The Real Effects of Capital Controls: Liquidity Constraints and Firm Investment

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There is a renewed debate in academic and policy circles about the merits of international capital mobility. The use of capital controls on inflows in particular has taken center stage in many emerging markets not only as prudential measures designed to mitigate the volatility of foreign capital inflows but also as protectionist controls aimed at maintaining persistent currency undervaluation. In this paper we evaluate the effects of capital controls on firm-level stock returns and real investment using data from Brazil. Theory suggests that the imposition of capital controls can drive up the cost of capital and curb investment. Liquidity constraints at the firm level are also more likely to bind when capital controls are imposed particularly if production and exporting are associated with fixed costs. We expect these effects to apply with special force to firms that are more dependent on external finance. The data suggest that there is a significant decline in cumulative abnormal returns for Brazilian firms following the imposition of capital controls on equity flows in 2008-2009 consistent with an increase in the cost of capital. Controls on debt flows, however, are associated with positive returns suggesting that the market views equity and debt flows as significantly different. The paper will extend the preliminary analysis to examine the real effects of capital controls on firm-level investment conditioning on firm-characteristics such as external finance dependence and export status.

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Key words: capital controls, cost of capital, investment, debt, equity, risk-sharing.

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1. Introduction

There is a renewed debate in academic and policy circles about the merits of international capital mobility. While free capital mobility brings many potential welfare gains, it also entails significant risks. As part of the larger debate about financial globalization, the extent to which policy-makers should allow foreign capital to flow into their economies remains a controversial issue.

Following the advice of academics, many emerging market policy makers opened up their capital markets to foreign capital in the late 1980s and early 1990s. In the aftermath of a spate of financial crises in the late 1990s however, a heated debate over international capital mobility has consumed the profession. Opponents of free capital flows maintain that hot money flows of international capital flee emerging economies at the first sign of trouble and the financial crises that ensue impose massive costs on these economies. Further, opponents cite evidence from a series of studies suggesting that the role of international capital flows for financing growth is ambiguous at best. This swing in the academic pendulum has not been lost on developing country policy makers who have increasingly taken to imposing a variety of capital controls to curb foreign capital inflows, effectively reversing the process of capital market openings that began in the 1980s.

Within this debate, the use of capital controls, in particular controls on inflows, has taken center stage. Several emerging market nations have recently turned to reserve requirements and taxes on capital inflows. For example, Brazil, Indonesia, and South Korea, have restricted capital inflows through the introduction of capital controls. South Korea has also responded with caps on the percentage of foreign reserves banks could hold[1] as many are holding massive amounts of reserves. In December of 2012, the IMF released an official statement in favor of the use on capital controls (IMF 2012). “For countries that have to manage the risks associated with inflow surges or disruptive outflows, a key role needs to be played by macroeconomic policies, as well as by sound financial supervision and regulation, and strong institutions. In certain circumstances, capital flow management measures can be useful. They should not, however, substitute for warranted macroeconomic adjustment.”

While the case for capital controls rests on promoting prudential controls designed to mitigate the volatility of foreign capital inflows, there is also an implicit aspect of controls that is protectionist in nature aimed at maintaining persistent currency undervaluation. Many policy

makers especially from emerging Asia and Latin America have expressed concerns that massive inflows in particular can lead to appreciation of the exchange rate and loss of competitiveness with potential lasting effects on the tradable sector.[2]

Although the monetary policy decisions of the U.S. Federal Reserve, European Central Bank, the Bank of England and the Bank of Japan (as well as China) had a primarily domestic focus, they led to substantial spillover effects for emerging market economies. As the interest rates in developed economies remained low, investors were attracted to the higher rates in Brazil, Chile, Taiwan, Thailand, and South Korea. The Governor of Taiwan's central bank, Perng Fai-Nan explained, "The US printed a lot of money, so there's a lot of hot money flowing around. We see hot money in Taiwan and elsewhere in Asia… These short-term capital flows are disturbing emerging economies."[3]

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

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

[3] The currency war rhetoric gained renewed force in early 2013 as Japan announced it would be taking more direct action in fighting deflation and weakening the yen. On January 22, 2013, Prime Minister Shinzo Abe publicized that the Bank of Japan would attempt to counter economic downturn through the unlimited purchasing of government bonds and instituting a policy of inflation targeting at 2%.

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

Thus far the extensive empirical literature has focused mostly on characterizing the aggregate effects of capital controls on exchange rates and interest rates.[4] However, aggregate data and macroeconomic analysis do not shed light on the channels through which capital controls can affect the economy at the micro-level. Data the firm- or plant-level offer an opportunity to do so. However studies about the effects of capital controls on firm-activity are relatively scarce[5]; data availability for emerging markets being an obvious constraint.

In this paper we will evaluate the effects of capital controls on firm-level stock returns and real investment using data from Brazil. We focus on Brazil as a case study for various reasons. Brazil has implemented a series of controls on capital flows in the last 5 years.[6] The stock market in Brazil is well developed and the country also has firm-level data about exports by destination and product that allow us to examine both the firm-level response to capital flows as well as the impact of capital controls on the competitiveness of exporting firms.

We use an event study methodology around the dates when the various capital control measures were announced using stock prices and firm level data from Datastream. All returns are estimated using symmetric different windows around the announcement 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. The market model is run using 250 days, with the estimation window ending 30 days before the event. The market returns used in the estimations are different broad equity market indices available in Brazil.

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

[5] In the Chilean context, Forbes (2007) has shown that capital controls can increase financing costs, particularly for small and medium enterprises.

[6] Some previous noteworthy examples include the Unremunerated Reserve Requirements in Chile (1990s), Colombia (1990s, 2007), and Thailand (2006). But none of these past examples compares to the level of active experimentation in the recent Brazilian experience.

Theory suggests that the imposition of capital controls can drive up the cost of capital and curb investment. Liquidity constraints at the firm level are also more likely to bind when capital controls are imposed particularly if production and exporting are associated with fixed costs. We expect these effects to apply with special force to firms that are more dependent on external finance. While our analysis could be motivated through different theoretical lenses, one hypothesis is based on liquidity constraints. If production and exporting are associated with fixed costs associated, liquidity constraints at the firm level become relevant. Firms with easier access to external finance or greater access to low cost of funds may be able to overcome the barriers associated with these fixed costs leading to increase investment and output.[7] Capital controls on the hand can increase uncertainty while reducing the availability of external finance, which can lower investment at the firm-level.

Preliminary evidence points to a significant decline in cumulative abnormal returns for Brazilian firms following the imposition of capital controls on equity flows in 2008-2009 consistent with an increase in the cost of capital. Controls on debt flows, however, are associated with positive returns suggesting that the market views equity and debt flows as different.

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

Throughout the 2000s, the Brazilian economy expanded due to the nation's commodity exports and consumer boom, except for a brief recession lasting two quarters at the end of 2008 caused by the global financial crisis. However, the impact of the financial crisis was short-lived, and Brazil's economy swiftly returned to growth by the second quarter in 2009. The commodity boom, paired with increased inflows of foreign capital, placed upward pressure on the Brazilian currency, the Real.[8] In 2008, the Real reached R$1.6 per U.S. dollar from a low of R$3.1 per U.S. dollar in 2004.[9]

In an attempt to prevent an excessive inflow of foreign capital, stabilize the exchange rate and reduce the upper trend on inflation, Brazil's Central government adopted a system of capital controls on inflows from abroad.[10] In March 2008, the central government established the

[7] If there are fixed costs associated with exporting, liquidity constraints at the firm level will also come into play. An appreciation of the domestic currency, despite potential negative effect on the competitiveness of exporters, may not have a large impact on aggregate exports (see Chaney, 2008).
[8] 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.
[9] Banco Central Do Brasil, accessed November 29, 2012.
[10] Capital controls are defined as any policy that is designed to reduce or redirect transactions into the capital account of a given nation. Capital controls are divided into administrative or direct controls, such as

Imposto Sobre Operações Financeiras (IOF), a financial transaction tax of 1.5% placed on incoming foreign fixed-income investments, as a means of quelling the flow of capital into the national economy. However, by October of that year, the wide reaching effects of the international financial crisis were becoming clear. Foreign direct investment in Brazil nearly halved from US$45.1bn in 2008 to US$25.9bn in 2009.[11] In an effort to quell the outflow of investment, the government eliminated the IOF.

Brazil recovered quickly from the economic downturn, and during the first nine months of 2009, approximately US$20bn of foreign investments entered the Brazilian equities market.[12] With the resumption of massive capital inflows, capital inflows 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.[13] Since its re-introduction in October of 2009, the IOF became a means for the Brazilian government to control the flux of capital into the nation, and the tax has repeatedly been both raised and expanded to include other forms of investments (see **Table 1**).

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

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

The decision to place capital controls on incoming investments was not unanimously supported. Edemir Pinto, Chief Executive of the Brazilian Stock Exchange, called the government to remove some of the existing capital controls on the grounds that the IOF was damaging the equity market. Over half of the money raised by Brazilian companies from IPOs

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required approvals for transactions, and market-based or indirect controls, such as taxes. Such controls can be placed inflows or outflows of capital.

[11] Economist Intelligence Unit, EIU Country Data, accessed September 2012.

[12] "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.

[13] "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.

originated from foreign investors, and Pinto claimed the tax on financial transactions was choking foreign inflows of capital. In early December 2011, the 2% IOF tax on equities was removed.

As the economy continued to be unresponsive to the government's stimulus spending, the Central Bank began aggressively cutting its overnight rate, known as the Selic rate, in an attempt to push down the Real. Copom, the monetary policy board at the Central Bank, had voted to cut the Selic rate eight consecutive times over a ten month period, reducing the Selic rate from 12.5% in late August 2011 to 8% in July 2012. The Copom decided to reduce the Selic rate, despite inflation measuring 6.5% in 2011, above the set 4.5% target.[14] The first week of June 2013, Brazil removed the tax on foreign investments in local debt and the 1% tax charged currency derivatives.[15,16] In July 1st they further eliminated reserve requirements on short dollar positions held by local banks.[17]

3.1 The Recent Literature on Capital Controls in Brazil

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

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

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

appreciation of the *real* when capital inflows were strong, a stated objective of the Brazilian authorities."

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

4. Effect of Measures: Event Study Methodology

We use an event-study methodology to examine the reaction of investors to positive and negative events (strengthening or weakening the 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 (Andrade et al, 2001).

The two commonly used event windows are the three days immediately surrounding the acquisition announcement, and a longer window beginning several days prior to the announcement and ending at the close of the acquisition. We analyze several windows (two, three, five, eleven, and twenty one days) but present results for the three and twenty-one day windows.

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

We calculate the mean cumulative return of the target stock price within the different windows (one, three, five, eleven, and twenty day window) of the announcement date. We

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

assume that stock prices follow a single factor market model. Our estimation period is 280 days before and up until 30 days preceding the event date. Cumulative abnormal returns (CARs) sum the abnormal returns over the event window, with abnormal returns estimated using a market model with Scholes-Williams betas (and CAPM). Using a standardized value of the cumulative abnormal return, we test the null hypothesis that the return is equal to zero.

4.1 Summary Statistics and Preliminary Results

Figure 1 depicts the evolution of the Bovespa index (the most commonly quoted index) corresponding to the different capital control announcements in Table 1. Table 2 shows summary statistics for Brazil's Bovespa. The data are divided into different sub-periods that correspond to different round of capital control policies. The first period is Q1 2008-Q4 2008 when capital controls were announced and subsequently reduced on 10/23/2008. Q1 2009-Q3 2009 is a time of no new announcements about controls. In the period between Q4 2009-Q3 2011 new controls were introduced and changed eight times over this period. From Q4 2011 onwards while controls on longer term debt instruments were introduced, they were removed for all but a few instruments. Table 2 shows both nominal and real returns on the aggregate BOVESPA index which shows that in the immediate aftermath of the global financial crisis the BOVESPA showed strong positive returns corresponding to the surge in foreign capital inflows. Table 3 presents firm level data for the firms in the Bovespa index for different sub-periods. Information includes firm size, and growth profitability, liquidity, leverage and investment measures.

Theory predicts that the direction of the change in expected returns will be firm specific. Expected returns will fall for firms whose exposure to systematic risk decreases and rise for those whose exposure increases. The change in expected returns will be reflected in stock prices. For example, a fall in a firm's expected return will cause an increase in its stock price. Table 4 presents preliminary evidence of the stock market's response to capital control events. Measures of raw returns and cumulative abnormal returns using Scholes-Williams betas that adjust for the noise in daily returns all 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.

We also have information for nine additional indices according to different asset classes. They are the Special Corporate Governance (IGC), the Basic Material (IMAT), the Consumption index (ICON), the Financial firm index (IFNC), the Industrial goods index (INDX), Mid-Large Cap firm index (MLCX), the Public Utilities index (UTIL), the Real Estate index (IMOB), and the Small Cap (SMLL). Table 4 divides the events into controls on equity and controls on debt

and repeats the analysis for the different indices. We display results for three-day window for controls on equity which show a significant decline in returns for seven out of nine indices. Controls on debt flows, however, are associated with positive returns suggesting that the market views equity and debt flows as significantly different.

We have conducted a number of tests to ensure the robustness of the findings. The firm and stock market regressions are estimated for different event windows and different methods for estimating return (simple CAPM, linked Scholes Williams, etc.) obtaining similar results.

5. Next Steps

An advantage of firm-level data is that detailed balance sheet and incorporation information allow us to analyze the role of firm characteristics in explain the impact of the capital controls and to identify the transmission mechanisms of policy shocks more directly on to real variables. Theory suggests that there ought to be significant cross-sectional variation in the stock price and real investment declines by firm-type (see Chari and Henry, 2004 and 2008). For example, the adverse effects on stock prices and investment may be stronger for small firms that are more dependent on external finance. The effects on investment may also be particularly adverse for exporting firms that are more dependent on external finance with a decline in the number of products and markets they serve following the imposition of capital controls. Imports of capital goods can also adversely affected by the policy.

As next steps the paper will examine the cross-sectional variation in the stock price and real investment declines by firm-type to see if the observed patterns are consistent with the reduction in investment observed in this period (see Figure 2). We will also examine whether the effects on investment are particularly negative for exporting firms that are more dependent on external finance as measured by leverage ratios and other measures of external finance dependence. The data also will allow us to examine whether there is a decline in the number of products and markets they serve following the imposition of capital controls[19] and whether imports of capital goods are also adversely affected by the policy.

[19] 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.

5. References

Bhagwati, Jagdish. 1998. "The Capital Myth: The Difference between Trade in Widgets and Dollars." Foreign Affairs, 77(3): 7–12.

Cardoso, Eliana and Ilan Goldfajn, 1998, "Capital Flows to Brazil: The Endogeneity of Capital Controls," *IMF Staff Papers*, Vol. 45(1), pp. 161–202.

Carvalho, Bernardo S. de M., and Márcio G. P. Garcia, 2008, "Ineffective Controls on Capital Inflows under Sophisticated Financial Markets: Brazil in the Nineties," in S. Edwards and M. Garcia, eds., *Financial Markets Volatility and Performance in Emerging Markets* (Cambridge, Massachusetts: National Bureau of Economic Research).

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

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 Blair Henry, Peter, 2008. "Firm-specific information and the efficiency of investment," *Journal of Financial Economics* 87(3), 636-655.

Edison, Hali J., Michael W. Klein, Luca Antonio Ricci, and Torsten Sløk. 2004. "Capital Account Liberalization and Economic Performance: Survey and Synthesis." *IMF Staff Papers,* 51(2): 220–56.

Eichengreen, Barry. 2001. "Capital Account Liberalization: What Do Cross-Country Studies Tell Us?" World Bank Economic Review, 15(3): 341–65.

Fischer, Stanley. 1998. "Capital Account Liberalization and the Role of the IMF." In Should the IMF Pursue Capital-Account Convertibility. Essays in International Finance, no. 207. Princeton: International Finance Section, Department of Economics, Princeton University, 1–10.

Fischer, Stanley. 2003. "Globalization and Its Challenges." American Economic Review, 93(2): 1–30.

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

Forbes, K., M. Fratzscher, T. Kostka, and R. Straub, 2012, Bubble Thy Neighbor: Portfolio Effects and Externalities from Capital Controls. NBER Working Paper No. 18052, May.

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

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

Korinek, Anton, 2011, The Economics of Prudential Capital Controls: A Research Agenda, IMF Economic Review, Vol. 59, No. 3, pp. 523-561.

Klein, Michael. 2012. "Capital Controls: Gates Versus Walls" NBER Working Paper 18526, Cambridge, MA.

Kose, M. Ayhan, Eswar S. Prasad, Kenneth S. Rogoff, and Shang-Jin Wei. 2009. "Financial Globalization: A Reappraisal." IMF Staff Papers, 56 (1): 8-62.

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

Obstfeld, Maurice. 1998. "The Global Capital Market: Benefactor or Menace?" Journal of Economic Perspectives, 12(4): 9–30.

Ostry, Jonathan D., Atish Ghosh, Karl Habermeier, Marcos Chamon, Mahvash Qureshi, and Dennis Reinhart, 2010, "Capital Inflows: The Role of Controls," IMF Staff Position Note No. 2010/04.

Ostry, Jonathan D., Atish Ghosh, Marcos Chamon, and Mahvash Qureshi, 2012, "Tools for managing financial-stability risks from capital inflows," *Journal of International Economics*, Vol. 88(2), pp. 407-421.

Rodrik, Dani. 1998. "Who Needs Capital-Account Convertibility?" In Should the IMF Pursue Capital-Account Convertibility. Essays in International Finance, no. 207. Princeton: International Finance Section, Department of Economics, Princeton University, 55–65.

Rogoff, Kenneth S. 1999. "International Institutions for Reducing Global Financial Instability." Journal of Economic Perspectives, 13(4): 21–42.

Stiglitz, Joseph E. 1999. "Reforming the Global Economic Architecture: Lessons from the Recent Crises." Journal of Finance, 54(4): 1508–21.

Stiglitz, Joseph E. 2000. "Capital Market Liberalization, Economic Growth, and Instability." World Development, 28(6): 1075–86.

Stiglitz, Joseph E. 2002. Globalization and Its Discontents. New York and London: Norton.

Summers, Lawrence H. 2000. "International Financial Crises: Causes, Prevention, and Cures." American Economic Review, 90(2): 1–16A

Table 1. Capital Controls in Brazil: 2008-2012

Announcement Date	Effective Date	Event
3/12/08	3/17/08	IOF tax of 1.5% introduced on fixed income investments made by non-residents
10/22/08	10/23/08	IOF tax reduced to 0% on fixed income investments following the collapse of Lehman Brothers
10/19/09	10/20/09	IOF tax of 2% introduced on equities and fixed income securities
11/19/09	11/19/09	Introduction of a tax of 1.5% on American Depositary Receipts (ADRs) converted into local stocks
10/4/10	10/5/10	IOF tax raised to 4% on fixed income bonds and derivatives; Remain 2% for equities
10/18/10	10/19/10	IOF tax increased to 6% on fixed income bonds and derivatives; Remain 2% for equities
3/29/11	3/29/11	IOF tax increased to 6% on overseas loans and bonds with maturities up to one year
1/6/11	4/4/11	Introduction of new reserve requirement; local banks must deposit 60% of their short positions in US dollars to the central bank
4/6/11	4/7/11	IOF tax extended to overseas bonds and bonds with maturities up to 2 years
7/27/11	7/27/11	Introduction of a tax of 1% on foreign exchange derivatives; legislation allow tax to be increased up to 25%
12/1/11	12/2/11	IOF tax reduced to 0% on variable income instruments traded on the exchange and certain debentures
3/1/12	3/1/12	IOF tax extended to cover overseas loans and bonds with maturities up to 3 years
3/12/12	3/12/12	IOF tax extended to cover overseas loans and bonds with maturities up to 5 years
5/21/12	5/22/12	IOF tax reduced from 2.5% to 1.5% for individual borrowers
6/14/12	6/14/12	IOF tax reduced to only cover overseas loans and bonds with maturities up to 2 years
12/5/12	12/5/12	IOF tax reduced to only cover overseas loans and bonds with maturities up to 1 year

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

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

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

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

Table 3. Summary Statistics: Firm Level Variables in Real Terms
(Deflated by Consumer Price Index)

	Q4 2007	Q1 2008- Q4 2008	Q1 2009- Q3 2009	Q4 2009- Q3 2011	Q4 2011	Q1 2012	Q2 2012- Q4 2012
SIZE AND GROWTH							
Total Assets	40934410	50489781	59135287	66068716	66084079	67309666	105146963
Total Asset Growth (1-year)	44.3	31.1	17.8	21.7	16.4	17.7	17.7
PROFITABILITY							
Return on Assets	9.2	7.1	4.8	6.9	5.8	5.9	5.8
Profit Margin	4.1	8.4	-1.5	-5.4	-10.3	11.8	8.9
LIQUIDITY							
Current Ratio	1.5	1.7	1.6	1.6	1.3	1.3	1.2
Quick Ratio	1.1	1.2	1.2	1.1	1.0	1.1	0.9
ASSET UTILIZATION							
Asset Turnover Ratio	0.6	0.6	0.5	0.5	0.4	0.4	0.4
Inventory Turnover Ratio	31.4	29.8	24.3	25.6	25.4	10.7	8.0
LEVERAGE							
Total Debt/Total Assets	0.3	0.3	0.3	0.2	0.2	0.2	0.2
Short-Term Debt/Total Debt	0.4	0.5	0.4	0.4	0.4	0.4	0.3
Increase in Total Debt/Total Assets	0.0	0.1	0.0	0.0	0.1	0.1	0.1
Increase in Short-Term Debt/Total Debt	0.1	0.0	-0.1	0.0	-0.1	0.1	0.0
OTHER							
Market Value-to-Book Ratio	4.5	0.7	1.8	2.8	2.5	2.8	3.0
Operating Income	836216	800376	695413	953805	521033	813922	875019
Net Sales or Revenues	4172114	4993814	4433102	5125207	5434568	5245721	8994226
Cash Stock- Generic	4768139	6279399	7268992	8800669	8396243	8606381	9248723
EBIT (Net income)	902084	1166092	987440	1140041	1050858	1105755	1242873
Net Proceeds from Shares	n.a.	n.a.	52311.0	n.a.	14.4	42.8	246.3
Capital Expenditures	n.a.	n.a.	283492.3	n.a.	11031.3	3241.2	13023.1
Net Property,Plant, Equipment	10233625	10897915	12526678	15026047	15540581	15975771	33999063

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

Table 4. Firms in Bovespa: Capital Controls on Equity
Measures of Abnormal Returns (2 day window)

Scholes-Williams Betas	
CAR	RAW
All Events	
-0.00428***	-0.0121***
(0.00118)	(0.00154)
Debt Events	
-0.00368***	-0.0123***
(0.00139)	(0.00184)
Equity Events	
-0.00781***	-0.0134***
(0.00177)	(0.00200)

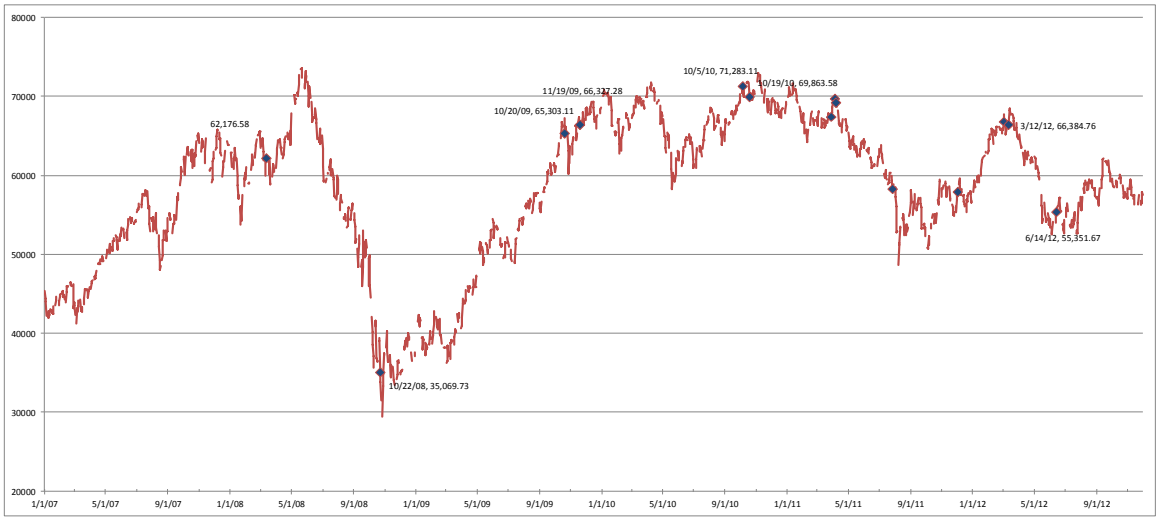
Notes: * p<0.05; ** p<0.01. Abnormal Returns, Firms in Bovespa. Schoels-Williams Betas. See Table 1 for list of events.

Table 5. Stock Market Indices (Relative to Bovespa): Capital Controls on Equity Cumulative Abnormal Returns (Three-day window)

Coef.	Std. Err.	t
Special Corporate Governance (IGC)		
-.01395	.00298	-4.68
Basic Material (IMAT)		
.0013	.00309	0.42
Financial (IFNC)		
Coef.	Std. Err.	t
-.03544	0.014	-2.50
Industrial (INDX)		
Coef.	Std. Err.	t
-.01193	.00470	-2.54
Mid-Large Cap (MLCX)		
Coef.	Std. Err.	t
-.01675	.00366	-4.57
Real Estate (IMOB)		
Coef.	Std. Err.	t
-.00924	.00224	-4.12
Small Cap (SMLL)		
Coef.	Std. Err.	t
.00188	.00170	1.11

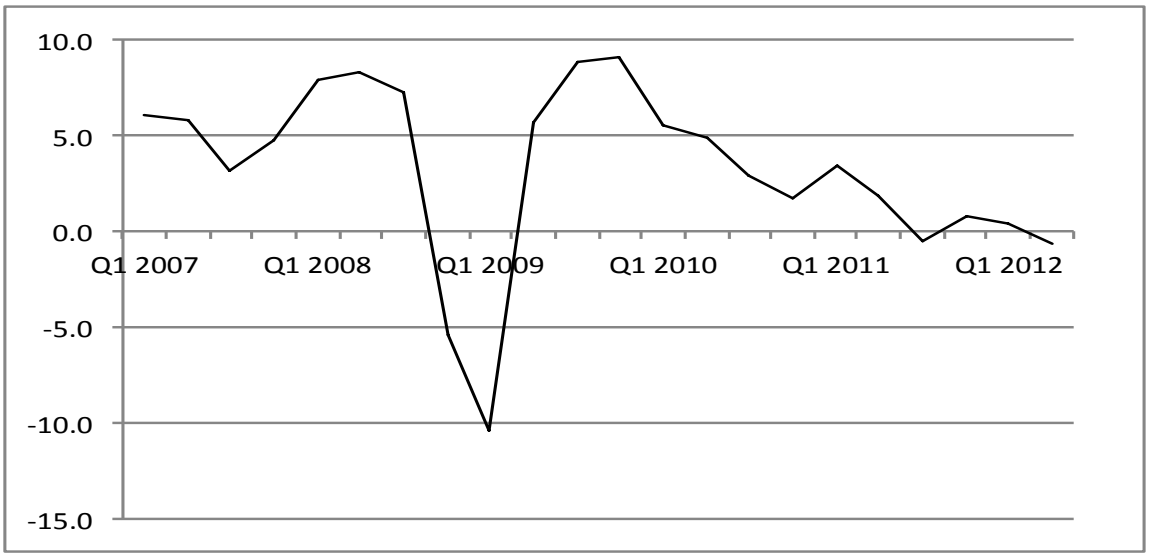
Notes: * $p<0.05$; ** $p<0.01$.

Figure 1: Bovespa Index and Capital Controls



Source: Datastream

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



Source: OECD.