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

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Key Idea of the Paper

- Investigating the adverse effects of capital controls policy on firm-level stock returns and real investment

The study found that capital controls

1) Segment international financial markets
2) Increase the cost of capital
3) Reduce the availability of external finance
4) Lower firm-level investment

Agenda

Introduction

1. Benefits and adverse effects of international financial liberalization
2. The purpose of capital controls policy and the theoretical underpinnings

Empirical analysis: The case of Brazil

3. Background: Brazil in the 2000s and the use of capital controls
4. Methodology and some interesting statistics
5. Results of the analysis
6. Conclusion

Introduction

BENEFITS AND ADVERSE EFFECTS OF INTERNATIONAL FINANCIAL LIBERALIZATION

Benefits of free flow of international capital

1. Reduce the cost of capital
2. Increase investment & economic growth
3. Offer international diversification gains for foreign investors

- Chari and Henry (2004), Bekaert, Harvey, and Lundblad (2005)

2008 – 2009 Global Financial Crisis

Monetary policies of U.S. FED, ECB, Bank of England, Bank of Japan, etc. focus solely on solving domestic problems. They pressed their interest rates down to surprisingly low levels.

Substantial spillover effects to emerging-market countries as investors were attracted to higher rates in Brazil, Chile, Taiwan, Thailand and South Korea.

Massive influx of foreign capital. A great portion of them was hot money flowing in and out of the countries for short-term interest or speculation. It disturbed the economy.

Appreciation of the exchange rate and loss of competitiveness with potential lasting effects on the export sector.

Adverse effects of massive capital inflow

- Massive capital inflows also build up excessive leverage in the financial system during capital inflow booms.

- When there is a sudden stop in these flows, deleveraging becomes very costly and may lead to financial distress.

- Think of the 1997 Tom Yum Kung Crisis in Thailand.

Capital Controls

Governments in emerging-market countries started to adopt capital controls policy to

(1) curb excessive capital inflows,
(2) mitigate the externalities generated by a build up in foreign debt and
(3) depreciate the currencies.

Literature Reviews

- Klein (2012) found that there is little evidence of the efficacy of capital controls on the growth of financial variables, the real exchange rate, or GDP growth.
- Chamon and Garcia (2013) found that controls created distortions in the pricing of financial assets.
- Forbes, Fratzscher, Kostka, and Straub (2012) suggested that capital controls in Brazil caused investors to significantly decrease their portfolio allocations to Brazil in both bonds and equities.

Theoretical Underpinnings (1)

- Theory predicts that the direction of the change in expected returns in response to the imposition of capital controls will be firm specific
- The change in expected returns will be reflected in stock prices.
- For example, a rise in E(Ri) will cause its stock price to decrease
- Note: Price of stock = $\frac{Dividends\ paid + Expected\ Price}{(1 + E(Ri))^t}$

Theoretical Underpinnings (2)

- The expected return changes can be decomposed into 2 components.

$$E(R_i) = R_f + \beta_{iM}(E(R_M) - R_f)$$

1. A change in the risk-free rate

   R_f changes from the country-specific risk-free rate to the world risk-free rate, which tends to be lower

2. A change in the firm-specific risk premium

   β_{iM} changes to β_{iW} as firm's returns become correlated with the world market

Theoretical Underpinnings (3)

- Now, firm-specific systematic risk or Beta is

$$\beta_{iW} = \frac{Cov\,(R_i, R_W)}{Var(R_W)}$$

- With completely open markets, the relevant source of systematic risk becomes the world market.

- The new CAPM model for expected returns is

$$E(R_i) = R_{f*} + \beta_{iW}(E(R_W) - R_{f*})$$

Theoretical Underpinnings (4)

- Historically, the covariance of the average investible firm's stocks return with the local market is roughly 200X larger than the covariance with the world market.

$$Cov\ (R_i, R_M) \text{ is 200X larger than } Cov\ (R_i, R_W)$$

- Thus, Beta falls. Together with the decrease in risk-free rate, the expected returns fall and stock prices rise up as a result of international financial liberalization.

- In other words, the cost of capital is reduced.

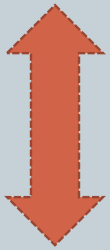
Theoretical Underpinnings (5)

- Imposing capital controls effectively segments the country's stock market from the rest of the world.

- It reduces the diversification opportunities for foreign investors.

Complete segmentation case

$$E(R_i) = R_f + \beta_{iM}(E(R_M) - R_f)$$



Depends on the scope of extensiveness of the controls

$$E(R_i) = R_{f*} + \beta_{iW}(E(R_W) - R_{f*})$$

Full integration case

Theoretical Underpinnings (6)

- Capital controls act like taxes that drive the cost of capital up.
- Thus, expected returns increase and stock price drops down. The CARs become negative.
- If capital controls have impacts on the expected value and cash flows of the companies, some firms can be better off if the expected cash flows rise up substantially enough.
- For example, export companies.

Empirical Analysis: The Case Study of Brazil

Background of capital controls in Brazil.

Brazil's economy expanded substantially due to a commodity exports and consumer BOOM. In 2008, real, a currency of Brazil, appreciated by 50% due to massive capital inflows.

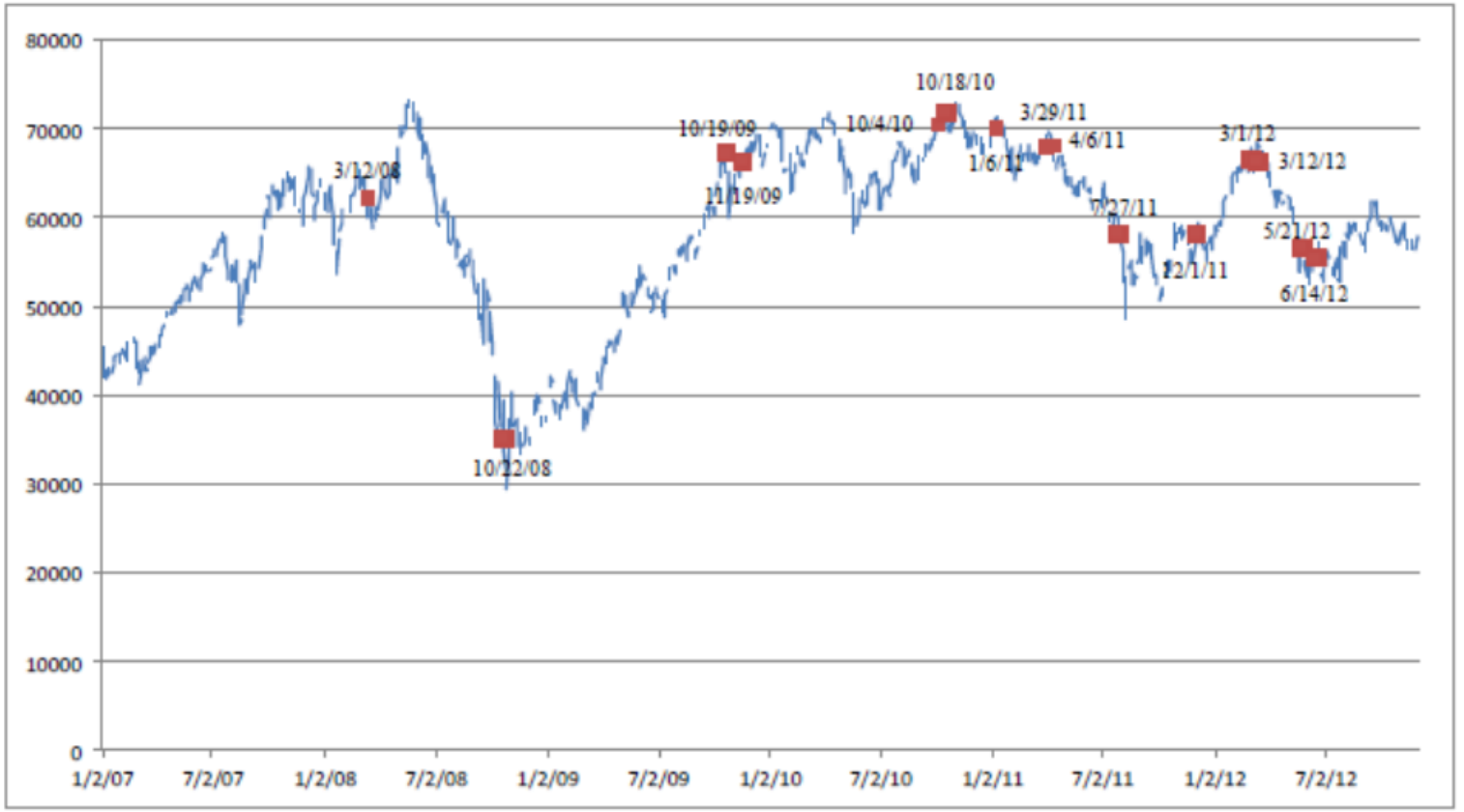
To prevent an excessive inflow of capital, Brazilian government imposed IOF, which is a tax on foreign fixed income investments. At first, IOF is set at 1.5%.

Foreign investment dropped in response from $45.1 billion in 2008 to $25.9 billion in 2009. Thus, government eliminated IOF.

Massive capital inflows resumed. Government had to impose IOF with 2% rate, then 4% and even 6% to combat appreciation and inflation.

Evolution of the BOVESPA index

Figure 1: Bovespa Index and Capital Controls



Source: Datastream

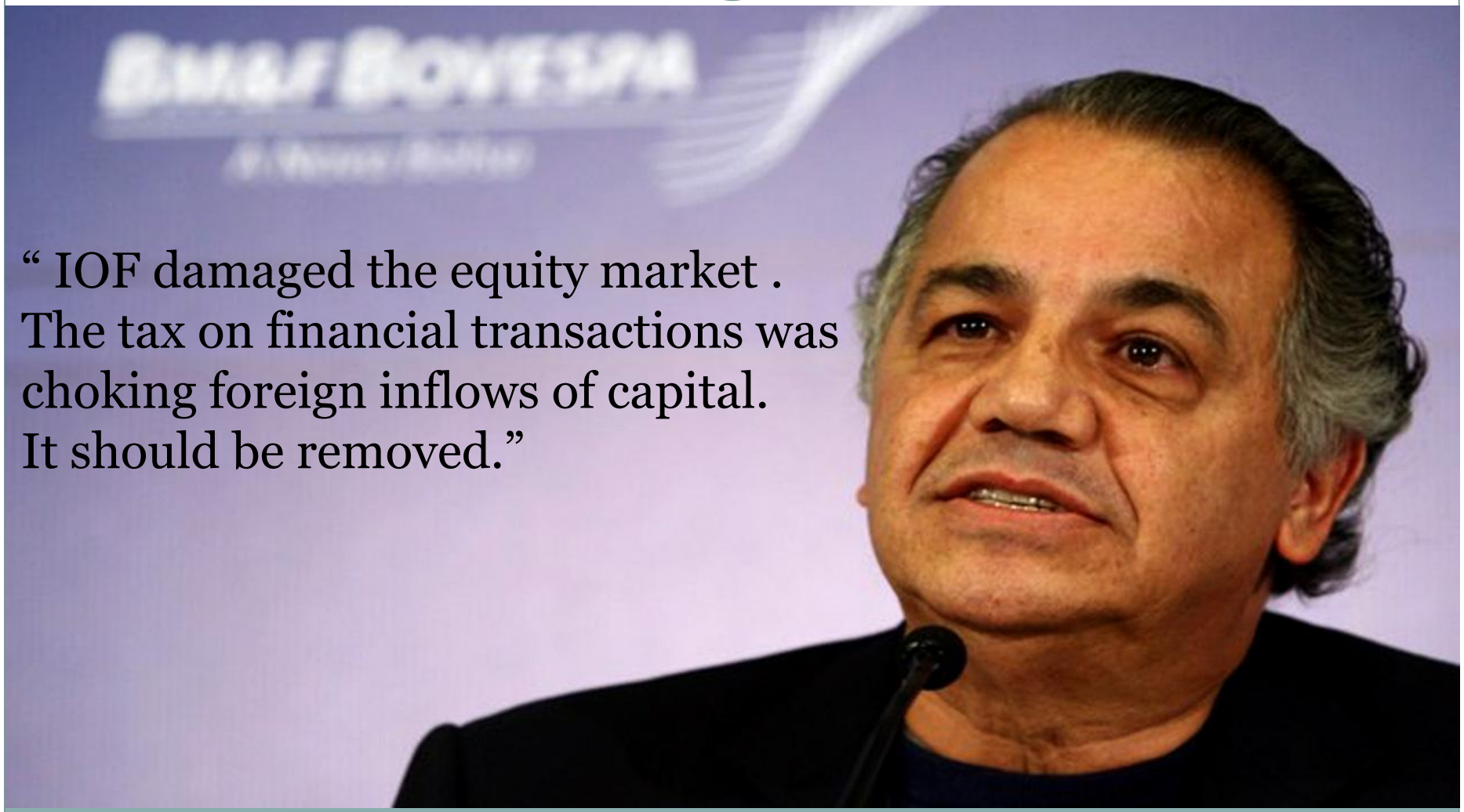
Government of Brazil imposed capital controls 15 times during 2008-2012

Table 1. Capital Controls in Brazil: 2008-2012

Date	Change in Bovespa (%) 2 days after	Debt Event	Equity Event	Event	Effective Date
3/12/2008	-0.30%	1	0	IOF tax=1.5% on fixed income investments made by non-residents	3/17/2008
10/22/2008	-10.23%	1	0	IOF tax=0% on fixed income investments	10/23/20008
10/19/2009	-2.61%	1	1	IOF tax=2% introduced on equities and fixed income securities	10/20/2009
11/18/2009	0.44%	0	1	Tax=1.5% on American Depositary Receipts (ADRs) converted into local stocks	11/19/2009
10/4/2010	0.22%	1	0	IOF tax=4% on fixed income bonds and derivatives; 2% for equities	10/5/2010
10/18/2010	-1.86%	1	0	IOF tax=6% on fixed income bonds and derivatives; 2% for equities	10/19/2010
3/28/2011	1.20%	1	0	IOF tax=6% on overseas loans and bonds with maturities up to 1 year	3/29/2011
4/6/2011	-0.46%	1	0	IOF tax to overseas bonds and bonds with maturities up to 2 years	4/7/2001
7/26/2011	-1.06%	0	1	Tax of 1% on foreign exchange derivatives; legislation allow tax to be increased up to 25	7/27/2011
12/1/2011	1.32%	0	1	IOF tax=0% on variable income instruments traded on the exchange and certain debentu	12/2/2011
2/29/2012	2.99%	1	0	IOF tax to cover overseas loans and bonds with maturities up to 3 years	3/1/2012
3/9/2012	2.53%	1	0	IOF tax to cover overseas loans and bonds with maturities up to 5 years	3/12/2012
5/21/2012	-3.48%	1	0	IOF tax=1.5% for individual borrowers (from 2.5%)	5/22/2012
6/13/2012	0.82%	1	0	IOF tax to overseas loans and bonds with maturities up to 2 years	6/14/2012
12/4/2012	0.16%	1	0	IOF tax to overseas loans and bonds with maturities up to 1 year	12/5/2012

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* .

Edemir Pinto,
the chief executive of Brazilian Stock Exchange



" IOF damaged the equity market .
The tax on financial transactions was choking foreign inflows of capital.
It should be removed."

Summary statistics for Brazil's BOVESPA

Table 2. Bovespa Index Returns

Notes: Bovespa: Nominal & Real Index deflated by Consumer Price Index, Percent Returns.

	Nominal Returns	Real Returns
Q1 2008-Q4 2008	-12.2	-15.7
Q1 2009-Q3 2009	-12.5	-16.2
Q4 2009-Q3 2011	35.4	26.1
Q4 2011	-13.8	-19.3
Q1 2012	14.0	12.3
Q2 2012-Q4 2012	-9.7	-11.9

In the period between Q4 2009 and Q 3 2011, new controls were introduced and changed eight times. During this subperiod, nominal and real returns of BOVESPA index averaged 35.4% and 26.1%.

Such high returns signify a great drop in stock prices.

Empirical Methodology (1)

- Examine investors' reaction to the strengthening or weakening of capital controls.
- If capital market is semi-strong form efficient, with respect to the announcements of capital controls, the stock prices will quickly adjust.
- The study examines the ABNORMAL RETURNs around various different windows of time surrounding the announcement of the capital control policy.

Empirical Methodology (2)

- The presenting results are based on two-day windows as it is the most reliable one.

- The abnormal returns estimated using a market model with Scholes-Williams betas that make adjustments for the noise in daily returns data.

Empirical Methodology (3)

Then, the study performs basic regression based on the specification

$$CAR_{it} = Constant + FirmControls_{it} + \varepsilon_{it}$$

where

- CAR is the cumulative abnormal returns for firm I over the event window t.
- Constant term captures impacts of the announcement on average returns.
- FirmControls : set of firm-specific characteristics, such as size, leverage, and so on, will be added

The equation is estimated using a panel regression to cope with correlation among abnormal returns across firms.

Firm-level summary statistics for the firms in the BOVESPA index

	Observations	Mean	Std. Dev	Median
		Panel A: All Firms		
Total Assets (Millions of R$)	862	66.8	142.1	12.7
Debt/Assets (%)	855	32.575	14.946	31.240
Short-term Debt/Debt (%)	851	28.5	22.8	21.6
External Finance Dependence	980	-65.855	899.734	-10.081
PP&E (Millions of R$)	886	16.0	43.8	3.7
Investment	854	0.053	0.507	0.017
Operating Revenues (Millions of R$)	888	0.8	2.2	0.2
Exporter Dummy	1000	0.410	0.492	0.000
		Panel B: Exporting Firms		
Total Assets (Millions of R$)	370	57.0	106.9	19.1
External Finance Dependence	410	-0.9542	2.634	-0.432
PP&E (Millions of R$)	370	30.3	63.0	7.1
Operating Revenues (Millions of R$)	370	1.3	3.0	0.2
		Panel C: Non-Exporting Firms		
Total Assets (Millions of R$)	492	74.1	163.4	9.6
External Finance Dependence	570	-112.5382	1177.969	-2.3682
PP&E (Millions of R$)	492	5.3	10.7	2.2
Operating Revenues (Millions of R$)	518	0.5	1.3	0.2

Post capital control announcement returns are significantly negative.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				All Events			
Constant	-0.00428***	-0.0339***	-0.0347***	-0.0300**	-0.00613***	-0.0348***	-0.0354***
	(0.00119)	(0.01230)	(0.01290)	(0.01370)	(0.00134)	(0.01190)	(0.01120)
Log Total Assets		0.00177**	0.00168**	0.00159*		0.00169**	0.00173**
		(0.00072)	(0.00075)	(0.00081)		(0.00071)	(0.00067)
Debt/Assets			0.0000758				
			(0.00007)				
Short-term Debt/Debt				-0.00413			
				(0.00513)			
Exporter					0.00452*	0.00508**	
					(0.00246)	(0.00239)	
Export < $1 mil							-0.0057
							(0.00434)
Export $1 mil -$100 mil							0.00823*
							(0.00450)
Export > $100 mil							0.00532**
							(0.00220)
Observations	1,000	941	931	854	1,000	941	941
R-squared	0.000	0.006	0.006	0.005	0.004	0.0103	0.0152

- Controlling the size, the coefficient on the constant term suggests that the CARs fall on average by a significant -3.39%.
- Large firms are less affected from the capital controls.
- Exporting firms are somewhat shielded from the capital controls.

Why exporting firms are less affected?

- First, they may have access to foreign currency proceeds
- Second, capital controls reduce capital inflows and subsequently prevent the domestic currency from appreciation. Exporters enjoy improved competitiveness internationally. This drives up their expected cash flows and abnormal returns.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Scholes-Williams						
	Panel A: Debt Events						
Constant	-0.00368***	-0.0328**	-0.0330**	-0.0290*	-0.00608***	-0.0340**	-0.0347***
	(0.00138)	(0.0141)	(0.0149)	(0.0157)	(0.00162)	(0.0138)	(0.0130)
Log Total Assets		0.00174**	0.00162*	0.00152+		0.00165**	0.00169**
(lag 1y)		(0.000822)	(0.000856)	(0.000918)		(0.000818)	(0.000773)
Debt/Assets			6.85e-05				
(lag 1y)			(7.93e-05)				
Short-term Debt/Debt				-0.00199			
(lag 1y)				(0.00599)			
Exporter					0.00584**	0.00634**	
					(0.00280)	(0.00274)	
Export < $1 mil							-0.00689
							(0.00581)
Export $1 mil -$100 m							0.0101**
							(0.00495)
Export > $100 mil							0.00668***
							(0.00245)
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**
	(0.00187)	(0.0174)	(0.0171)	(0.0173)	(0.00249)	(0.0161)	(0.0168)
Log Total Assets		0.00185*	0.00192*	0.00199*		0.00175*	0.00193**
(lag 1y)		(0.00103)	(0.00103)	(0.00104)		(0.000926)	(0.000962)
Debt/Assets			9.19e-05				
(lag 1y)			(0.000122)				
Short-term Debt/Debt				-0.0138			
(lag 1y)				(0.00991)			
Exporter					0.00503	0.00707*	
					(0.00370)	(0.00369)	
Export < $1 mil							0.00619+
							(0.00420)
Export $1 mil -$100 m							0.00916*
							(0.00476)
Export > $100 mil							0.00584
							(0.00485)
Observations							
R-squared	0.000	0.012	0.015	0.025	0.007	0.027	0.028

External finance-dependent firms are more negatively impacted by capital controls.

	(1)	(2)	(3)	(4)	(5)	(6)
	All Events					
Constant	-0.0335***	-0.0346***	-0.0229*	-0.0234*	-0.0261	-0.0337+
	(0.0119)	(0.0111)	(0.0134)	(0.0128)	(0.0220)	(0.0212)
Log Total Assets	0.00162**	0.00168**	0.00127*	0.00129*	0.00185	0.00234*
(lag 1y)	(0.0007)	(0.0006)	(0.0007)	(0.0007)	(0.0013)	(0.0013)
ExtFinDep	-7.96e-07***	-7.97e-07***				
(lag 1y)	(1.59e-07)	(1.59e-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)
Exporter	0.00535**		0.00724**		-0.00274	
	(0.0024)		(0.00279)		(0.0027)	
Export < $1 mil		-0.00570		-0.00397		-0.00764+
		(0.0043)		(0.0046)		(0.0046)
Export $1 mil -$100 mil		0.00895*		0.0102**		-0.000891
		(0.0046)		(0.0047)		(0.0053)
Export > $100 mil		0.00537**		0.00759***		-0.00469
		(0.0022)		(0.0026)		(0.0047)
Observations	926	926	921	921	457	457
R-squared	0.0106	0.0116	0.014	0.019	0.009	0.011
Standard Errors	Two-Way Clustering	Two-Way Clustering	Two-Way Clustering	Two-Way Clustering	Two-Way Clustering	Two-Way Clustering

	Panel A: Initial Imposition of Controls: 3/12/2008						Panel B. Post Lehman: 10/19/2009					
	3 Years Before	3 Years After	T-test means (p-value)	2 Years Before	2 Years After	T-test means (p-value)	3 Years Before	3 Years After	T-test means (p-value)	2 Years Before	2 Years After	T-test means (p-value)
1. All Firms	4.51%	5.18%	0.656	5.64%	5.29%	0.865	5.43%	2.47%	0.183	5.65%	1.70%	0.174
Standard Deviation	0.317	0.217		0.370	0.228		0.271	0.519		0.228	0.596	
N	631	708		442	496		717	689		490	482	
2. Size												
Log Assets> mean	1.82%	3.65%	0.295	1.88%	4.06%	0.356	1.78%	2.07%	0.8758	2.57%	1.54%	0.564
Standard Deviation	0.316	0.162		0.377	0.167		0.246	0.143		0.143	0.141	
N	505	248		337	207		421	103		251	85	
Log Assets<mean	15.27%	6.00%	0.002	17.70%	6.18%	0.001	10.62%	2.54%	0.0051	8.89%	1.74%	0.059
Standard Deviation	0.299	0.241	**	0.320	0.263	***	0.294	0.559	*	0.288	0.654	*
N	126	460		105	289		296	586		239	397	
3. Export												
Exporting	5.82%	3.98%	0.427	7.81%	3.07%	0.140	4.47%	4.20%	0.8388	2.73%	5.63%	0.067
Standard Deviation	0.344	0.181		0.402	0.196	†	0.185	0.128		0.176	0.148	*
N	275	312		192	214		312	292		215	208	
Non Exporting	3.49%	3.92%	0.833	3.97%	4.07%	0.970	6.17%	1.19%	0.1841	7.94%	-1.00%	0.073
Standard Deviation	0.294	0.241		0.344	0.249		0.321	0.675		0.260	0.779	*
N	356	356		250	252		405	397		275	274	
4. Liquidity												
ExtFinDep>mean	5.06%	3.58%	0.293	6.45%	3.17%	0.082	5.21%	1.70%	0.1423	5.24%	1.09%	0.194
Standard Deviation	0.279	0.183		0.326	0.178	*	0.277	0.529	†	0.229	0.624	
N	556	587		383	409		651	620		440	434	
ExtFinDep<mean	-0.23%	15.02%	0.041	-0.51%	17.76%	0.059	7.09%	1.78%	0.0871	8.82%	3.66%	0.204
Standard Deviation	0.529	0.373	**	0.596	0.425	*	0.203	0.125	*	0.225	0.14199	
N	72	88		56	64		60	60		44	42	
ExtFinDep>median	8.05%	3.98%	0.077	9.57%	4.10%	0.078	4.95%	-0.73%	0.142	3.72%	-1.92%	0.301
Standard Deviation	0.363	0.184	*	0.419	0.196	*	0.194	0.684	†	0.180	0.817	
N	308	348		219	246		356	339		245	237	
ExtFinDep<median	1.13%	6.25%	0.009	1.77%	6.31%	0.090	5.64%	4.19%	0.505	7.19%	4.53%	0.247
Standard Deviation	0.262	0.247	***	0.311	0.260	*	0.335	0.219		0.270	0.222	
N	323	350		223	242		343	332		231	233	

Conclusion

1. Capital controls led to an increase in cost of capital and a significant decline in cumulative abnormal returns for Brazilian firms.
2. Controls on debt flows are associated with less negative returns than controls on equity flows.
3. Large firms are less affected.
4. Exporting firms are less adversely affected as well.

Conclusion

5. Firms that are more dependent on external finance are more adversely affected.

6. Real investment at the firm level falls significantly as a result of capital controls.