“Two Sides of the Same Coin? Stock Market Reactions to the Brazilian Devaluation”

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Two Sides of the Same Coin? Stock Market Reactions to the Brazilian Devaluation

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Abstract

While exchange rate crises generally result in significant economic disruptions for the affected country, one group of firms is expected to benefit – export-oriented firms. A significant devaluation should raise an exporter's profits as the increase in the value of foreign currency revenues brings higher expected future profits. In an efficient market, the value of export firms should be less affected by a currency crisis than firms that are primarily focused on the domestic economy. In a similar fashion, exported-oriented firms in a closely integrated trading partner country should experience lower future profits and an immediate decline in the stock value. We conduct an event study of the effects of the 1999 Brazilian devaluation on a cross-section of publicly traded Brazilian and Argentine firms. We find that Brazilian export firms outperform Brazilian non-export firms in the months after this crisis. Surprisingly, we find no differential impact of the real devaluation on Argentine exporters versus non-exporters.

Key words: currency crises, exchange rates, stock market reactions.

1. Introduction

In corporate finance, a firm's value is equal the present discounted value of its expected future free cash flows. Free Cash Flows (FCF) depend crucially on the interplay between its revenues and expenses. When a firm's revenues and expenses are in different currencies, exchange rate changes will change the firm's future FCF's in its home currency and therefore the market value of its stock.

To some extent the currency devaluation results in a sustained contraction of the domestic economy, a firm whose expenses and revenues are primarily generated domestically will be negatively impacted by the devaluation. These non-export firms may experience declining unit sales, revenues and profits. Firms that rely on imports of raw materials are likely to suffer the greatest falls in value because of the increase in their expenses as well as a decline in revenues.

In contrast, a firm that is primarily an exporter should be positively affected by the same devaluation. Its expenses are in local currency but its revenues in foreign currency now translate into larger amounts of local currency. Export firms should experience increases in their profits and future free cash flows denominated in local currency. As a result, the local currency value of an export firm's shares may increase despite any negative effects of the crisis on the local economy as a whole. In fact, significant currency devaluation may also increase export firms' unit sales and revenues abroad by lowering the foreign currency cost of their products in the rest of the world.

The first country's currency devaluation will have consequences for firms in any closely integrated trading partner. Export-oriented firms in the trading partner will be negatively affected by the devaluation – their foreign currency revenues translated are worth less while their costs in their home currency are unchanged, resulting in lower future profits. Non-export-firms within the trading partner are also likely to be harmed – these must compete against the first country's export firms which costs have been lowered by the currency devaluation.

Currency crises, and their attendant large devaluations, should thus have significant and differential effects on the valuation of firms across countries that are close trading partners. This paper examines the effects of Brazil's devaluation of the real in December 1999 on a cross-section of export and non-export firms in Brazil and Argentina. Brazil and Argentina are members of the Mercosur customs union and are closely integrated in terms of cross-border flows of goods and services. Brazil's crisis of December 1999, where the real fell in value by over 50% against the US dollar (and

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Argentine peso) in less than a month, provides an opportunity to study how this currency crisis affected the share returns of publicly traded firms on the Brazilian and Argentine stock markets.

2. Brazilian Devaluation within Mercosur

Mercosur, or the Southern Common Market, is a customs union formed in 1991 by Brazil, Argentina, Uruguay, and Paraguay. Chile and Bolivia became associate members of Mercosur in 1996. Mercosur has become the third largest market in the world after NAFTA and EU. As a customs union, no tariff or other barriers exist in trade between members but common tariff rates are established toward trade with the rest of the world. The lack of tariffs between members combined with a tariff wall to the outside means that a custom union may be both trade creating and trade diverting[1]. Both effects result in increased cross-border trade between members. In fact, intra-Mercosur trade increased from 8.9% of the bloc's total trade in 1990 to 20.4% of its total trade in 1995 according to WTO annual report.

As the two largest members of Mercosur, the economies of Brazil and Argentina have always represented the bulk of trade within the union. This tight integration between the two economies meant that Brazil's devaluation of the Real in 1999 resulted in a significant impacts on both countries. Mercosur trade statistics indicate that Brazilian exports to Argentina increased by roughly 30% in Real from 1998 through 1999 while Argentine exports to Brazil fell by 21% in peso terms during the same period. Much of Argentina's slow growth and deteriorating economic situation, leading to the failure of its currency board in 2002, have been attributed to the ongoing effects of the Real's devaluation in 1999.

The evidence seems clear that at an aggregate level, export-oriented firms in Brazil responded to the devaluation by increasing sales to Argentina and that Argentine export-oriented firms suffered from a significant fall in revenues. Evidence from previous crises in Mexico and Latin America indicates that firms in these countries attempted to offset the negative local economic effects of a currency crisis by shifting sales from the domestic economy to the rest of the world. The more internationally-oriented the firm, the larger this shift to foreign markets is. Lipsey (2001) finds that dollar-denominated export revenues rose significantly after both Mexican peso crises, arguing that export firms' peso revenues must have increased substantially after each crisis.

The focus of our paper is on how a currency crisis affects firm values rather than firm production responses. The 30% increase in Real revenues for Brazilian exporters as a whole should have significantly increased both Real-denominated net profits and FCF's in the year after the devaluation. To the extent that investors in Brazilian stock market anticipated this effect, we should see local currency returns for publicly traded Brazilian exporters to be higher in the months after the devaluation and to be higher than those of publicly traded Brazilian non-export firms.

The effect of Brazil's devaluation across Argentine firms is less clear-cut. At an aggregate level, Argentine export firms experienced a 20% fall in peso revenues in 1999. If the Argentine stock market anticipated these lower future revenues, profits and free cash flows for these firms, then publicly-traded Argentine exporters should exhibit lower local currency returns after the Brazilian devaluation. A similar rationale, however, applies to non-exporter Argentine firms, as their revenues and profits are likely to suffer as a result of the sudden influx of cheap Brazilian exports into Argentina in the year after the devaluation. Thus it is not clear whether Argentine exporters will exhibit significantly worse stock market performance than non-exporters in the months after the Brazilian devaluation.

We use regression analysis on the cross-section of publicly traded Brazilian and Argentine firm returns to examine whether Brazilian (Argentine) exporters fare better (worse) than Brazilian (Argentine) non-exporters in the face of the large Real devaluation. Following Chari and Henry (2001) and Goldberg and Veitch (2002), we include variables to control possible market anomalies based on firm size, market liquidity, or price to earnings or book value. Our focus is on

[1] Trade creation occurs within accustom union when domestically produced output is replaced by lower cost output from a member country. Trade diversion occurs when lower cost output from the rest of the world is replaced by higher cost output produced by a member of the customs union because of high tariff barriers to countries outside the customs union.

the difference on how firm cumulative excess returns in the months after the crisis vary between exporters and non-exporters. We expect that Brazilian (Argentine) exporter firms will be less (more) negatively affected by the Real devaluation than non-export firms even after taking into account differences in other variables that may affect returns.

Table 1

Pre- and Post-Real Crisis Share Returns

	Average Cumulative Monthly Returns post-Real Devaluation				
	Month of	1-3 months	4-6 months	7-9 months	10-12 months
Brazil					
Exporters N= 34	-0.3759	0.6143	0.3381	0.1586	0.2026
St. Dev.	0.4964	0.4905	0.3259	0.2362	0.2460
Non-Exporters N= 37	0.0506	0.3495	0.1402	-0.0681	0.1222
St. Dev.	0.2222	0.2631	0.3100	0.3858	0.4077
Argentina					
All N= 29	-0.1704	-0.1094	0.1784	0.0462	-0.0140
St. Dev.	0.1237	0.1536	0.2592	0.2888	0.3496
Exporters N= 11	-0.1458	-0.0822	0.2237	0.0861	0.0167
St. Dev.	0.1297	0.1731	0.2844	0.3612	0.4482
Non-Exporters N= 18	-0.1854	-0.1260	0.1507	0.0218	-0.0328
St. Dev	0.1211	0.1431	0.2468	0.2489	0.2865

Table 1 presents summary data on share returns for Brazilian and Argentine exporters versus non-exporter firms for a year after the Real crisis of December 1999. The most notable result is that the cumulative excess returns for Brazilian exporters are positive for all of the sub-periods examined post-crisis. In addition, these returns are significantly larger than the results for Brazilian non-exporter firms in each sub-period after the devaluation. At an aggregate level, the devaluation resulted in positive excess returns to Brazilian firms on average but increased the value of Brazilian exporters even more. Our benchmark of normal returns is based on the average return experience by each firm over the year prior to the devaluation. The results for Brazilian firms are consistent with a story of poor performance of Brazil's economy in the year prior to the devaluation also depressing Brazilian firm returns. All Brazilian firms experience positive excess returns once the devaluation, with its expectations of improved economic performance, occurs.

The impact of the Real's devaluation on Argentine firms is quite surprising. Excess return behavior does not seem to differ significantly for Argentine exporters versus non-exporters. Interestingly, Argentine firms experience negative returns in the month before, and month of, the Real's devaluation as might be expected. In the year after the devaluation, however, both Argentine firms experience positive excess returns relative to their benchmark returns. These aggregate firm results seem at odds with the macroeconomic data on declines in Argentine exports to Brazil and Argentina's poor economic performance since the Real's devaluation in December 1999.

3. Data Sources and Definitions

Our data on share prices and returns comes from the International Finance Corporation (IFC) Emerging Markets Database. We have a panel of 71 publicly quoted Brazilian firms and 29 Argentine firms whose monthly share price information is available from 12 months prior to the Real crisis through twelve months after the crisis (1998:12 through 2000:12) The dataset consists of: (a) 34 exporter firms and 37 non-exporter firms for Brazil and (b) 11 exporter firms and 18 non-exporter firms for Argentina. Exporter firms were identified based on a combination of their SIC codes reported to the IFC and data reported by Argentina's Instituto Nacional de Estadística y Censos regarding imports and exports between Argentina and Brazil, broken down by industry.

The average monthly return over the 12 months prior to the Real crisis of December 1999 was calculated for each firm. This average return was used as a proxy for each firm's "normal" return in our study. Excess returns in each of the cumulative three-month periods after the Real crisis were calculated for each firm as the difference between the firm's actual return in those months and its "normal" return. Our regression analysis uses the 1-3 month, 4-6-month, 7-9 month and 10-12 month cumulative excess returns as the dependent variable to be explained.

The IFC database was used to generate "market anomaly" variables to control the possibility that cumulative excess return differences across firms were the result of Brazilian and Argentine stock market inefficiencies, rather than the export/non-export character of the firms. We follow Chari and Henry (2001) in our choice of these variables described in Table 2.

Table 2

Economic Variables

Symbol	Economic Variable
EXPORT	Dummy for Exporter
TURNOVER	% of Market Turnover *(V traded)*
P/E	Price/Earnings ratio – Firm to Market
P/BK	Price to Book Value ratio – Firm to Market

The market anomaly variables (TURNOVER, P/E, P/BK) are calculated as the yearly average for the firm or market in the year before the Real devaluation. Each of these variables is calculated as an index of the firm's average value over the year prior to the devaluation relative to the average total market value for the variable. Thus an index of 100 means the firm's average value for the variable is equal to the average of overall market in which it is traded.

4. Regression Results

Our analysis of the effect of the Real crisis on the stock returns of Brazilian and Argentine firms is conducted in two stages. At the first stage we examine the 1-3-, 4-6, 7-9 and 10-12 three-month cumulative excess returns for evidence of a significant difference across export firms versus non-export firms. This involves running the simple regression (1) over the cross-section of firms for each cumulative excess return measure. We expect that the coefficient on the EXPORT variable will be positive (negative) and significantly different from zero if exporters fare better (worse) as a result of the devaluation than non-exporters.

$$ER_i = \alpha_0 + \alpha_1 EXPORT_i + \varepsilon_i . \quad (1)$$

The second stage of the analysis augments the initial regression with additional firm-specific variables to determine if differences in cumulative excess returns arise from market anomalies familiar in the CAPM literature. The resulting regression (2) involves variables for firm liquidity, P/E and P/Book Value and is similar to the approach in Chari and Henry (2001). A parsimonious regression is then estimated that demonstrates that for the Real crisis the distinction

between exporter and non-exporter is the only significant determinant of individual firm cumulative excess returns.

$$ER_i = \alpha_0 + \alpha_1 EXPORT + \alpha_2 TURNOVER + \alpha_3 (P/E) + \alpha_4 (P/Bk). \quad (2)$$

Table 3 presents the results for the simplified model that estimates firm returns for the period preceding, the event month and 3-month intervals post-Real crisis. Recall that the EXPORT variable measures the significance that cumulative excess returns are higher for Brazilian export firms than for domestic firms. The major finding in the first model is that the EXPORT variable is significant for the cumulative three-month excess returns continuing until 9 months post crisis. As hypothesized, this implies that export firms in Brazil do significantly better than domestic firms post crisis.

Table 3

Simple Return Regression Results for Cross-section of Brazilian Firms

Variables	Month -1 Excess Returns	Month 0 Excess Returns	Cumulative 1-3-Month Excess Returns	Cumulative 4-6-Month Excess Returns	Cumulative 7-9-Month Excess Returns	Cumulative 10-12-Month Excess Returns
Constant	-0.1021***	0.0506	0.3495***	0.1402***	-0.0681	0.1222**
EXPORT	0.0840**	0.3253***	0.2648***	0.1979**	0.2267***	0.0804
R^2	0.1653	0.3308	0.6246	0.3986	0.1249	0.1962

Table 3 tests the significance of the variables in our model as outlined in equation 1. Significance levels for the results are reported as ***,** and * which indicate 1%, 5% and 10% significance levels respectively.

The dramatic increase in returns for exporter firms appears as early as the crisis month itself implying that the Brazilian stock market reacted quickly to the crisis. Participants assess the expected effects of the devaluation on the financial position of firms and immediately force share prices, and returns, to reflect these expectations. Brazilian exporters' stock prices and returns, in Real, increase because their cash flow positions are likely to be positively affected by the currency depreciation. Note also that the intercept in the 1-3 month and 4-6 month cumulative excess return regressions is significantly positive, indicating that both types of Brazilian firms, on average, enjoyed positive excess returns in the six months after the crisis. In addition, the R^2 of the excess return regressions increases as one moves from the crisis month to the first 3-month period post-devaluation. This indicates that there may have been a continuing adjustment period after the crisis while the market fully evaluated the differential effects of the devaluation.

Table 4

Full Return Regression Results for Cross-section of Brazilian Firms[1]

Variables	Regression for Month -1	Regression for Month 0	Regression for Month 1-3
Constant	-0.0608	0.0887	0.3597***
EXPORT	0.0920**	0.3257***	0.2489**
TURNOVER	-0.9543	-1.1667	0.7344
P/E	-0.0002	0.0006	-0.0002
P/Bk	-0.0171	0.0064	-0.0357
R^2	0.1997	0.3569	0.6282

Table 4 tests the significance of the variables in our model as outlined in equation 2. Significance levels for the results are reported as ***,** and * which indicate 1%, 5% and 10% significance levels respectively.

[1] We ran the full model for Argentina and found that no other variables were significant in explaining excess returns.

Table 4 presents the results for the regression that incorporates other firm specific factors that may explain return behavior. We present results for the periods around the devaluation itself but regressions for the later period excess returns yield similar results. None of the additional "market anomaly" variables are significant in any of the return regressions. Besides, the estimated coefficients on the exporter variable in this full regression model are not significantly different from their values in the simple regression. Consistent with our initial hypothesis, whether or not the firm as an exporter appears to be the driving force behind differential post-crisis return behavior for Brazilian firms in the face of the Real's devaluation.

Table 5

Simple Return Regression Results for Cross-section of Argentine Firms

Variables	Month -1 Excess Returns	Month 0 Excess Returns	Cumulative 1-3-Month Excess Returns	Cumulative 4-6-Month Excess Returns	Cumulative 7-9-Month Excess Returns	Cumulative 10-12-Month Excess Returns
Constant	-0.1005***	-0.1854***	-0.1260***	0.1507**	0.0218	-0.0328
EXPORT	0.0157	0.0397	0.0438	0.0730	0.0642	0.0494
R^2	0.6119	0.6713	0.3574	0.3422	0.0376	0.0065

Table 5 tests the significance of the variables in our model as outlined in equation 1. Significance levels for the results are reported as ***,** and * which indicate 1%, 5% and 10% significance levels respectively.

Table 5 presents the results for the simplified model that estimates firm returns for the period preceding the event month and 3-month intervals post Real crisis for Argentina. The first observation is that export-oriented firms perform no differently than the domestic firms both pre and post crisis. The export variable is positive across the board, however, it is not significant. The significant constant variable in the month prior to the crisis, crisis month and 3 months post is consistent with our intuition. If Argentine firms suffer lower revenues and profits because of the crisis, the intercept will reflect the negative returns for all firms in the sample. Our results indicate an approximate 20% drop in returns for all firms in the month of the crisis and a continued fall of 13% in the 3 months post crisis. Returns do rebound from months 4-6, however, the cumulative effect of the crisis is still negative given the prior months results. This may indicate a correction in the market's assessment of the crisis' impact on Argentine firms (i.e. an adjustment to an overreaction in the crisis month and 3 months post crisis).

5. Conclusions

The purpose of this paper was to investigate how the value of publicly traded firms reacts to a significant currency devaluation. We expected that in closely integrated trading partners, export firms of the devaluing country would experience higher values and returns than non-export firms within the country. In contrast, we expected the value and returns of export firms in the trading partner to fall dramatically. There was also reason to believe that non-export firms would also experience smaller declines in value and returns because of the increased competition from the devaluing country's exporters.

Our event study focused on the impact of Brazil's devaluation of the Real in December 1999 on the fortunes of its companies and those of its close trading partner Argentina. As founding members of Mercosur, they had experienced rapid growth in trade flows with one another from 1991 through to the crisis in 1999. We examined monthly excess returns for all publicly traded firms in each country that were listed in the IFC database by using the cross-section regression on firm cumulative excess returns over sub-periods in the year following the Real's devalution as in Chari and Henry (2001).

Our results for Brazil were as expected. There is strong evidence of significantly higher returns to Brazilian exporters after the devaluation relative to non-exporting Brazilian firms. We find evidence of positive cumulative excess returns to Brazilian exporters over the year following the devaluation, with these excess returns becoming smaller as we move further away from the devaluation event. Brazilian non-export firms exhibit positive, but smaller, excess returns in the periods immediately after the devaluation. This is likely indicative of the lack of financial crisis associated with the devaluation and the speed with which macroeconomic stability was attained (see Gruben and Welch (2001) for more details).

In contrast, our results for Argentina are puzzling. The conventional macroeconomic view is that the Brazilian devaluation hobbled Argentina's growth in the following three years and that this was one of the main contributors to the collapse of Argentina's currency board arrangement. We find that Argentine firms did not experience much in the way of negative excess return, except in the three months after the Real's devaluation, and that these are partially reversed by positive excess returns later in the year. Counter to our expectations, we also find that there is no significant difference in excess returns between Argentine exporters and non-export firms. While these results are puzzling, they suggest that perhaps financial markets are "asymmetrically efficient", focusing primarily on the effects on the devaluing country and overlooking the consequences for its trading partners.

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