Pessimistic Foreign Investors and Turmoil in Emerging Markets :
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Pessimistic Foreign Investors and Turmoil in Emerging Markets:

The Case of Brazil in 2002

Sandro C. Andrade[*]   Emanuel Kohlscheen[†]

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Abstract

Using survey data, we document that foreign-owned institutions became more pessimistic than locally owned institutions about the strength of the Brazilian currency around the 2002 presidential elections. As a result of their relative pessimism, foreign-owned institutions made larger forecast errors. Consistent with the emergence of their relative pessimism, foreign investors heavily sold Brazilian stocks and the Brazilian currency in futures markets ahead of the 2002 elections. Periods of stronger foreign sell-off were associated with larger equity price declines and larger depreciation of the Brazilian Real in spot and futures markets. These results are consistent with foreign investors' lack of knowledge of Brazilian institutions contributing to the sharp depreciation of the Brazilian currency and stock market ahead of the 2002 presidential elections.

Keywords: currency crisis, portfolio flows, difference of opinions, elections

JEL number: F31, F36, G15

[*]School of Business Administration, University of Miami. PO BOX 248094. Coral Gables, FL, 33124. E-mail: sca@miami.edu.

[†]Economics Department, University of Warwick. CV4 7AL, Coventry, UK. E-mail: e.kohlscheen@warwick.ac.uk.

1   Introduction

The crises of the 1990s engendered a substantial change of perspective in the analysis of emerging market crises. Before, crises were quickly attributed to macroeconomic mismanagement, particularly to unsustainable fiscal imbalances. Afterward, economists began to seriously consider that some crises may be precipitated by self-fulfilling pessimistic expectations of foreign lenders. For example, a number of prominent economists blamed foreign investors for their role in the 1997 East Asian emerging market crisis (Bhagwati, 1998; Stiglitz, 1998; Rodrik, 1998; Radelet and Sachs, 1998). Self-fulfilling lender-led crises can be rationalized by a variety of models, all of them exhibiting multiple equilibria. These models include those of Obstfeld (1986, 1996), Sachs, Tornell, and Velasco (1996), Cole and Kehoe (1996, 2000), Calvo and Mendoza (2000a,b), Chang and Velasco (2001), and Chang (2007).[1]

Along with a new generation of theoretical models, the crises of the 1990s stimulated a spurt of empirical research on the behavior of foreign investors in emerging markets, especially during crises. A short list of papers in this literature includes Choe, Kho, and Stulz (1999), Kim and Wei (2002a,b), Borensztein and Gelos (2003), Kaminsky, Lyons, and Schmukler (2004), Dvorak (2005), Broner, Gelos, and Reinhart (2006), and Froot and Ramadorai (2008). Two questions that permeate this line of research are whether foreign investors' trading is less information-based than that of locals, and whether trading by foreigners exacerbates crises in emerging markets. As we discuss later, evidence is mixed. Our study adds one data point to this literature. A novel feature of our work is the use of surveys of expectations of financial market participants. These surveys are conducted by the Central Bank of Brazil and include the major players in local financial markets.

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[1] See Masson (1999), Calvo (2005, chapter 12), and Kaminsky (2006) for discussion.

We use surveys to compare the exchange rate expectations of locally and foreign-owned institutions around the 2002 Brazilian presidential elections.[2] Reports from that time reveal that expectations were heavily influenced by the potential victory of Luís Inácio "Lula" da Silva, a left-wing opposition candidate who emerged victorious in the elections.[3] We document that during that time period foreign-owned institutions were more pessimistic than locally owned ones about the strength of the Brazilian currency and made considerably larger forecast errors accordingly. For example, between August 2002 and February 2003, foreigners' estimates for the USD/BRL exchange rate at the end of 2004 were on average 0.186 (BRL) cents above locals' estimates, with the difference being statistically significant at the 5% level. Using the average USD/BRL spot exchange rate in the forecasting period (3.498), the 0.186 difference means that, relative to locally owned institutions, foreign-owned institutions, on average, forecasted a $0.186/3.498 = 0.053$ larger depreciation of the Brazilian Real.

We also document that foreigners' trading activity in financial markets was consistent with their expectations becoming more pessimistic than those of locals. Data on trading imbalances show that foreign investors substantially sold Brazilian equity and Brazilian currency (in the futures market) to local investors ahead of the 2002 presidential elections. Furthermore, we show that 10-day periods with stronger foreign sales (i.e., local purchases) of equity were associated with larger concurrent equity price reductions and larger depreciations of

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[2]Brazilian presidential elections occur in two rounds. All candidates participated in the first round, on October 6, 2002. The two top candidates from the first round, Jose Serra, from the incumbent centrist coalition, and Lula from the leftist Workers' Party, faced off in the second round. On October 27, 2002 Lula was elected president, and his government would not break off from the macroeconomic policies of previous administrations.

[3]On June 6, 2002 Goldman Sachs announced the Lulameter, which "quantifies the probability of a Lula victory that is currently being priced in by currency markets" (Tenengauzer, 2002). The report concludes that "the market is being over-optimistic regarding the exchange rate in the event of a Lula victory" and recommends that "investors should protect against BRL exposure into the elections period." Martinez and Santiso (2003) present a thorough and enjoyable discussion of the Brazilian pre-electoral period in 2002.

the Brazilian currency in the spot market; days with stronger foreign sales of BRL in futures markets were associated with larger depreciation of the Brazilian currency in the futures market. When coupled with survey evidence, these results indicate that the foreign sell-off likely exacerbated the depreciation of Brazilian equity and the Brazilian Real ahead of the elections.[4]

1.1 Related literature

In this paper, evidence that foreigners' had "worse" expectations than locals during the Brazilian crisis in 2002 comes from survey data. In contrast, many studies address the ultimate question of whether foreign trading during a crisis is less information-based than that of locals by testing whether foreign investors engage in "momentum trading" or "herding behavior." These would be mechanical ways of trading that disregard economic fundamentals.[5]

For example, Kim and Wei (2002a) and Choe, Kho, and Stulz (1999) use different datasets to test whether foreign investors in Korea tended to herd and follow momentum-like strategies in the period around the 1997 East Asian crisis. Kim and Wei (2002a) find evidence of herding and momentum before and during the crisis, whereas Choe, Kho, and Stulz (1999) find that foreigners engaged in momentum trading and herding prior to the crisis, but during

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[4] A dollar invested in the Brazilian IBOVESPA Stock Index in January 1, 2002 was worth 38 cents in September 30, 2002. Value was lost both because the IBOVESPA index lost 36% of its value in BRL and because the Brazilian Real lost 40% of its value relative to the dollar.

[5] One difficulty with this approach is that the statistical results used to identify herding and momentum are also consistent with fully rational trading strategies that use information efficiently. "Herding" could be due to investors responding to the same information. "Momentum-trading" could be due to investors following dynamic trading strategies that create convex payoff patterns (i.e., portfolio insurance a la Leland 1980), or to foreign investors and market prices responding to a gradual build-up of credibility regarding a government commitment not to expropriate foreigners (Cherian and Perotti, 2001), or to informed investors breaking up orders to minimize the price impact of their trades (Kyle, 1985).

the crisis herding was somewhat reduced and momentum trading disappeared. Choe, Kho, and Stulz (1999) also document a strong foreign sell-off and large price declines during the crisis. Authors of both articles conclude that foreign trading probably did not exacerbate the crisis either because foreigners held a relatively small part of the Korean stock market capitalization (Kim and Wei, 2002a), or because, within the crisis period, days with large foreign net selling were not associated with more negative returns (Choe, Kho, and Stulz, 1999).[6] Borensztein and Gelos (2003) use data on holdings of mutual funds investing in emerging markets and conclude that foreign investors engage in momentum trading and herding behavior. Kaminsky, Lyons, and Schmukler (2004) also document momentum trading by U.S. mutual funds investing in emerging markets and show that this behavior is due both to customer flows and portfolio decisions by mutual fund managers.

Other than checking whether foreign investors follow seemingly mechanistic trading strategies, there are three alternative ways to assess the informational content of foreign trading. First, Frankel and Schmukler (1996, 2000) propose comparing the prices of closed-end country funds trading in the U.S. to the underlying prices of their emerging markets stocks. They conclude that locals are better informed than foreigners because emerging market stock prices lead closed-end fund prices.

Second, several authors investigate the relation between foreign trading flows and future returns. Evidence is mixed. Using daily flows of institutional investors in and out of 44 different countries, Froot, O'Connell, and Seasholes (2001) find evidence consistent with momentum trading, but because foreign purchases forecast future returns, they conclude that

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[6]In contrast, Richards (2005) and Wang (2007) use East Asian data after the crisis and document large returns in days of strong foreign trading, and suggest that price pressure from foreign trading can create potentially large price dislocations.

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foreigners are likely to trade based on information not possessed by locals. In a follow-up paper, Froot and Ramadorai (2008) study the relation between cross-border equity flows and domestic and foreign equity returns and reach the same conclusion. However, other authors use different data sets and statistical techniques to address the same ultimate question and reach the opposite conclusion, namely, that local investors are better informed than foreigners (e.g., Hau, 2001; Griffin, Nardari, and Stulz, 2004; Choe, Kho, and Stulz, 2005; Dvorak, 2005; Menkhoff and Schmeling, 2008). In an attempt to reconcile the conflicting evidence, Froot and Ramadorai (2008) conjecture that foreigners have better information about macro fundamentals in emerging markets, whereas locals have better information about how individual firms relate to each other.

The third way to verify whether foreigners trade on the basis of "worse" information sets than locals is to use survey data to directly compare the expectations of locals and foreigners. Once again, the evidence is mixed. MacDonald and Marsh (1996) use survey data to compare G7 exchange rate forecasts made by financial institutions located in different countries. While documenting substantial heterogeneity among individual forecasts, MacDonald and Marsh (1996) find negligible differences among forecasts averaged across different forecasting locations.[7] In contrast, Berger, Ehrmann, and Fratzscher (2009) find that forecasters from Frankfurt (where the European Central Bank is located) perform substantially better than other European forecasters when predicting monetary policy in the Euro area. Using data from the Institutional Brokers Estimate System (I/B/E/S), Bae, Stulz, and Tan (2008) show that local analysts tend to make smaller forecast errors than foreign analysts when predicting firm-specific earnings. In contrast, Bacmann and Bolliger (2001) use a subset of the I/B/E/S

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[7]Other studies using surveys of exchange rate expectations include Frankel and Froot (1987), Ito (1990), Cavaglia, Verschoor, and Wolff (1993,1994), Chinn and Frankel (1994), Koedijk and Wolff (1996), Elliott and Ito (1999), and Bacchetta, Mertens, and van Wincoop (2009).

data and find that foreign analysts outperform local ones when forecasting earnings of Latin American firms, with the foreign outperformance being statistically significant for Mexico and Colombia.

To the best of our knowledge, ours is the first study using survey data to document local informational advantage when it comes to forecasting a macroeconomic variable (the exchange rate).[8] Moreover, because the divergence of expectations between locals and foreigners happened around presidential elections (but not in other times) and foreign underperformance is due to their relative pessimism, we can narrow down the source of the local advantage. To wit, foreigners where over-pessimistic regarding the Brazilian economy following a potential victory by Lula in the elections. This links our paper to the literature examining the effect of political uncertainty on emerging financial markets. This literature includes Alesina and Tabellini (1989), Martinez and Santiso (2003), Block and Vaaler (2004), Bonomo and Terra (2005), Chang (2006, 2007, forthcoming), Leblang and Satyanath (2008), and Andrade (2009).

2   Exchange Rate Forecasts

We rely on exchange rate forecasts obtained from monthly surveys conducted by the Central Bank of Brazil. Practically all major players in the Brazilian fixed income currency markets participate in the survey. Since November 2001 the forecasts have been sent to the Central Bank via an electronic system. The identity of the five best forecasting institutions over

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[8]Kaufmann, Mehrez, and Schmukler (2005) show that expectations of managers of local firms can help improve exchange rate forecasts based on macroeconomic variables. Menkhoff and Schmeling (2008) show that order flow from Moscow and St. Petersburg has a more persistent impact on the RUR/USD exchange rate than order flows from other regions.

the recent past is made public on a regular basis to give institutions an incentive to deliver their best forecasts. Reflecting the survey's high profile, aggregate statistics of the forecasts are widely reported by the Central Bank and the national press. The forecasts of individual institutions, to which we have access under a non-disclosure agreement with the Central Bank of Brazil, are kept confidential. A detailed description of the survey can be found in Marques, Fachada and Cavalcanti (2003).

The Central Bank of Brazil asks institutions participating in the surveys to, every month, forecast the future BRL price of one dollar at different target dates. We study surveys from January 2002 to June 2003, focusing on forecasts for the exchange rate 12 months ahead and at the end of 2003, 2004, and 2005. The survey data consist of an unbalanced panel because not all institutions input answers for all target dates at all times. The average number of months in the January 2002 to June 2003 (18 months) in which a forecaster submits at least one forecast (for some target date) is 12.4, while the median is 16.

There are 103 different forecasting institutions in our sample period. Most of these (88) are financial institutions, including banks and asset management firms. The remaining institutions are either economic consulting firms (9) or large non-financial firms (6). We classify each forecasting institution as being locally owned or foreign-owned. There are 60 locally owned institutions, and 43 foreign-owned ones. Foreign-owned institutions include banks such as Citibank, Bank Tokyo-Mitsubishi, Deutsche Bank, and JP Morgan; economic consulting firms such as IDEA Global; and non-financial firms such as Telefónica.

2.1 Forecast Heterogeneity and Its Likely Source

We begin by documenting a large increase in the dispersion of exchange rate forecasts around Brazil's 2002 presidential election, after pooling locally and foreign-owned institutions. Figure 1 shows that the coefficient of variation of exchange rate forecasts peaks at the election period for all forecast horizons. For all horizons, the coefficient of variation is about 2.5 times larger around October 2002 than at the beginning (January 2002) or at the end (June 2003) of the sample period. This confirms that uncertainties stemming from the presidential election were the driving force of the heterogeneity of beliefs during our sample period. The basic uncertainties were whether Lula would be elected president, and if he was elected president, whether he would retain the basic macroeconomic framework of his predecessors.

FIGURE 1

We observe expectations, but not information sets. Therefore, we cannot unequivocally tell whether the heterogeneity we document is mostly due to different private information or mostly due to agents interpreting public information in different ways. However, given the nature of the basic uncertainties bedeviling Brazilian markets at the time (regarding the outcome of the presidential election, or regarding Lula's macroeconomic framework if elected), we are more sympathetic to the view that agents at the time had access to essentially the same information but "agreed to disagree" on its interpretation.[9] As Harris and Raviv (1993) state on page 474: "People often share common information yet disagree as to the meaning

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[9]In the context of the U.S. presidential election of 2008, Moretti and Lee (2009) study the relation between publically released poll information and prices in prediction markets. The authors show that rather than anticipating how the forthcoming polling numbers might be, prices in prediction markets used the changes in polls to update their forecasts of the final election outcome. Their evidence suggests there was no private information regarding the outcome of the election.

of this information, not only in the evaluation of risky assets but also in the evaluation of political candidates, economic policies, and the outcome of horse races. One example of this is the variety of opinions among financial analysts and macroeconomists regarding future movements of interest rates, exchange rates, gross national product, and stock prices despite the fact that all these analysts have access to the same economic data."[10]

2.2 Divergence of Forecasts Between Locally and Foreign-Owned Institutions

The pooled dispersion statistics discussed above mask an important divergence of forecasts between groups of investors taking place around the 2002 presidential elections. In fact, there is plenty of anecdotal evidence that foreigners had more pessimistic economic scenarios for the Brazilian economy than locals. Two weeks ahead of the runoff election between Lula and the incumbent coalition's candidate, the *New York Times* reported: "Wall Street investors, stung by recent losses in Argentina and wary of the outcome of presidential elections in Brazil, are once again diverging from their Brazilian counterparts in their outlook on the nation's ability to avoid a crippling financial crisis. The differences in opinion [...] have become more striking since Luiz Inácio Lula da Silva, the presidential candidate of the left-leaning Workers' Party, was forced on Sunday into a second round of voting with José Serra, the candidate of the centrist governing party" (Romero, 2002).

In Figures 2 through 5 we use the Central Bank surveys to verify whether the anecdotal difference of opinions between local and foreigners was indeed of a systematic nature. Each month we compute the average forecast from locally and foreign-owned institutions for our four target dates and plot both average forecasts against the future realized exchange rate.

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[10]See also Kandel and Pearson (1995).

At any point in time, the distance between each average forecast and the future realized exchange rate is the forecast error. Figures 2, 3, 4, and 5 show that locally owned institutions made smaller forecast errors for all four target dates.

FIGURE 2 to 5

For all of the target dates, the major factor behind the forecasting underperformance of foreign-owned institutions was their relative pessimism in the period of August 2002 to February 2003 (i.e., higher forecasts for future BRL price of 1 USD.)[11] It seems that relative to local institutions, foreign ones overreacted to the prospect of a Lula victory, which became increasingly likely after national broadcasting of campaign advertisements (and thus the official campaigning period) started in July 2002.[12]

Table 1 reports the results of tests of whether the differences between forecasts of locally and foreign-owned institutions in the August 2002 to February 2003 period are statistically significant. For each of the four target dates, we regressed the individual exchange rate forecasts against a foreign-owned institution dummy variable labeled *Foreign Dummy*. We include month effects, i.e., a different dummy variable for each month in which the forecast was made. This controls for the fact that we pool forecasts made at different months. We report standard errors that are robust to heteroskedasticity and clustered by forecasting

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[11] The figure for 12-months-ahead forecasts suggests that locally owned institutions became more bearish than foreign-owned ones a few months before August 2002, leading to smaller forecast errors in that period. However, apart from the end of 2003 and the end of 2004 forecasts made in July 2002, the figures for the other target dates do not show notable differences between local and foreign forecasts prior to August 2002.

[12] Based on the sticky-information model of Mankiw and Reis (2002) and the findings of Borensztein and Gelos (2003), one could be tempted to conclude that the forecast divergence between locals and foreigners might be attributed to greater rational inattention on the part of foreign forecasters. This view however is not warranted: while individual foreign forecasters changed their forecast in 77.5% of the months, locals did so in 78.3%.

institution.

TABLE 1

The OLS regressions in Panel A show that the divergence of forecasts between locally and foreign-owned institutions illustrated by Figures 2 through 5 was indeed statistically significant. *Foreign Dummy* is statistically significant for all target dates. Panel A results also indicate that the divergence of expectations is economically significant. For example, foreigners' estimates for the BRL price of 1 USD at the end of 2004 were on average 0.186 (BRL) cents above locals' estimates. Using the average USD/BRL spot exchange rate in the forecasting period (3.498), the 0.186 difference means that, relative to locals, foreigners on average forecasted a $0.186/3.498 = 0.053$ larger depreciation of the Brazilian Real.[13]

The median regressions in Panel B confirm the results of the OLS regressions in Panel A, since *Foreign Dummy* remains statistically significant for all target dates. This shows that the results in Panel A are not driven by a few outliers. In untabulated OLS regressions, we perform three additional robustness checks. First, we regress the log of the exchange rate forecasts and verify that *Foreign Dummy* remains statistically significant for all four forecasting target dates. Second, we add a dummy variable equal to 1 if the forecasting institution is a financial one, and equal to 0 otherwise. Results are unchanged: *Foreign Dummy* remains statistically significant for all four target dates, and the financial institution dummy variable is insignificant for all target dates. Third, we remove institutions with less than 6 forecasts in the January 2002 to June 2003 period from the sample and verify that the

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[13]Given their "Lulameter," it is interesting to check Goldman Sachs' forecasts for the BRL/USD exchange rate in October 2002. We collect forecasts in the October 8, 2002 and the November 12, 2002 editions of their Goldman's *Global FX Analyst* publication. In both editions, Goldman's forecasts for the BRL price of 1 USD 12 months in the future were 4.40. The average local and foreign forecasts were, respectively, 3.51 and 3.66 (October 2002) and 3.60 and 3.74 (November 2002). Goldman Sachs made much larger forecast errors than the average locally and foreign-owned institutions in our sample.

results are unchanged: *Foreign Dummy* remains statistically significant for all four target dates.

3   Foreign Trading Imbalances and Market Prices

It seems natural that the divergence of expectations between locally and foreign-owned institutions would generate trading activity in financial markets. In this section we document that financial market data are consistent with foreigners becoming relatively more pessimistic than locals ahead of the 2002 elections. Using data on trading imbalances in the Brazilian stock exchange (BOVESPA) and the Brazilian exchange rate futures market (BM&F), we document that foreigners were net sellers of Brazilian stocks and the Brazilian currency ahead of the elections (i.e., locals were net buyers).

Did the foreign sell-off exacerbate the depreciation of Brazilian equity and currency values? Admittedly, it is very hard to provide an unequivocal empirical answer to this question. In this section we test whether periods of stronger foreign sell-off (i.e., local buys) are associated with larger equity and currency declines. If foreign sales were unrelated to returns, the case for a worsening of price declines caused by foreign selling would be much weaker.[14] However, we find that periods of stronger foreign sell-off were indeed associated with larger equity price declines and larger depreciation of the Brazilian Real in spot and futures markets. Coupled with the survey results, this suggests that foreign trading exacerbated the decline in Brazilian equity and currency values during the crisis.

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[14]This is what Choe, Kho, and Stulz (1999) report. They state on page 231: "During the last three months of 1997 [the crisis period], days with large foreign net selling do not have significant market-adjusted returns; even raw returns on these days are not significantly negative. There is therefore no convincing evidence that foreign investors play a destabilizing role."

3.1 Stock Market

The BOVESPA Stock Exchange classifies each participant in a stock trade as a domestic or a foreign trader. The exchange divulges data on the BRL amount transacted by each type of trader in both stock purchases and stock sales separately. The data is aggregated across all stocks in non-overlapping 10-day periods adding up to 36 periods per year.[15] We construct a *Foreign Buys-Sells* trading imbalance variable by subtracting the total BRL volume of sells by foreigners from the total BRL volume of buys by foreign investors in a given 10-day period. The variable is in billions of BRL. Figure 6 plots *Foreign Buys-Sells* and the corresponding level of the IBOVESPA Stock Index from January 2002 to December 2003.

FIGURE 6

Figure 6 shows that, on average, *Foreign Buys-Sells* is negative during the sample period. In particular, there was a sequence of large net foreign sales from mid-May to early October 2002, coinciding with a steep decline in the IBOVESPA Stock Index from about $12,500$ to about $8,500$. Using the total BRL trading volume on the exchange in that period, we calculate that, on average in that period, foreign sells and foreign buys represented, respectively, 29.9% and 24.8% of all trades. Thus, excess foreign sales accounted for 5.1% of total trading volume at BOVESPA from mid-May to early October 2002. The foreign sell-off of Brazilian equity is consistent with foreigners becoming relatively more pessimistic than locals about the Brazilian economy, as indicated by survey data.

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[15]Naturally, the total BRL volume of buys aggregated across trader types in a given period is equal to the total BRL volume of sells aggregated across trader types in the same period.

Table 2 below examines the relation between *Foreign Buys-Sells* and contemporaneous stock returns and percent changes in the USD price of 1 BRL. We label these variables *IBOVESPA Returns* and *BRL Appreciation*, respectively. We study the relation between these variables both in 2002, a period in which markets were influenced by the presidential elections, as well as in the more tranquil period of 2003-2004.

TABLE 2

The first two columns of Table 2 show that, during 2002, periods of high foreign sales of equity to locals were associated with larger declines in Brazilian stock prices and the Brazilian currency. The R^2s of the univariate regressions are 0.47 and 0.30, respectively. These results are consistent with the emergence of the relative pessimism of foreigners, prompting them to sell Brazilian equity to locals, thus exerting downward pressure on stock prices. Moreover, in order to repatriate the proceeds of the stock sales, foreigners need to buy USD in the local spot market. Large repatriation trades following stock sales, plus possibly other correlated foreign purchases of dollars, may have exerted downward pressure on the Brazilian Real. This is consistent with the positive correlation between *Foreign Buys-Sells* and *BRL Appreciation* shown in Table 2.

Admittedly, the results in Table 2 in isolation do not allow us to conclude that foreign selling exacerbated equity depreciation during the 2002 Brazilian crisis. It is possible that bad public news about the Brazilian economy drove both equity declines and foreign sales (i.e., local buys). In this case, equity declines would have been the same had foreigners not sold equity, because price changes would only reflect the incorporation of public information into prices.

For example, Brennan and Cao (1997) propose an elegant model in which foreign investors receive less precise information than local investors, and in which *Foreign Buys-Sells* can be either positively or negatively correlated with contemporaneous returns. The sign of the correlation critically depends on whether the foreign information disadvantage arises from less precise signals received in the current period or from an accumulation of less precise signals received in the past. In the latter case, Brennan and Cao's theory can explain the positive contemporaneous correlation between *Foreign Buys-Sells* and *IBOVESPA returns* documented by us without our contention that the foreign sell-off contributed to the sharp decline in Brazilian asset values.

However, our evidence includes not only the regressions in Table 2 but also the survey data previously discussed, and perhaps the anecdotal evidence provided by the *New York Times* article (Romero 2002). Survey data show that foreigners became relatively more pessimistic than locals ahead of the 2002 elections. This relative change in beliefs is consistent with the overall foreign sales documented here and the correlation between *Foreign Buys-Sells* and *IBOVESPA returns* shown in Table 2. Integrating the survey and regression results, the evidence suggests that foreign sales during the crisis exacerbated equity declines; i.e., equity declines would have been smaller had foreigners not become more pessimistic than locals and sold equity accordingly.[16]

In the last two columns of Table 2 we provide additional evidence that the 2002 period, marked by the emergence of foreign pessimism, was indeed different from other, less turbu-

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[16]Note that the survey results are inconsistent with Brennan and Cao's (1997) theory. In their model, noise in signals is uncorrelated across investors. Therefore, expectations averaged across (large) groups of investors are identical because noise cancels out. That is, even though foreigners in Brennan and Cao's (1997) model have larger confidence intervals around their expectations, on average they hold the same point estimates as locals. See Rubinstein (1974) and Dunne, Hau, and Moore (forthcoming) for models in which (exogenous) relative changes in beliefs drive trading and asset prices.

lent periods. The table shows that, in the non-crisis 2003-2004 period, *Foreign Buys-Sells* was much less contemporaneously correlated with both *IBOVESPA Returns* and *BRL Appreciation* than during 2002. The R^2s of the univariate regressions drop from 0.47 and 0.30 to 0.08 and 0.01, respectively. More important, the slope coefficient in the non-crisis period (0.039) is five times smaller than the slope coefficient during 2002 (0.183), meaning that for a foreign net sale of a given BRL size, contemporaneous stock price declines were much more modest in 2003-2004 compared to 2002. This suggests that the mechanism by which foreign imbalances are correlated with stock returns was different in 2002 compared to other, more tranquil periods.

3.2 Futures Exchange

In this section we repeat the analysis of the previous section using data from the BRL/USD market at the Brazilian BM&F futures exchange rather than stock market data.[17] The exchange classifies each position (long or short) as being held by a local or a foreign trader. For each future contract type, the exchange divulges the total number of long positions and the total number of short positions for each type of trader each day.[18] We add the foreign net (long BRL) position across all BRL/USD future contracts in a given day. In Figure 7 we plot the time evolution of the resulting Foreign Net BRL position (in USD billion) and compare it to the evolution of the BRL price of 1 USD according to the futures contract of the nearest maturity. Note that foreigners held a negative net long position in BRL during

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[17]As Ventura and Garcia (2009) explain, the Brazilian exchange rate futures market is particularly important because regulatory restrictions prevent many agents from trading in the spot market. As a result, the futures market, especially the nearest maturity contract, has higher trading volume and narrower bid-ask spreads than the spot market. Moreover, Ventura and Garcia (2009) provide evidence that price discovery tends to happen in the futures market and then be transmitted to the spot market by arbitrage.

[18]Naturally, for each futures contract type at any given time, the total number of long positions is equal to the total number of short positions.

2002; i.e., they were short BRL in the BM&F futures market. This is consistent with a structural desire to hedge the exchange rate exposure of investments in Brazil.

FIGURE 7

Figure 7 shows that foreigners increased their short BRL position throughout 2002, reaching a peak of about \$1.7 billion USD by October 2002. The increase in foreign short positions coincides with a sharp depreciation in the Brazilian currency in the futures market and is consistent with the emergence of foreign pessimism found in survey data.

Table 3 reports the results of our investigation of the relation between changes in the foreign net BRL long position, labeled *Changes in Net Foreign BRL Position*, and changes in the future USD-denominated price of 1 BRL for the nearest maturity future contract, labeled *BRL Appreciation*. Apart from month-ends when the nearest maturity futures contract expires and thus both long and short positions in that contract expire, *Changes in Net Foreign BRL Position* is positive on days in which foreigners buy more BRL in the futures market than they sell. We add a *New Month Dummy* variable to the right-hand side of the regression equation to account for the expiration of the nearest maturity future contract, which changes the future contract used in the calculation of *BRL Appreciation*.

TABLE 3

The first column of Table 3 shows that *Changes in Net Foreign BRL Position* is positively associated with *BRL Appreciation* in the futures market in 2002. This is consistent with the

foreign sell-off of Brazilian currency in the futures market, driven by the emergence of foreign pessimism, exerting downward pressure on the Brazilian Real. Once again, the trading and price change data alone do not allow us to unequivocally state that foreign trading exacerbated the depreciation of the Brazilian currency in the futures market. However, this seems to be the most reasonable explanation, given the evidence from survey data.

The second column of Table 3 examines the relation between *Changes in Net Foreign BRL Position* and *BRL Appreciation* in the more tranquil 2003-2004 period. The table shows that both are still positively correlated. However, similar to the evidence from the stock market, the slope coefficient in 2003-2004 is much smaller compared to 2002. Thus, data on exchange rate futures also suggest that the mechanism by which foreign imbalances are correlated with price changes was different in 2002 compared to less turbulent periods. Our contention is that the emergence of foreign pessimism shown in survey data caused excess foreign sales to locals, which caused equity and currency values to depreciate beyond what would have obtained had foreigners held the same expectations as locals.

4   Concluding Remarks

Particularly in young democracies, political factors can dominate economic scenarios during election times. If the political preferences of parties and leaders are not common knowledge, expectations of market participants may diverge. In particular, foreign investors may be prone to forming excessively pessimistic expectations when faced with uncertain political preferences. To the extent that short-term capital inflows finance a large portion of local long-term investment projects, these pessimistic expectations may become self-fulfilling and

precipitate a financial crisis.

We use survey data on exchange rate expectations of major players in the Brazilian market to show that, relative to locally owned institutions, foreign-owned institutions became excessively pessimistic ahead of the 2002 presidential elections. Foreign pessimism led to larger forecast errors. Consistent with the emergence of foreign pessimism, foreign investors heavily sold Brazilian equity and Brazilian currency ahead of the elections, likely contributing to the sharp depreciation in equity and currency values in that period. While our results do not settle the debate concerning the relative importance of local macroeconomic fragilities versus foreign investors' panic in explaining emerging market crises, the additional data point we provide helps to strengthen the latter factor vis-à-vis the former one.

References

Alesina, A. and G. Tabellini (1989) External debt, capital flight and political risk. *Journal of International Economics* 27, 199-220.

Andrade, S.C. (2009) A model of asset pricing under country risk. *Journal of International Money and Finance* 28(4), 671-695.

Bacchetta, P., E. Mertens, and E. van Wincoop (2009) Predictability in financial markets: What do survey expectations tell us? *Journal of International Money and Finance* 28(3), 406-426.

Bacmann, J-F. and G. Bolliger (2001) *Who are the Best? Local Versus Foreign Analysts on Latin American Stock Markets.* EFMA 2002 London Meetings.

Bae, K.H., Stulz, R.M. and H.P. Tan (2008) Do local analysts know more? A cross-country study of the performance of local analysts and foreign analysts. *Journal of Financial Economics* 88, 3, 581-606.

Berger, H., M. Ehrmann, and M. Fratzscher (2009) Forecasting ECB monetary policy: Accuracy is (still) a matter of geography. *European Economic Review* 53(8), 1028-1041.

Bhagwati, J. (1998) The capital myth: The difference between trade in widgets and dollars. *Foreign Affairs* 77(3), 7-12.

Block, S., and P. Vaaler (2004) The price of democracy: Sovereign risk ratings, bond spreads and political business cycles in developing countries. *Journal of International Money and Finance* 23, 917-46.

Bonomo, M.A. and M.C. Terra (2005) Elections and exchange rate policy cycles. *Economics and Politics* 17, 151-176.

Borensztein, E.R., and R.G. Gelos (2003) A panic-prone pack? The behavior of emerging market mutual funds. *IMF Staff Papers* 50(1):*43-63.*

Brennan, M.J. and H.H. Cao (1997) International portfolio investment flows. *Journal of Finance* 52(4), 1851-1880.

Broner, F., R.G. Gelos, and C.M. Reinhart (2006) When in peril, retrench: Testing the portfolio channel of contagion. *Journal of International Economics* 69(1), 203-230 .

Calvo, G.A., and E. Mendoza (2000a) Capital-market crises and economic collapse in emerging markets: An informational-frictions approach. *American Economic Review,* 59-64.

Calvo, G.A., and E. Mendoza (2000b) Rational contagion and the globalization of securities markets. *Journal of International Economics* 51, 79-113.

Calvo, G.A. (2005) *Emerging Markets in Turmoil: Bad Luck or Bad Policy?* MIT Press.

Cavaglia, S., W.F.C. Verschoor, and C.C.P. Wolff (1994) On the biasedness of forward foreign exchange rates: Irrationality or risk premia. *Journal of Business* 67(3), 321-343.

Cavaglia, S., W.F.C. Verschoor, and C.C.P. Wolff (1993) Further evidence on exchange rate expectations. *Journal of International Money and Finance* 12(1), 78-98.

Chang, R. (forthcoming) Elections, capital flows, and politico economic equilibria. *American Economic Review*

Chang, R. (2006) Electoral uncertainty and the volatility of international capital flows. Working Paper, Rutgers University.

Chang, R. (2007) Financial crises and political crises. *Journal of Monetary Economics* 54(8), 2409-2420.

Chang, R. and A. Velasco (2001) A model of financial crises in emerging markets. *Quarterly Journal of Economics* 116, 489-517.

Cherian, J.A. and E. Perotti (2001) Option pricing and foreign direct investment under political risk. *Journal of International Economics* 55(2), 358-377.

Chinn, M. and J. Frankel (1994) Patterns in exchange-rate forecasts for 25 currencies. *Journal of Money, Credit and Banking* 26(4), 759-770.

Choe, H., B. Kho, and R.M. Stulz (1999) Do foreign investors destabilize stock markets? The Korean experience of 1997. *Journal of Financial Economics* 54, 227-264.

Choe, H., B. Kho, and R.M. Stulz (2005) Do domestic investors have an edge? The trading experience of foreign investors in Korea. *Review of Financial Studies* 18, 3.

Cole, H.L. and T.J. Kehoe (1996) A self-fulfilling model of Mexico's 1994-1995 debt crisis. *Journal of International Economics* 41, 309-330.

Cole, H.L. and T.J. Kehoe (2000) Self-fulfilling debt crises. *Review of Economic Studies* 67, 91-116.

Dunne, P., H. Hau, and M. Moore (forthcoming) International order flows: Explaining equity and exchange rate returns. *Journal of International Money and Finance*

Dvorak, T. (2005) Do domestic investors have an informational advantage? Evidence from Indonesia. *Journal of Finance* 60(2), 817-839.

Elliott, G. and T. Ito (1999) Heterogeneous expectations and tests of efficiency in the yen/dollar forward market. *Journal of Monetary Economics* 43(2), 435-456.

Frankel, J.A. and K.A. Froot (1987) Using survey data to test standard propositions regarding exchange rate expectations. *American Economic Review* 77(1), 133-153.

Frankel, J.A. and S.L. Schmukler (1996) Country fund discounts and the Mexican crisis of 1994: Did local residents turn pessimistic before international investors? *Open Economies Review* 7 (Supplement 1), 551-64.

Frankel, J.A. and S.L. Schmukler (2000) Country funds and asymmetric information. *International Journal of Finance and Economics* 5, 177-95.

Froot, K.A., P. O'Connell, and M. Seasholes (2001) The portfolio flows of international investors. *Journal of Financial Economics* 59, 151-193.

Froot, K.A. and T. Ramadorai (2008) Institutional portfolio flows and international investments. *Review of Financial Studies* 21(2), 937-971.

Griffin, J.M., F. Nardari, and R.M. Stulz (2004) Are daily cross-border equity flows pushed or pulled? *Review of Economics and Statistics* 86(3), 641-657.

Harris, M. and A. Raviv (1993) Differences of opinion make a horse race. *Review of Financial Studies* 6(3), 473-506.

Hau, H. (2001) Location matters: An examination of trading profits. *Journal of Finance* 56, 1959-1983.

Ito, T. (1990) Foreign exchange rate expectations: micro survey data. *American Economic Review* 80(3), 434-449.

Kaminsky, G. (2006) Currency crises: Are they all the same? *Journal of International Money and Finance* 25, 503–527.

Kaminsky, G., R.K. Lyons, and S.L. Schmukler (2004) Managers, investors, and crises: mutual fund strategies in emerging markets. *Journal of International Economics* 64, 113-34.

Kandel, E. and N.D. Pearson (1995) Differential interpretation of public signals and trade in speculative markets. *Journal of Political Economy* 103, 831-72.

Kaufmann, D., G. Mehrez and S.L. Schmukler (2005) Predicting currency fluctuations and crises: Do resident firms have an informational advantage? *Journal of International Money and Finance* 24, 1012-29.

Kim, W. and S.J. Wei (2002a) Offshore investment funds: Monsters in emerging markets? *Journal of Development Economics* 68, 205-224.

Kim, W. and S.J. Wei (2002b) Foreign portfolio investors before and during a crisis. *Journal of International Economics* 56, 1, 77-96.

Koedijk, K.G., and C.C.P. Wolff (1996) Exchange rate returns, "news," and risk premia. *Economics Letters* 50(1), 127-134.

Kyle, A. (1985) Continuous auctions and insider trading. *Econometrica* 53, 1315-1336.

Leblang, D. and S. Satyanath (2008) Politically generated uncertainty and currency crises: theory, tests and forecasts. *Journal of International Money and Finance* 27, 480-97.

Leland, H.E. (1980) Who should buy portfolio insurance? *Journal of Finance* 35(2), 581-594.

MacDonald, R.M. and I.W. Marsh (1996) Currency forecasters are heterogenous: Confirmation and consequences. *Journal of International Money and Finance* 15(5), 665-685.

Mankiw, N.G. and R. Reis (2002) Sticky information versus sticky prices: A proposal to replace the New Keynesian Phillips curve. *Quarterly Journal of Economics* 177 (4): 1295-1328.

Marques, A.B.C., P. Fachada and D.C. Cavalcanti (2003) *Banco Central System of Market Expectations*. Banco Central do Brasil Technical Note n. 36. [in Portuguese].

Martinez, J., and J. Santiso (2003) Financial markets and politics: The confidence game in Latin American emerging economies. *International Political Science Review* 24(3), 363-395.

Masson, P.R. (1999) *Multiple Equilibria, Contagion, and the Emerging Market Crises.* IMF WP/99/164.

Menkhoff, L. and M. Schmeling (2008) Local information in foreign exchange markets. *Journal of International Money and Finance* 27, 1383-1406.

Moretti, E. and D.S. Lee (2009) Bayesian learning and the pricing of new information: Evidence from prediction markets. *American Economic Review* 99(2), 330-336.

Obstfeld, M. (1986) Rational and self-fulfilling balance-of-payments crises. *American Economic Review* 76, 72-81.

Obstfeld, M. (1996) Models of currency crises with self-fulfilling features. *European Economic Review* 40, 1037-1047.

Radelet, S. and J. Sachs (1998) The onset of the East Asian financial crisis. NBER Working Paper 6680.

Richards, A. (2005) Big fish in small ponds: The trading behavior and price impact of foreign investors in Asian emerging equity markets. *Journal of Financial and Quantitative Analysis* 40(1), 1-27.

Rodrik, D. (1998) Who needs capital account convertibility? Working Paper, Harvard University.

Romero, S. (2002) Analyts remain sharply divided on outlook for Brazil. *New York Times* 12 October 2002.

Rubinstein, M. (1974) An aggregation theorem for securities markets. *Journal of Financial Economics* 1, 225-344.

Sachs, J., A. Tornell, and A. Velasco (1996) The Mexican peso crisis: Sudden death or death foretold? *Journal of International Economics* 41, 265-283.

Stiglitz, J. (1998) Boats, planes, and capital flows. *Financial Times*, March 25.

Tenengauzer, D. (2002) The Lulameter. *Emerging Markets Strategy* 02/10, 10-12. Goldman Sachs Report.

Ventura, A. and M. Garcia (2009) Mercados futuro e à vista de cambio no Brasil: O rabo balanca o cachorro. [Exchange rate futures and spot market in Brazil: The tail wags the dog]. PUC-Rio Working Paper. [in Portuguese].

Wang, J. (2007) Foreign equity trading and emerging market volatility: Evidence from Indonesia and Thailand. *Journal of Development Economics* 84(2), 798-811.

Table 1: Local vs. Foreign Forecasts of the BRL price of 1 USD

Table has results of regressions of forecasts of the BRL price of 1 USD 12- months ahead, or at the end of 2003, 2004, or 2005. Forecasts were made in the August/2002 to February/2003 period. Panel A has OLS regressions and Panel B has median regressions. *Foreign Dummy* is equal to 1 if the forecasting institution is foreign-owned, and 0 if it is locally owned. *Month Effects* represent a dummy variable for each of the 7 months in the sample period. OLS standard errors are robust to heteroskedasticity and clustered at the forecasting institution level. Median regression standard errors are bootstrapped 10,000 times with clustering at the forecasting institution level. *, **, and *** represent significance at the 1%, 5%, and 10% level respectively.

Panel A. OLS Regressions

	12 months ahead	End of 2003	End of 2004	End of 2005
Foreign Dummy	0.100 *	0.092 *	0.186 **	0.243 **
	(1.84)	(1.80)	(2.20)	(2.16)
Month Effects	yes	yes	yes	yes
Number of Forecasts	367	448	338	279
Number of Forecasters	82	85	67	54
R^2	0.49	0.46	0.39	0.33

Panel B. Median Regressions

	12 months ahead	End of 2003	End of 2004	End of 2005
Foreign Dummy	0.128 **	0.100 **	0.200 **	0.250 *
	(2.56)	(1.97)	(1.97)	(1.91)
Month Effects	yes	yes	yes	yes
Number of Forecasts	367	448	338	279
Number of Forecasters	82	85	67	54
Pseudo-R^2	0.31	0.32	0.27	0.24

Table 2: Foreign Trading Imbalances at BOVESPA and Changes in Market Prices
Table has results of regressions of changes in market prices on contemporaneous trading imbalances at the BOVESPA Stock Exchange. Imbalances and market price changes are for non-overlapping 10-day periods. Percent changes in the IBOVESPA Stock Level are labeled *IBOVESPA Returns* and percent changes in the USD price of 1 BRL are labeled changes *Brazilian Real Appreciation. Foreign Buys-Sells*, the foreign trading imbalance at BOVESPA, is denominated in BRL billions. Standard errors are robust to heteroskedasticity. There is no evidence of autocorrelation of residuals. *, **, and *** represent significance at the 1%, 5%, and 10% level respectively.

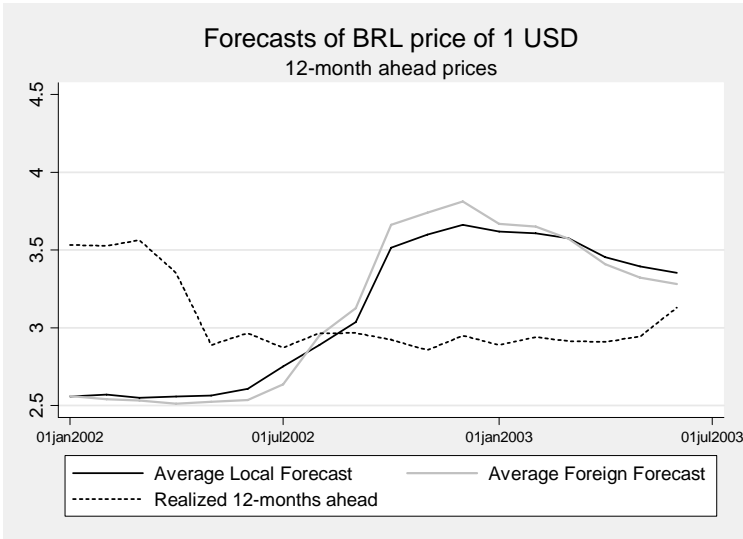|	Jan/2002 - Dec/2002		Jan/2003 - Dec/2005	
	IBOVESPA returns	BRL Appreciation	IBOVESPA returns	BRL Appreciation
Foreign Buys-Sells	0.183 ***	0.135 ***	0.039 **	0.007
	(5.54)	(3.23)	(2.17)	(1.00)
Constant	0.004	-0.005	0.008	0.003
	(0.54)	(-0.66)	(1.33)	(1.18)
N	0.47	0.30	0.08	0.01
R^2	36	36	72	72

Table 3: Changes in Foreign Net USD Position at BM&F and Changes in Market Prices

Table has results of regressions of daily percent changes in the USD price of 1 BRL. The price is the end-of-day settlement price for the nearest maturity future contract at the BM&F futures exchange. *Change in Foreign Net USD Position* is denominated in USD billion, and includes exchange rate futures contracts of all maturities. *New Month Dummy* is equal to 1 at the first trading day of each month, when the contract defined as the "nearest" changes. Standard errors are robust to heteroskedasticity. There is no evidence of autocorrelation of residuals. *, **, and *** represent significance at the 1%, 5%, and 10% level respectively.
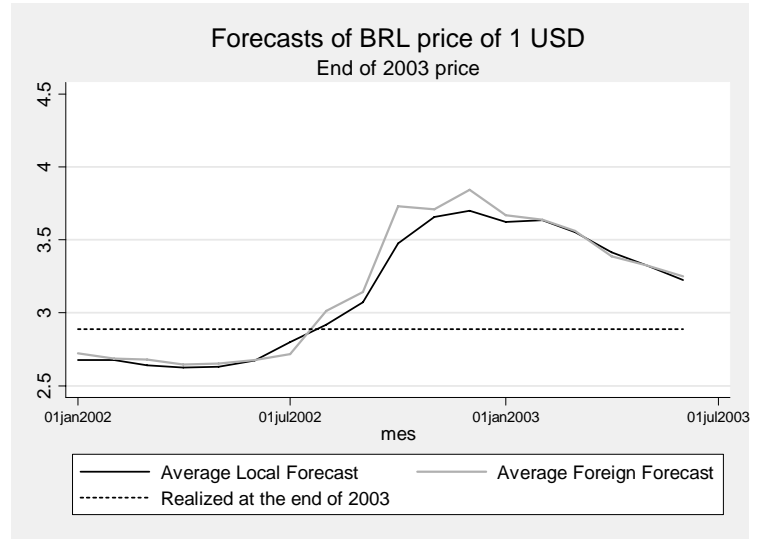
	Jan/2002 - Dec/2002	Jan/2003 - Dec/2005
	BRL appreciation (nearest future contract)	BRL Appreciation (nearest future contract)
Change in Foreign Net BRL Position	0.046 ***	0.017 ***
	(6.21)	(9.69)
New Month Dummy	0.011	-0.011 ***
	(0.74)	(-4.11)
Constant	-0.002 **	0.001 **
	(-2.19)	(3.17)
N	248	499
R^2	0.16	0.26

12-months ahead

Forecasts of BRL price of 1 USD
12-month ahead prices

End of 2003

Forecasts of BRL price of 1 USD
End of 2003 price

End of 2004

Forecasts of BRL price of 1 USD
End of 2004 price

End of 2005

Forecasts of BRL price of 1 USD
End of 2005 price

Figure 5. Foreign Trading Imbalances at BOVESPA

BOVESPA: Foreign Buys-Sells and Index Level
(non-overlapping 10-day periods)
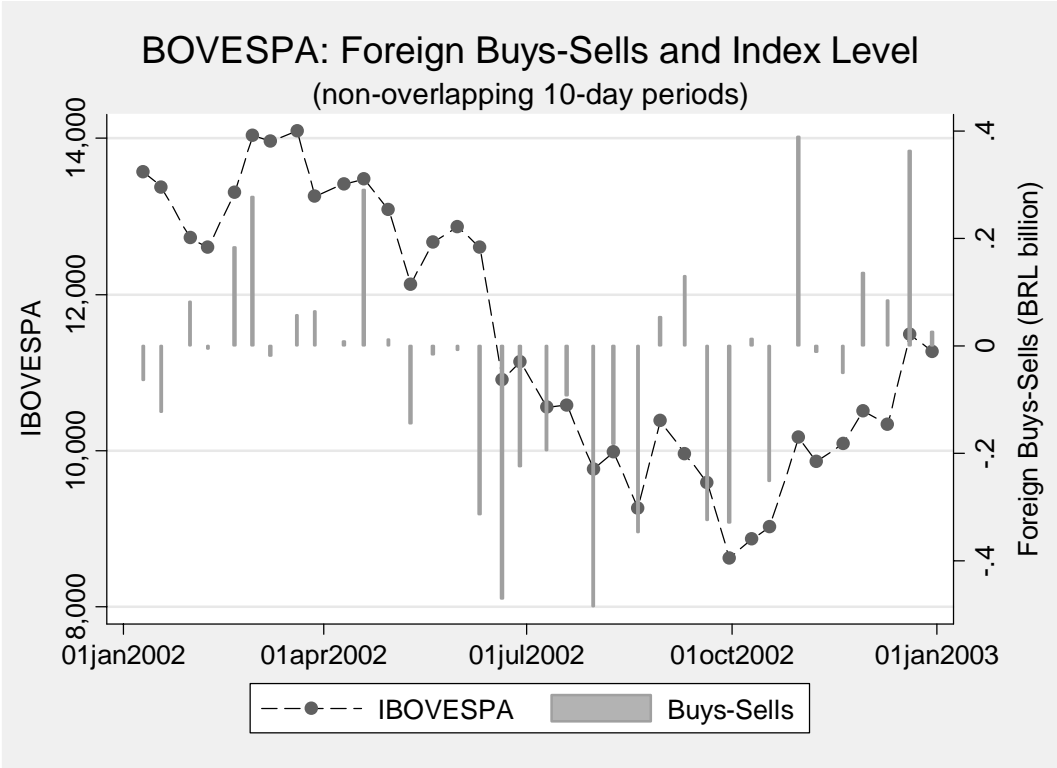
Figure 6. Foreign Net BRL Position at BM&F's Exchange Rate Futures Market

BM&F: Foreign Net USD Position and USD Future Price
(future price is for nearest maturity contract)