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

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The Rationale for Capital Controls

- Macro-prudential Concerns: Mitigate the volatility of foreign capital inflows.
- Protectionism: Prevent currency appreciation.

"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."

-Perng Fai-Nan
October 2010

Macro-Micro Level Analysis

- An extensive empirical literature has focused on the aggregate effects of capital controls. (Magud, Reinhart, and Rogoff, 2011).
 - Macroeconomic analysis do not shed light on the channels through which capital controls can affect the economy at the micro-level.
- Studies about the effects of capital controls on firm-activity are relatively scarce (Forbes 2007a, b).
 - Data availability for emerging markets being an obvious constraint.

Firm-Level Analysis Using Brazilian Data

- Evaluate the effects of capital controls on firm-level stock returns & real investment using data from Brazil.
- Brazil has implemented a series of controls on capital flows in the last 5 years.
 - The stock market in Brazil is relatively well developed:
 - Value stocks traded above 40% and 65% market cap. % GDP, 2007-2012 (WDI, WB).
 - Firm-level and export data:
 - Firm-level response to capital flows as well as the impact of capital controls on exporting firms, (Datastream, Secex).
- Event-study methodology around the dates when the various capital control measures were announced using stock prices and firm level data.

Table 1: Capital Controls in Brazil, 2008-2012

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

General Predictions

- Theory suggests that if successful capital controls can drive up the cost of capital.
- Credit constraints at the firm level are more likely to bind for firms that are more dependent on external finance.
 - If production and exporting are associated with fixed costs and dependent on external finance, credit constraints at the firm level become relevant (Chaney, 2008).
 - 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 (Rajan and Zingales, 1998, etc.).
- Frequent changes to capital controls can increase uncertainty while reducing the availability of external finance, which can lower investment at the firm-level.

Results

- Significant decline in cumulative abnormal returns following changes in capital controls.
- Controls on debt flows are associated with less negative returns:
- Firm characteristics:
 - Large firms and exporting firms are less affected by the controls.
 - The largest exporting firms (>\$100 million) are less affected.
- Firms that are more dependent on external finance are more adversely affected by the imposition of capital controls.
- Investment declines significantly for small, non-exporting firms that are dependent on external finance. Exporters increase investment.

Roadmap

- Theoretical underpinnings
- Event study methodology
- The Data
- Results
- Conclusion

The Imposition of Capital Controls Constitutes a Move Away from Financial Openness.

- Changes in expected returns will depend on changes in firm-specific systematic risk
- The change in expected returns will be reflected in stock prices. How?
 - Required Rates of Return
 - Expected Future Cash Flows

- All else equal, stock prices will fall if the market imputes an increase in expected returns or the firm-specific cost of capital or a decrease in expected future cash flows.

Capital Controls Reduce International Diversification Opportunities

- Complete financial market integration implies that::

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

- Assume a country imposes capital controls segmenting its stock market from the rest of the world.
 - Assume also that expected future cash flows remain unchanged.
- Market segmentation will reduce the diversification opportunities for foreign investors (effects magnified if domestic investors are limited in ability to invest abroad).
- The relevant pool of investors will tilt towards domestics. For any individual stock:

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

- Depending on the level of controls the change in expected returns will reflect a range from complete to partial segmentation.
- Alternatively, controls create a price wedge in the expected returns or a tax that drives up the expected return relative to the benchmark return under full integration.

Capital Control & Stock Prices

1. Risk-free rate effect.
2. Firm-specific risk premium effect.
3. Expected cash flow effect.
 - If some firms benefit from the protectionism, expected cash flows could increase more than the rise in the required rate of return such that stock prices rise:

Methodology: Event Study

- Announcement effect of capital controls news:
 - If capital markets are semi-strong form efficient to public information, stock prices will quickly following an announcement (Andrade et al., 2001).
 - Two-day window: most stringent test to capture the announcement effect of the capital controls with less concern about other confounding news events.
- Stock prices are from Datastream.
- Mean cumulative return of the target stock price within the different windows:
 - Estimation window is 280 days before and up until 30 days preceding the event date.
- Cumulative abnormal returns (CARs) using a market model with Scholes-Williams betas

Data

- Data about firm characteristics are taken from Worldscope.
 - BOVESPA (most common index in Brazil).
 - For robustness use other indices such as IBRA.
- We use quarterly data from Q1 2006-Q4 2012.
 - Proxy for size: the (log) of total assets (sales).
 - Proxy liquidity: debt to total assets and short term debt to total debt.
 - Lagged one year deflated by CPI;
- The firm level information was matched to export status and the range of exports using data from the Brazilian Secretary of External Trade (Secretaria de Comercio Exterior, Secex).
 - The export range is in US\$ (FOB) and includes firm exporting less than \$1million, between \$1 million and \$100 million, and above \$100 million.

Main Specification

- The basic regression specification is as follows:

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

- CAR_{it} is the cumulative abnormal return for firm i over the event window t .
- Firm controls include a set of firm-specific characteristics such as size, leverage, etc.
- Robust/clustered standard errors.

Cumulative Abnormal Returns are Negative & Significant when Capital Controls are Announced

	(1)	(2)	(6)	(7)
Constant	-0.00428*** (0.001)	-0.0339*** (0.012)	-0.0348*** (0.0113)	-0.0354*** (0.0119)
Log Total Assets		0.00177*** (0.0007)	0.00169** (0.0007)	0.00173** (0.0007)
Exporter			0.00508* (0.0024)	
Export < \$1 mil				-0.00570 (0.0043)
Export \$1 mil - \$100 mil				0.00823* (0.0045)
Export > \$100 mil				0.00532** (0.0022)
Observations	1,000	941	941	941
R-squared	0.000	0.006	0.0103	0.0152

Debt vs. Equity Events

- Similar pattern of results holds with highly significant negative cumulative abnormal returns (Table 5).
- Controls on debt flows in Panel A display a less negative announcement effect (Columns 2-4, 6-7) compared to controls on equity flows in Panel B. T-tests of means confirm differences.
- For equity related announcements the short term debt ratio is negative and significant → overall -4.8% decline (Panel B, Column 4)
- Firms with higher levels of short-term debt are perhaps 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 firm returns.

Table 6: External Finance Dependence Drives Abnormal Returns

- The constant is negative & significant ranging from -2.3% to -3.4%.
- External finance dependence drives down abnormal returns further in alternative specifications.
 - $(CE-CF)/CE$ (continuous)
 - $(CE-CF)/CE > \text{mean}$ (dummy)
 - $(CE-CF)/CE$ (manufacturing dummy)
- Large firms and exporters are somewhat shielded—firm size and export coefficients are positive & significant.
- Coefficient on small exporter variable is negative & significant.

Investment: Before and After Regime Change (Table 7)

	3/12/2008			10/19/2009		
	Before	After	T-test	Before	After	test
1. All Firms	5.6%	5.3%		5.7%	1.7%	
2. Size						
Assets> μ	1.9%	4.1%		2.6%	1.5%	
Assets< μ	17.7%	6.2%	***	8.9%	1.7%	*
3. Export						
Exporting	7.8%	3.1%	†	2.7%	5.6%	*
Non Exporting	4.0%	4.1%		7.9%	-1.0%	*
4. Liquidity						
CE-CF/CE> μ	6.5%	3.2%	*	5.2%	1.1%	
CE-CF/CE< μ	-0.5%	17.8%	*	8.8%	3.7%	

Robustness Checks and Additional Tests (Table 9)

	Control	Constant	Standard Error
(1)	Bank Debt	-0.0357**	(0.0137)
(2)	Operating Revenue	-0.00705***	(0.00121)
(3)	Excluding Lehman Event	-0.0329***	(0.0111)
(4)	Invariant Estimation Window	-0.0356***	(0.0114)
(5)	Tightening Events	-0.0242***	(0.00896)
(6)	Loosening Events	-0.0577*	(0.0289)
(7)	MNCs	-0.0286*	(0.0146)
(8)	ADRs	-0.0574***	(0.0176)
(9)	Foreign Bond Issuance	-0.0672***	(0.0135)

Robustness Checks and Additional Tests

- Different windows and different methodologies for computing returns (raw returns, CAPM).
- Firms on the alternative IBRA stock exchange.
- IPO of OGX (June-2008).

Discussion

- The evidence in this paper suggests that capital controls can: -
 - increase market uncertainty
 - reduce the availability of external finance
 - lower investment at the firm-level.
- Implications for macro models that focus on aggregate variables to examine the optimality of capital controls & abstract from heterogeneity at the firm-level.
- In particular, the evidence suggests that capital controls disproportionately affect small, non-exporting firms especially those more dependent on external finance.