00173**	0.00141
		(0.000901)	(0.000882)	(0.000953)		(0.000895)	(0.000746)	(0.000959)
Debt/Assets			7.58e-05+					
			(5.25e-05)					
Short-term Debt/Debt				-0.00413				
				(0.00441)				
Exporter					0.00452+	0.00508*		0.00515
					(0.00299)	(0.00308)	-0.0057*	(0.00341)
Export < $1 mil							-0.0035	
							0.00823*	
Export $1 mil -$100 mil							(0.00494)	
							0.00532	
Export > $100 mil							(0.00434)	
							0.00173**	
10/22/08								-0.0260***
								(5.53e-05)
10/19/09								-0.0104***
								(0.000183)
11/18/09								-0.00313***
								(0.000183)
10/4/10								0.00565***
								(0.000370)
10/18/10								-0.00582***
								(0.000370)
3/28/11								-0.00120***
								(0.000388)
4/6/11								-0.00399***
								(0.000434)
7/26/11								-0.0124***
								(0.000487)
12/1/11								-0.000895
								(0.000781)
2/29/12								0.00176***
								(0.000574)
3/9/12								0.00210***
								(0.000574)
5/21/12								-0.0125***
								(0.000633)
6/13/12								0.00111+
								(0.000633)
12/4/12								0.00564***
								(0.000711)
Observations	1,000	941	931	854	1,000	941	941	941
R-squared	0.000	0.006	0.006	0.005	0.004	0.0103	0.0152	0.056

Table 4. The Market Reaction is Different For Controls on Debt Vs. Equity.

Notes: Panel A reports results for capital controls on debt-related flows and Panel B on equity-related flows. The sample includes all events and the firms on the Bovespa exchange. Cumulative Abnormal Returns are measured over a two-day window using Scholes-Williams betas. Log Total Assets, Debt to Assets, and Short Term Debt to Total Debt all correspond to one year lagged values and are from Worldscope. Export data are matched from Secex. Clustered standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Cumulative Abnormal Returns (Scholes-Williams)						
	Panel A: Debt Events						
Constant	-0.00368+	-0.0328*	-0.0330**	-0.0290+	-0.00608*	-0.0340*	-0.0347**
	(0.0024)	(0.0178)	(0.0168)	(0.0193)	(0.0032)	(0.0176)	(0.0140)
Log Total Assets		0.00174*	0.00162*	0.00152		0.00165*	0.00169**
(lag 1y)		(0.0010)	(0.0010)	(0.0011)		(0.0010)	(0.0008)
Debt/Assets			0.0000685				
(lag 1y)			(0.0001)				
Short-term Debt/Debt				-0.00199			
(lag 1y)				(0.0053)			
Exporter					0.00584*	0.00634**	
					(0.0030)	(0.0031)	
Export < $1 mil							-0.00689
							(0.0051)
Export $1 mil -$100 mil							0.0101*
							(0.0055)
Export > $100 mil							0.00668
							(0.0052)
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*
	(0.0027)	(0.0274)	(0.0259)	(0.0264)	(0.0048)	(0.0261)	(0.0229)
Log Total Assets		0.00185	0.00192	0.00199		0.00175	0.00193
(lag 1y)		(0.0016)	(0.0015)	(0.0016)		(0.0016)	(0.0014)
Debt/Assets			0.0000919				
(lag 1y)							
Short-term Debt/Debt				-0.0138**			
(lag 1y)				(0.0069)			
Exporter					0.00503	0.00707	
					(0.0137)	(0.0079)	
Export < $1 mil							0.00619
							(0.0064)
Export $1 mil -$100 mil							0.00916
							(0.0094)
Export > $100 mil							0.00584
							(0.0073)
Observations	268	224	222	220	268	224	224
R-squared	0.000	0.012	0.015	0.025	0.007	0.027	0.028

Table 5. External Finance-Dependent Firms are More Negatively Impacted by Capital Controls

Notes: The sample includes all events and the firms on the Bovespa exchange. Cumulative Abnormal Returns are measured over a two-day window using Scholes-Williams betas. Log Total Assets corresponds to lagged values (to the closest year) taken from Worldscope. In (1)-(8), External Finance Dependence is measured as (CE-CF)/CE which is the difference between capital expenditures and cash flows divided by cash flows as in Rajan and Zingales (1998); in (9)-(10) Common Equity to capital expenditures (CapEx) from Datastream. Export data are matched from Secex. Sources: Datastream and Secex. Clustered standard errors in parenthesis in (1)-(6) and (9)-(10) and robust standard errors in (7)-(8); sector fixed effects in (7)-(8). *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Cumulative Abnormal Returns (Scholes-Williams)									
	Panel A: All Events						Panel B: All Events-Sector Fixed Effects		Panel C: All Events	
Constant	-0.0335***	-0.0346***	-0.0229*	-0.0234*	-0.0261	-0.0337+	-0.00736	-0.0157	-0.0384**	-0.0398***
	(0.0119)	(0.0111)	(0.0134)	(0.0128)	(0.0220)	(0.0212)	(0.0229)	(0.0212)	(0.0157)	(0.0126)
Log Total Assets	0.00162**	0.00168**	0.00127*	0.00129*	0.00185	0.00234*	0.000428	0.000892	0.00187**	0.00195***
(lag 1y)	(0.0007)	(0.0006)	(0.0007)	(0.0007)	(0.0013)	(0.0013)	(0.0013)	(0.0018)	(0.0009)	(0.0007)
Exporter	0.00535**		0.00724**		-0.00274		-0.00947***		0.00601*	
	(0.0024)		(0.00279)		(0.0027)		(0.0030)		(0.0031)	
Export < $1 mil		-0.00570		-0.00397		-0.00764+		-0.0100***		-0.00492
		(0.0043)		(0.0046)		(0.0046)		(0.0031)		(0.0035)
Export $1 mil -$100 mil		0.00895*		0.0102**		-0.000891		0.00137		0.0101**
		(0.0046)		(0.0047)		(0.0053)		(0.0031)		(0.0051)
Export > $100 mil		0.00537**		0.00759***		-0.00469		-0.0137***		0.00613
		(0.0022)		(0.0026)		(0.0047)		(0.0023)		(0.0045)
ExtFinDep	-7.96e-07***	-7.97e-07***					-5.27e-07***	-6.00e-07***		
(lag 1y)	(1.59e-07)	(1.59e-07)					(1.39e-07)	(1.37e-07)		
ExtFinDep>mean			-0.00681**	-0.00662**						
(dummy variable)			(0.0026)	(0.0026)						
High Ext. Fin. (Manuf)					-0.00571+	-0.00586*				
(dummy variable)					(0.0033)	(0.0034)				
Common Equity / CapEx									-2.08e-08**	-2.08e-08**
									(8.77e -09)	(8.68e -09)
Observations	926	926	921	921	457	457	926	926	875	875
R-squared	0.0106	0.0116	0.014	0.019	0.009	0.011	0.003	0.009	0.013	0.018
Standard Errors	Cluster	Cluster	Cluster	Cluster	Cluster	Cluster	Robust	Robust	Cluster	Cluster

Table 6 Panel A. Interest Rates, Exchange Rates, and Cost of Capital Post-Capital Control Announcements

Notes: Change in the 1-year, 3-years, and 5-years interest rates, 2 and 3 days after the pre-announcement date in columns (1)-(6). Percentage change in the exchange rate Brazilian Real to U.S. dollar at 2 and 3 days after announcement date. Robust standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15. Source: BM&F, Bovespa, and Bloomberg.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Changes in Interest Rates and Exchange Rate Post-Capital Control Announcements							
	Interest Rates						Exchange Rate	
	1-Year [t-1,t+2]	1-Year [t-1,t+3]	3-Year [t-1,t+2]	3-Year [t-1,t+3]	5-Year [t-1,t+2]	5-Year [t-1,t+3]	% Change [t+2]	% Change [t+3]
	All Events							
Constant	0.159	0.173+	0.229+	0.236*	0.249*	0.255*	-0.0028	-0.0037
	(0.118)	(0.106)	(0.139)	(0.131)	(0.121)	(0.130)	(0.003)	(0.005)
Obs.	16	16	16	16	16	16	16	16

Table 6 Panel B. Interest Rates, Exchange Rates, and Cost of Capital Post-Capital Control Announcements

Notes: Implied cost of capital following Hail and Leuz (2009) and Easton (2004). Data obtained from IBES are calculated for different-length windows both before and after the event. Max and Min refer to root values over the relevant 14-day or 21-day window. Log Total Assets corresponds to lagged values (to the closest year) taken from Worldscope. Export data are matched from Secex. Clustered standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel B: Cost of Capital							
	Max (14 days)		Min (14 days)		Max (21 days)		Min (21 days)	
Constant	-0.329	-0.509	-0.293	-0.482	-0.257	-0.421	-0.185	-0.346
	-0.721	(0.856)	(0.731)	(0.864)	(0.662)	(0.782)	(0.664)	(0.779)
Log Total Assets	0.0709	0.0819	0.0696	0.0811	0.0632	0.0731	0.0596	0.0692
(lag 1y)	-0.0497	(0.0579)	(0.0500)	(0.0582)	(0.0442)	(0.0516)	(0.0438)	(0.0510)
Exporter	-0.377		-0.379		-0.330		-0.331	
	-0.275		(0.284)		(0.231)		(0.238)	
Export < $1 mil		0.0961		0.0966		0.136		0.150
		(0.592)		(0.606)		(0.572)		(0.588)
Export $1 mil -$100 mil		-0.437+		-0.429		-0.389+		-0.387+
		(0.293)		(0.306)		(0.252)		(0.262)
Export > $100 mil		-0.487*		-0.501*		-0.431*		-0.435*
		(0.294)		(0.302)		(0.247)		(0.252)
Post-Event Dummy	0.0738+	0.0713+	0.0786*	0.0758*	0.0602*	0.0624**	0.0624**	0.0645**
	-0.0483	(0.0472)	(0.0423)	(0.0402)	(0.0308)	(0.0317)	(0.0297)	(0.0305)
Observations	952	952	917	917	1,102	1,102	1,062	1,062
R-squared	0.017	0.023	0.016	0.023	0.017	0.024	0.016	0.023

Table 7. Capital Controls: Firm-Level Investment Response

Notes: Investment is the Change in the Log of Deflated Property, Plant & Equipment. Log Total Assets are from Worldscope. Export data are matched from Secex. External Finance Dependence is measured as (CE-CF)/CE which is the difference between capital expenditures and cash flows divided by cash flows as in Rajan and Zingales (1998). *** p<0.01, ** p<0.05, * p<0.1, † p<0.15.

	Investment		
	Capital Controls Regime		
	2007-2009	2010-2012	T-test means (p-value)
1. All Firms	0.22	0.03	3.80***
Standard Deviation	0.02	0.04	
N	672	689	
2. Size			
Log Assets> median	0.10	0.10	-0.01
Standard Deviation	0.02	0.03	
N	301	401	
Log Assets<median	0.31	-0.08	4.05***
Standard Deviation	0.04	0.10	
N	371	281	
Log Assets> mean	0.13	0.09	1.01
Standard Deviation	0.02	0.03	
N	251	364	
Log Assets<mean	0.27	-0.05	3.65***
Standard Deviation	0.03	0.09	
N	421	318	
3. Export			
Exporting	0.22	0.24	-0.51
Standard Deviation	0.03	0.03	
N	257	257	
Non Exporting	0.22	-0.10	4.25***
Standard Deviation	0.03	0.07	
N	415	425	
4. Liquidity			
ExtFinDep>median	0.23	0.09	1.73**
Standard Deviation	0.03	0.08	
N	339	338	
ExtFinDep<median	0.21	-0.03	4.13***
Standard Deviation	0.04	0.04	
N	333	344	
ExtFinDep>mean	0.23	0.05	3.69***
Standard Deviation	0.02	0.04	
N	652	661	
ExtFinDep<mean	-0.24	-0.82	1.00
Standard Deviation	0.26	0.51	
N	20	21	

Table 8. The Firm-Level Investment Response in the Aftermath of Capital Controls

Notes: Investment is the change in Property, Plant & Equipment divided by Assets from the previous period in (1) and the percentage change in the log Property, Plan & Equipment in (2)-(4). Q corresponds to market to book value plus total debt divided by total assets. Free cash flow, market to book value, sales, assets, and cash from from Worldscope. Export data are matched from Secex. Columns (1)-(2) include all firms, column (3) restricts the sample to the firms with above median level of assets, column (4) to those with below the median level of assets. Regressions include firm fixed effects. Clustered standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, † p<0.15.

	(1)	(2)	(3)	(4)
	Investment (Various Measures)			
	All Firms		Assets > Median	Assets < Median
Free Cash Flow$_t$/Total Assets$_{t-1}$	2.09E-06			
	(0.0000)			
Market-To-Book Value$_{t-1}$	1.22e-07**			
	(0.0000)			
Sales$_{t-1}$/Total Assets$_{t-1}$	7.60E-07			
	(0.0000)			
Cash$_{t-1}$/Total Assets$_{t-1}$	1.35e-05***			
	(0.0000)			
Post Regime Dumy 2010	-2.76E-06	-0.295**	0.0377	-0.669**
	(0.0000)	(0.1500)	(0.0825)	(0.3100)
Post Regime Dumy 2011	-2.05E-06	-0.232*	-0.432*	-0.374
	(0.0000)	(0.1380)	(0.2540)	(0.2830)
Post Regime Dumy 2012	-4.09e-06**	0.526	0.451	-0.565**
	(0.0000)	(0.6680)	(0.4580)	(0.2360)
Free Cash Flow$_t$/Total Assets$_t$		0.933	0.877***	1.066
		(0.9080)	(0.2620)	(0.9890)
Log(Total Assets$_t$)		-0.0859	0.0534	0.126
		(0.0960)	(0.5040)	(0.1610)
Export		0.746	2.388	0.258
		(0.6540)	(2.1410)	(0.7270)
Q_t		2.898	4.296	-1.551*
		(3.6150)	(4.0250)	(0.8630)
Constant	-2.79E-06	0.325	-2.421	-1.209
	(0.0000)	(1.5400)	(7.7540)	(2.4240)
Observations	1,126	1,327	690	637
# Companies	69	69	41	40
R-squared	0.05	0.00	0.01	0.11

Table 9. Robustness: Capital Controls, Alternative Indices & Event Windows

Notes: Cumulative Abnormal returns using Scholes-Williams betas and CAPM and Raw Returns. Results for BOVESPA and IBRA indices. Clustered standard errors in parenthesis. ***p<0.01, **p<0.05, *p<0.1, ‡p<0.15. Source: Datastream.

	BOVESPA			IBRA		
	CAR		RAW	CAR		RAW
	Scholes-Williams	CAPM		Scholes-Williams	CAPM	
	Panel A: All Events					
2 day	-0.00428***	-0.00348***	-0.0121***	-0.00574***	-0.00459***	-0.00902***
	(0.00119)	(0.00118)	(0.00118)	(0.000866)	(0.000863)	(0.000936)
2 day (prior)	-0.000726	-0.00218**	0.00396***	-0.000349	-0.00214***	0.00529***
	(0.00103)	(0.000911)	(0.000996)	(0.000785)	(0.000764)	(0.000812)
3 day	-0.00237*	-0.00300**	-0.00270**	-0.00342***	-0.00411***	-0.000785
	(0.00131)	(0.00127)	(0.00127)	(0.000996)	(0.000988)	(0.00104)
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***
	(0.00138)	(0.00136)	(0.00144)	(0.000987)	(0.000979)	(0.00108)
2 day (prior)	-0.000680	-0.00177*	0.00261**	0.000194	-0.00106	0.00446***
	(0.00108)	(0.00102)	(0.00113)	(0.000854)	(0.000846)	(0.000910)
3 day	-0.00132	-0.00154	-0.00299**	-0.00236**	-0.00251**	-0.00108
	(0.00144)	(0.00142)	(0.00148)	(0.00109)	(0.00109)	(0.00116)
Observations	797	797	797	1,484	1,484	1,484
	Panel C: Equity Events					
2 day	-0.00781***	-0.00776***	-0.0134***	-0.00843***	-0.00792***	-0.00991***
	(0.00187)	(0.00185)	(0.00174)	(0.00163)	(0.00163)	(0.00163)
2 day (prior)	-0.00101	-0.00338*	0.00862***	-0.00127	-0.00460***	0.00889***
	(0.00205)	(0.00186)	(0.00180)	(0.00152)	(0.00149)	(0.00143)
3 day	-0.00706***	-0.00841***	-0.00662***	-0.00840***	-0.00987***	-0.00396*
	(0.00258)	(0.00244)	(0.00240)	(0.00204)	(0.00201)	(0.00201)
Observations	268	268	268	502	502	502

Table 10 Panel A. Robustness Tests and Additional Checks

Notes: The sample includes all events and the firms on the Bovespa exchange. Cumulative Abnormal Returns are measured over a two-day window using Scholes-Williams betas. Log Total Assets and Operating Revenue corresponds to lagged one year values from Worldscope; Bank Debt/Total Debt correspond to one quarter lagged values and are from Worldscope. Export data (dummy variables) are matched from Secex. External Finance Dependence is measured as (CE-CF)/CE which is the difference between capital expenditures and cash flows divided by cash flows as in Rajan and Zingales (1998). Loosening events corresponds to a dummy for events associated with reductions in the IOF. MNCs correspond to firms that belong to a multinational firm (either Brazilian or foreign). ADRs corresponds to firms that issue ADRs on the NYSE. Foreign Bond Issuance data are from Bloomberg. Clustered standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Cumulative Abnormal Returns (Scholes-Williams)							
	Bank Debt	Operating Revenue	Excluding Lehman Event	Invarient Estimation Window	Tightening / Loosening Events	MNCs	ADRs	Foreign Bond Issuance
Constant	-0.0357**	-0.00705***	-0.0329***	-0.0356***	-0.0333***	-0.0286*	-0.0574***	-0.0672***
	(0.0137)	(0.00121)	(0.0111)	(0.0114)	(0.0155)	(0.0146)	(0.0176)	(0.0135)
Log Total Assets	0.00184**		0.00168**	0.00182**	0.00168*	0.00137+	0.00285**	0.00330***
(lag 1y)	(0.0008)		(0.000684)	(0.0007)	(0.00094)	(0.000834)	(0.00110)	(0.000767)
ExtFinDep	-2.75e-05***	-7.68e-07***	-6.31e-07***	-5.90e-07***	-8.78e-07**	-6.32e-07***	-0.000162	-0.000117***
(lag 1y)	(6.90-E06)	(1.53e-07)	(1.04e-07)	(1.21-07)	(1.37e-07)	(1.46e-07)	(0.000322)	(9.46e-06)
Exporter	0.0048+	0.00502*	0.00452*	0.0046+	0.00539*	0.00487*	0.00729*	0.00834***
	(0.0029)	(0.0025)	(0.0026)	(0.0027)	(0.0031)	(0.0027)	(0.0040)	(0.0025)
Bank Debt / Total Debt	-3.70e-07**							
	(1.43e-07)							
Operating Revenue		5.91e-10**						
(lag 1y)		(2.32e-10)						
Loosening Dummy					-0.00384			
					(0.0052)			
Observations	709	939	817	781	926	661	420	286
R-squared	0.011	0.007	0.010	0.012	0.013	0.007	0.003	0.005

Table 10 Panel B. Robustness Tests and Additional Checks

Notes: The sample includes all events and the firms on the Bovespa exchange. Cumulative Abnormal Returns are measured over a two-day window using Scholes-Williams betas. Log Total Assets correspond to one year lagged values and are from Worldscope. Export data are matched from Secex. Regressions (1)-(4) include a dummy for equity-related flows. VO is turnover by volume, NOSH is number of shares outstanding, MCAP is market capitalization. Clustered standard errors in parenthesis in columns (1)-(2) and (5)-(6) and bootstrapped standard errors in columns (3) and (4). *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel B: Cumulative Abnormal Returns (Scholes-Williams)						
	All Events						
	Equity Dummy	Equity Dummy	Equity Dummy	Equity Dummy	VO/NOSH	(VO*P)/MV	(VO*P)/MCAP
Constant	-0.0321***	-0.0332***	-0.0321***	-0.0332***	-0.0338**	-0.0338**	-0.0338**
	(0.0121)	(0.0113)	(0.0116)	(0.0110)	(0.0159)	(0.0159)	(0.0158)
Log Total Assets	0.00160**	0.00166**	0.00160**	0.00166**	0.00163*	0.00163*	0.00163*
(lag 1y)	(0.0007)	(0.0007)	(0.0007)	(0.0006)	(0.0009)	(0.0009)	(0.0009)
ExtFinDep	-7.16e-07***	-7.18e-07***	-7.16E-07	-7.18E-07	-8.05e-07***	-8.06e-07***	-8.06e-07***
(lag 1y)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Exporter	0.00548**		0.00548**		0.00545*	0.00547*	0.00547*
	(0.0025)		(0.0027)		(0.0032)	(0.0032)	(0.0032)
Export < $1 mil		-0.00553		-0.00553			
		(0.0044)		(0.0052)			
Export $1 mil -$100 mil		0.00906*		0.00906*			
		(0.0047)		(0.0055)			
Export > $100 mil		0.00550**		0.00550**			
		(0.0022)		(0.0024)			
Equity	-0.00467*	-0.00463*	-0.00467*	-0.00463*			
	(0.0024)	(0.0025)	(0.0025)	(0.0024)			
VO/NOSH					-1.94E-06		
(lag 1y)					(0.0000)		
(VO*P)/MV						4.88E-08	
(lag 1y)						(0.0000)	
(VO*P)/MCAP							2.87E-05
(lag 1y)							(0.0002)
Observations	926	926	926	926	916	916	916
R-squared	0.013	0.019	0.013	0.019	0.011	0.011	0.011
Standard Errors	Cluster	Cluster	Bootstrap	Bootstrap	Cluster	Cluster	Cluster

Table 11 Panel A. Robustness: Post Capital Control Announcement Returns

Notes: The sample includes all events and the firms on the Bovespa exchange. Cumulative Abnormal Returns are measured over a two-day window using Scholes-Williams betas. Log Total Assets, Debt to Assets and Short Term Debt to Total Debt all correspond to one year lagged values and are from Worldscope. Export data are matched from Secex. Bootsrapped standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A: Cumulative Abnormal Returns (Scholes-Williams)							
	All Events							
Constant	-0.00428***	-0.0339***	-0.0347***	-0.0300***	-0.00613***	-0.0348***	-0.0354***	-0.0262**
	(0.0013)	(0.0116)	(0.0118)	(0.0114)	(0.0013)	(0.0110)	(0.0123)	(0.0122)
Log Total Assets		0.00177***	0.00168**	0.00159**		0.00169***	0.00173**	0.00141**
		(0.0007)	(0.0007)	(0.0007)		(0.0007)	(0.0007)	(0.0007)
Debt/Assets			0.0000758					
			(0.0001)					
Short-term Debt/Debt (lag 1y)				-0.00413				
				(0.0041)				
Exporter					0.00452*	0.00508**		0.00515**
					(0.0025)	(0.0022)		(0.0026)
Export < $1 mil							-0.0057	
							(0.0055)	
Export $1 mil -$100 mil							0.00823+	
							(0.0052)	
Export > $100 mil							0.00532**	
							(0.0021)	
10/22/08								-0.0260***
								(0.0095)
10/19/09								-0.0104*
								(0.0062)
11/18/09								-0.00313
								(0.0056)
10/4/10								0.00565
								(0.0056)
10/18/10								-0.00582
								(0.0054)
3/28/11								-0.0012
								(0.0052)
4/6/11								-0.00399
								(0.0052)
7/26/11								-0.0124**
								(0.0057)
12/1/11								-0.000895
								(0.0068)
2/29/12								0.00176
								(0.0057)
3/9/12								0.0021
								(0.0052)
5/21/12								-0.0125*
								(0.0069)
6/13/12								0.00111
								(0.0059)
12/4/12								0.00564
								(0.0104)
Observations	1000	941	931	854	1000	941	941	941
R-squared	0	0.006	0.006	0.005	0.004	0.01	0.015	0.056
Bootstrapped Errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 11 Panel B. Robustness: Debt Vs. Equity.

Notes: Panel A reports results for capital controls on debt-related flows and Panel B on equity-related flows. The sample includes all events and the firms on the Bovespa exchange. Cumulative Abnormal Returns are measured over a two-day window using Scholes-Williams betas. Log Total Assets, Debt to Assets and Short Term Debt to Total Debt all correspond to one year lagged values and are from Worldscope. Export data are matched from Secex. Bootstrapped standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Panel B: Cumulative Abnormal Returns (Scholes-Williams)						
	Panel A: Debt Events						
Constant	-0.00368**	-0.0328**	-0.0330**	-0.0290**	-0.00608***	-0.0340***	-0.0347***
	(0.0016)	(0.0133)	(0.0135)	(0.0133)	(0.0016)	(0.0121)	(0.0129)
Log Total Assets		0.00174**	0.00162**	0.00152**		0.00165**	0.00169**
(lag 1y)		(0.0008)	(0.0007)	(0.0007)		(0.0007)	(0.0007)
Debt/Assets			0.0000685				
(lag 1y)			(0.0001)				
Short-term Debt/Debt				-0.00199			
(lag 1y)				(0.0058)			
Exporter					0.00584**	0.00634**	
					(0.0026)	(0.0027)	
Export < $1 mil							-0.00689
							(0.0055)
Export $1 mil -$100 mil							0.0101*
							(0.0060)
Export > $100 mil							0.00668**
							(0.0028)
Observations	797	776	768	692	797	776	776
R-squared	0	0.005	0.005	0.004	0.005	0.011	0.018
	Panel B: Equity Events						
Constant	-0.00781***	-0.0387**	-0.0428**	-0.0364*	-0.00987***	-0.0401**	-0.0431**
	(0.0017)	(0.0160)	(0.0177)	(0.0194)	(0.0024)	(0.0171)	(0.0179)
Log Total Assets		0.00185**	0.00192**	0.00199*		0.00175*	0.00193*
(lag 1y)		(0.0009)	(0.0010)	(0.0011)		(0.0010)	(0.0010)
Debt/Assets			0.0000919				
(lag 1y)			(0.0001)				
Short-term Debt/Debt				-0.0138**			
(lag 1y)				(0.0068)			
Exporter					0.00503*	0.00707*	
					(0.0029)	(0.0039)	
Export < $1 mil							0.00619
							(0.0063)
Export $1 mil -$100 mil							0.00916
							(0.0065)
Export > $100 mil							0.00584
							(0.0044)
Observations	268	224	222	220	268	224	224
R-squared	0.000	0.012	0.015	0.025	0.007	0.027	0.028
Bootstrapped Errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 11 Panel C. Robustness: Additional Checks

Notes: The sample includes all events and the firms on the Bovespa exchange. Cumulative Abnormal Returns are measured over a two-day window using Scholes-Williams betas. Log Total Assets and Operating Revenue corresponds to lagged one year values from Worldscope; Bank Debt/Total Debt correspond to one quarter lagged values and are from Worldscope. Export data (dummy variables) are matched from Secex. External Finance Dependence is measured as (CE-CF)/CE which is the difference between capital expenditures and cash flows divided by cash flows as in Rajan and Zingales (1998). Loosening events corresponds to a dummy for events associated with reductions in the IOF. MNCs correspond to firms that belong to a multinational firm (either Brazilian or foreign). ADRs corresponds to firms that issue ADRs on the NYSE. Foreign Bond Issuance data are from Bloomberg. VO is turnover by volume, NOSH is number of shares outstanding, MCAP is market capitalization. Bootstrapped standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1, ‡ p<0.15.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Panel C: Cumulative Abnormal Returns (Scholes-Williams)										
	Bank Debt	Operating Revenue	Excluding Lehman Event	Invarient Estimation Window	Tightening / Loosening Events	MNCs	ADRs	Foreign Bond Issuance	VO/NOSH	(VO*P)/MV	(VO*P)/MCAP
Constant	-0.0357**	-0.00705***	-0.0329***	-0.0356***	-0.0333***	-0.0286**	-0.0574***	-0.0672***	-0.0338***	-0.0338***	-0.0338***
	-0.0154	-0.00145	-0.0108	-0.0115	-0.0113	-0.0145	-0.0198	-0.0205	(0.0122)	(0.0122)	(0.0122)
Log Total Assets	0.00184**		0.00168***	0.00182***	0.00168**	0.00137*	0.00285**	0.00330***	0.00163**	0.00163**	0.00163**
(lag 1y)	-0.000835		-0.000642	-0.000683	-0.000688	-0.000825	-0.00114	-0.00111	(0.0007)	(0.0007)	-0.000703
Exporter	0.00476+	0.00502*	0.00452*	0.00456*	0.00539**	0.00487*	0.00729*	0.00834**	0.00545**	0.00547**	0.00547**
	-0.00314	-0.00272	-0.00263	-0.00268	-0.00263	-0.00291	-0.00378	-0.00406	(0.0026)	(0.0027)	(0.0027)
ExtFinDep	-2.75e-05**	-7.68E-07	-6.31E-07	-0.00000059	-8.78E-07	-6.32E-07	-0.000162	-0.000117	-8.05E-07	-8.06E-07	-8.06E-07
(lag 1y)	-0.0000134	-0.00000286	-0.00000291	-0.00000256	-0.00000359	-0.0000228	-0.000322	-0.000131	0.0000	0.0000	0.0000
Bank Debt / Total Debt	-0.00000037										
	-0.0000581										
Operating Revenue		5.91e-10**									
(lag 1y)		-2.79E-10									
Loosening Dummy					-0.00384						
					-0.00337						
VO/NOSH									-1.94E-06		
(lag 1y)									(0.0033)		
(VO*P)/MV										4.88E-08	
(lag 1y)										0.0000	
(VO*P)/MCAP											2.87E-05
(lag 1y)											(0.0043)
Observations	709	939	817	781	926	661	420	286	916	916	916
R-squared	0.011	0.008	0.011	0.012	0.013	0.007	0.032	0.049	0.011	0.011	0.011
Bootstrapped Errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes