Cross-Border Trading as a Mechanism for Capital Flight: ADRs, CEDEARs and the Argentine Crisis

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Abstract

This paper examines the surprising performance of the Argentine stock market in the midst of the country's most recent financial crisis and the role played by cross-listed stocks in Argentine capital flight. Although Argentine investors were subject to capital controls, they were able to purchase cross-listed stocks for pesos in Argentina, convert them into dollar-denominated shares, re-sell them in New York and deposit the dollar proceeds in U.S. bank accounts. In the paper we show that: (1) ADR discounts went as high as 45% (indicating that Argentine investors were willing to pay significant amounts in order to legally move their funds abroad), (2) the implicit peso-dollar exchange rate on the eve of the devaluation anticipated a 42% fall in the value of the peso relative to the dollar, (3) local market factors in Argentina became more important in pricing peso denominated stocks with associated ADRs, while the same stocks in New York were mainly priced based on global factors, (4) capital outflow using the ADR and CEDEAR markets was substantial (our estimate for ADRs is between $835 million and $3.4 billion) .

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"In the emerging Markets, the star performance came from Argentina. The Merval rose 25.6%. This rise occurred when the country's fundamentals took a distinct turn for the worse. Draconian capital controls were introduced to preempt a massive build-up of capital flight... The reason the market is going up is simply that the stock market is seen as a way of protecting assets and a means, by ADR conversion, of getting money out of Argentina." Investavenue.com, December 10, 2001.

"Buenos Aires' normally sleepy stock exchange jumped 25% in the week following Cavallo's announcement. The short-lived rally was prompted by investors who loaded up on shares in a handful of Argentine blue chips, then converted them into their corresponding American depositary receipts, sold them on the New York Stock Exchange for dollars, and parked the proceeds abroad. Since few U.S. investors want these shares, Argentines have to sell their ADRs at a loss. But apparently those in search of a safe haven for their money are willing to pay a price". Argentines Dust Off Their Survival Skills: They're using a vast array of tricks to outwit capital controls, Business Week, December 24, 2001.

1. Introduction

In December 2001, after a decade of open capital markets, the Argentine government imposed a series of financial market controls in an ultimately unsuccessful bid to forestall economic crisis. This paper studies the impact of these controls on four aspects of Argentine financial markets. First, we document how Argentine investors were able to transfer dollars abroad using cross-listed securities and thereby circumvent the intent, if not the letter, of the capital control laws. Second, we study the role these controls played in limiting financial market arbitrage for cross-listed securities. Third, we show that the Argentine stock market served as a shadow foreign exchange market during the capital control regime, which in turn, allows us to back out the market's implicit forecast of the size of the devaluation. And fourth, we test whether the imposition of controls led to changes in the underlying pricing structure of cross-listed stocks priced in pesos in Argentina and in dollars in New York.

Although the exact timing and causes of Argentina's economic fall from grace are contentious, there is little disagreement that by the last quarter of 2001 Argentina was on the brink of a full-scale collapse.[1] Between July and November 2001, Argentines withdrew over $15 billion from banks -- on November 30, 2001

[1] Mussa (2002) makes the case that the persistent inability of the Argentine government to run responsible fiscal policy was the primary cause of the economic collapse. Others point to the deleterious effects of an over-valued currency on exports (see, for example, Feldstein (2002)) and the sudden stop in foreign capital inflows (Calvo, Izquierdo, and Talvi (2002)).

alone, banks saw withdrawals of $1.3 billion. On December 3rd, in a desperate effort to prevent further massive capital outflows, financial market controls were established (these are known as the "Corralito"), which among other restrictions, imposed a ceiling of $1,000 a month on bank withdrawals.[2] In January the Argentine peso was officially devalued, all bank deposits and debts were "pesofied", and U.S. dollar accounts were no longer permitted.

In contrast to the experiences of other emerging markets, the crisis appears to have been "good news" for the Argentine stock market.[3] Figure 1 shows the stock market indices (denominated in dollars) in Argentina, Malaysia, Mexico and Thailand during their respective financial crises.[4] The stock markets in Malaysia, Mexico and Thailand stagnated in the weeks preceding their currency devaluations, and then sharply declined after devaluation. While the market in Argentina was also in a slump two months before the devaluation, the *Corralito* triggered a 50 percent expansion of the market. One interpretation of the stock market run up in Argentina is that for some reason investors viewed the likely devaluation of the peso as beneficial for firms, whereas in other countries such crises are generally harmful.[5] The contention of this paper, however, is that the idiosyncratic reaction of the Argentine stock market was largely due to the specific restrictions in the *Corralito* which allowed investors to use their frozen bank deposits to purchase stocks listed on the Argentine exchange, and, in so doing, provided a legal mechanism for transferring funds abroad via cross-listed securities.

[Figure 1 here]

The two types of cross-listed securities we examine are American Depositary Receipts (ADRs) and Certificados de Depositos Argentinos (CEDEARS). ADRs are shares of non-U.S. (in this case Argentine) corporations sold in the U.S (and denominated in dollars).[6] CEDEARs are shares of non-Argentine firms (mostly

[2] A literal translation of "Corralito" is little corral. It is also the word for "playpen."

[3] It is interesting to note that the Argentine stock market began its upturn when the *Corralito* was first imposed on December 3rd, and then rose even higher after President De La Rua and Finance Minister Domingo Cavallo resigned (December 19 and 20th) when expectations of an impending devaluation intensified. It was not until after the announcement of the devaluation (on January 7th) that the stock market, measured in US dollars, began its decline.

[4] The vertical line on the figure marks the corresponding devaluation date for each country. The flat intervals in the plot indicate periods when the Argentine market was closed.

[5] See, for example, Forbes (2002).

[6] Although Depositary Receipts (DRs) can be issued in a number of markets, all of the cross-listed firms from Argentina issued DRs in the United States; consequently, we will refer to Argentine cross-listed shares as ADRs.

U.S. firms) that are cross-listed on the Argentine exchange and sold for pesos.[7] The discounts we find on cross-listed stocks suggest that Argentine investors were willing to pay a substantial price to move their deposits out of Argentina through the conversion of local shares to shares abroad. At their peak, some ADRs were trading at a discount of in excess of 45 cents on the dollar. A rough estimate is that ADR transactions alone resulted in a capital outflow of roughly $835 million to $3.4 billion between December 1, 2001 and May 31, 2002.

There is an extensive literature on ADRs and their role in the global integration of financial markets (see, for example, the survey by Karolyi (1998)). Cross-listing of foreign stocks on U.S. exchanges allows firms in foreign markets to enjoy the advantages of greater liquidity, transparency and access to the U.S. capital market.[8] From the perspective of U.S. investors, ADRs are a convenient way of obtaining global diversification.[9] Cross-listing of U.S. stocks on other exchanges, such as CEDEARs, has not been as widely studied but this type of activity clearly provides the same sorts of diversification benefits to local investors. The unusual set of circumstances in Argentina surrounding the *Corralito* give cross-listed securities a new, and previously unstudied, role as a mechanism for capital flight.[10]

A general message of our analysis is that once having established ADRs and other kinds of contractual arrangements across markets, it may be difficult if not impossible to reverse the process of capital market integration with (even draconian) capital controls. Although the exact set of circumstances that existed in Argentina are unlikely to occur elsewhere, the recent dramatic increase in the number of ADRs issued by firms in emerging markets suggests that capital control measures may become a less viable policy tool for governments in the midst of financial market crisis. Indeed, as of the time of this writing, Venezuela is experiencing financial turmoil, has imposed capital controls and until the ADR loophole was closed, investors were trading heavily in home shares with underlying ADRs on the local exchange.

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[7] Most CEDEARs are issued by Deustche Bank, which acts as the depositary bank, and is the only authorized institution that can transform CEDEARs back into shares sold on U.S. exchanges.

[8] See, for example, Alexander, Eun and Jankiramanan (1987), Foerster and Karolyi (1999), Miller (1999), Ahearne, Griever, and Warnock (2001), and Doidge, Karolyi and Stulz (2002).

[9] See, for example, Officer and Hoffmeister (1987), Wahab and Khandala (1993), and Jiang (1998). Domovitz, Glen and Madhavan (1997), Errunza, Hogan and Hung (1999), and Karolyi and Stulz (2002) examine the broader influences of ADR programs on the development and integration of markets.

[10] Melvin (2002) also documents the unusual behavior of the Argentine stock market and the role of ADRs during the *Corralito* period.

The paper is organized as follows. Section 2 provides details about the specific restrictions of the *Corralito* and defines the arbitrage premium/discount between local and U.S. ADR prices. Section 3 examines the behavior of non-cross-listed and cross-listed returns pre- and post-*Corralito* and calculates arbitrage bounds for cross-listed securities based on the transactions costs that U.S. and Argentine investors faced during the December 2001 to July 2002 period. We then use the cross-listed security premium to estimate the market's expectation of the devaluation. Section 4 examines the market factors that influenced cross-listed portfolio returns in New York and Argentina before and after the imposition of the *Corralito*. And section 5 concludes.

2. ADRs, CEDEARs, the Corralito, and the Argentine Stock Market

In principle the performance of the Argentine stock market in the pre-devaluation period is puzzling. Just one month before a widely anticipated devaluation of the peso and in the midst of a staggering financial crisis with massive capital outflows and bank runs, the stock market was booming. To place the recent performance of the stock market in some perspective, Figure 2 shows Argentina's stock market index, the Merval, in pesos and U.S. dollars, from January 1990 to April 2002. Argentina's currency board was established in March 1991, triggering a stock market boom that lasted until June 1992. The market was negatively affected by the Mexican crisis in late 1994, and again by the Asian crisis in 1997, but stayed well above its pre-March 1991 level. Beginning in early 2000, however, the market began a steady decline, sliding down to levels not seen in a decade.

[Figure 2 here]

2.1 The Corralito

By mid-2001, years of stagnating economic growth, lagging exports, weak banks and mounting fiscal deficits had taken their toll. In October negotiations over a bailout package with the IMF failed and Argentina was on the brink of financial collapse. To stave off a run on banks and a speculative attack on the peso, on December 1, 2001 Finance Minister Cavallo announced a series of restrictions on bank withdrawals and dollar transfers abroad. Under the *Corralito*, depositors were limited to withdrawals of 250 pesos per week per account[11] but could

[11] Perhaps unsurprisingly there was a sudden increase in the number of new bank accounts in early December. The government promptly changed the regulations so that the deposit limits applied per person rather than per account. According to the press, some 500,000 accounts were opened in the two days following the imposition of bank restrictions.

access their accounts to transfer funds within the banking system.[12] Wire transfers required Central Bank approval, foreign currency futures transactions were prohibited, and in effect, all investors, foreign and domestic, were prohibited from transferring funds abroad. The restrictions were announced as temporary measures that would remain in place until the danger of the speculative attack had passed.

The *Corralito*, did not, however, restrict investors from trading Argentine securities including those that were cross-listed on another market. Indeed, to do so would have seriously destabilized the local market as it would have prevented investors from trading in some of the largest and most liquid stocks on the market. The ADR[13] "loophole" worked as follows: Argentine residents were allowed to use bank deposits in excess of the $1,000 monthly ceiling to purchase Argentine stocks. If a stock happened to be cross-listed in another country those shares could be legally converted from Argentine shares into ADRs. The ADRs could then be sold in the United States and the dollar proceeds deposited in a U.S. account. Under normal circumstances the dollar proceeds would appear in the Argentine Balance of Payments as a capital inflow, as U.S. residents have acquired claims on Argentine firms. Under the *Corralito*, however, the capital inflows did not occur, and the dollars and/or shares remained outside of Argentina. In effect, the ADR "loophole" allowed Argentines to transfer monies abroad, but the transactions did not result directly in a fall in Argentina's international reserves (or a fall in Argentine bank deposits). ADR conversions, however, did reduce the number of (underlying) shares available on La Bolsa.

2.2 Costless and instantaneous arbitrage premia

In order to understand how the ADR loophole influenced the relative prices of ADRs in Buenos Aires and New York, it is useful to define the trade-offs facing U.S. and Argentine investors considering a purchase of a cross-listed security. We first assume that arbitrage between the two markets in which the security is

[12] Some of the original withdrawal limits were eventually modified, though the main restrictions on capital outflow remained in place until December 2, 2002 (exactly one year after they were first introduced). See Appendix 1 for a detailed timeline of the changes in financial market regulations in Argentina beginning in October 2001.

[13] In the discussion that follows we will refer only to ADRs in explaining the capital control "loophole." The same conditions apply to CEDEARs, which involved purchasing non-Argentine stocks (mostly U.S. stocks) for pesos, converting them back to their underlying shares, and re-selling them for dollars in the U.S.

cross-listed is instantaneous and costless. While this is clearly unrealistic, it will establish a useful benchmark for examining transactions costs.

We will use the following definitions:

P_t^L = price of local shares, in pesos

P_t^{ADR} = price of ADR in the United States, in dollars

S_t = spot exchange rate, U.S. dollars per peso

ξ = number of underlying shares per unit of depositary receipt

Consider the return to an Argentine investor who purchases local shares and then converts them to an ADR. We take the view that given the extent of dollarization of the Argentine economy, investors were concerned about preserving the dollar value of their assets, and therefore we compute dollar returns. The instantaneous arbitrage premium on holding the ADR is then:

$$(1) \qquad \pi_t^1 = \frac{p_t^{ADR} - S_t \xi p_t^L}{S_t \xi p_t^L}$$

The premium/discount changes with local price, the U.S. price (which is a function of U.S. demand) and the exchange rate.

From the perspective of a U.S. investor, the rate of return would be

$$(1') \qquad \pi_t^2 = \frac{S_t \xi p_t^L - p_t^{ADR}}{p_t^{ADR}}$$

2.3 Arbitrage with transactions costs

Argentine investor

We now allow for transactions costs and consider again an Argentine investor in period t who has purchased cross-listed stocks. The investor can sell the stocks in Buenos Aires or transform the stocks into ADRs and sell them in the United States. Transforming the stock into an ADR, setting up a U.S. account and selling the stock takes time, and involves transaction costs and different risks.[14]

Define n_0 as the minimum time required to sell the ADR in New York, and consider the following two strategies:

[14] Information from brokers suggests that the time to conversion varied considerably across type of investor and across time. For this reason we use contemporaneous prices and exchange rates as a benchmark in computing arbitrage returns.

1) Sell the stock in Buenos Aires at p_{t+n}^{L}

2) Sell the ADR in New York at p_{t+n}^{ADR}

where $n \geq n_0$. If the expected return of strategy 2 is larger than the expected return of strategy 1, then every risk neutral local investor (assuming all the other investing opportunities are arbitraged) would transform their stocks into ADRs and follow strategy 2. On the other hand, under normal conditions risk-neutral local investors would simply hold their local shares when the expected return of strategy 1 is bigger than expected return of strategy 2. The expected return (at period t) in U.S. dollars of following strategy 2 is:[15]

$$(2) \qquad E_t R_2 = \frac{E_t[p_{t+n}^{ADR}\ (1-\tau_3)(1-\tau_5)] - \tau_4 - [\xi\, p_t^L (1+\tau_1+\tau_2) S_t]}{[\xi\, p_t^L (1+\tau_1+\tau_2) S_t]}$$

where $\xi P_t^L (1+\tau_1+\tau_2)$ is the pesos the investor needs to buy ξ local shares to obtain one ADR, and $E_t[p_{t+n}^{ADR}\ (1-\tau_3)(1-\tau_5)]$ is the dollar amount that the Argentine investor expects to obtain after selling the ADR in the U.S. at time t+n after taxes and expenses. Argentine investors typically face a broker's fee, τ_1, and a transactions fee, τ_2. A second broker's fee, τ_3, is incurred when the asset is sold in the United States. We also include a fixed fee in dollars, τ_4, that the investor must pay to transform the regular shares into an ADR. Finally, the cost of opening a bank account in the United States is τ_5. Note that the investor does not have to physically obtain dollars to carry out this operation (the return is simply expressed in dollar units) so the investor does not pay a fee for obtaining foreign exchange. Note also that all of the transactions in (2) were permitted under the *Corralito*.

If the Argentine investor were to instead use the dollar amount $[\xi\, p_t^L (1+\tau_1+\tau_2) S_t]$ to buy local shares and sell them in Buenos Aires in period t+n for the expected (net of taxes) price, her expected return at time t will be:

$$(3) \qquad E_t R_1 = \frac{E_t \xi\, p_{t+n}^{L}\ (1-\tau_1-\tau_2) S_{t+n} - \ \xi\, p_t^L (1+\tau_1+\tau_2) S_t}{\xi\, p_t^L (1+\tau_1+\tau_2) S_t}$$

[15] Here we are assuming the conversion fee is paid in dollars in the U.S. once the operation is complete, and the amount is withdrawn from the investor's banking account.

Where $\xi\, p_t^L(1+\tau_1+\tau_2)S_t$ is the amount, expressed in dollars, the investor needs in order to buy enough shares of the local stock to reach the equivalent of one ADR, and $E_t\xi\, p_{t+n}^{\mathrm{L}}\ (1-\tau_1-\tau_2)S_{t+n}$ is the amount of money she receives for selling the shares after n periods. The returns are calculated net of the broker's fee and the local transactions fee.

For the investor to be willing to convert shares to ADRs, it must be the case that $E_tR_1 \le E_tR_2$ or

$$(4) \qquad E_t[\,p_{t+n}^{ADR}\ (1-\tau_3)(1-\tau_5)]-\tau_4 - E_t[\xi\, p_{t+n}^{\mathrm{L}}\ (1-\tau_1-\tau_2)S_{t+n}] \ge 0$$

U.S. investor

We next derive the trade-off facing a U.S. investor. The trade-off is different for the two investors because of the asymmetries in fees, taxes and institutional regulations in the two markets. The U.S. investor purchases the ADR in the U.S. and can either

I) Sell the ADR in New York at p_{t+n}^{ADR} or
II) Sell the stock in Buenos Aires at p_{t+n}^{L}.

The first strategy gives the expected return to holding the ADR for n periods:

$$(5) \qquad E_tR_I = \frac{E_t p_{t+n}^{ADR} - p_t^{ADR}}{p_t^{ADR}}$$

U.S. investors do not face a broker's fee or a stock market transactions fee.[16]

The return to converting the ADR to local shares, and repatriating the earnings is given by:

$$(6) \qquad E_tR_{II} = \frac{E_t\xi\, p_{t+n}^{\mathrm{L}}\ (1-\tau_1-\tau_2)(1-\tau_6)S_{t+n} - \quad p_t^{ADR}}{p_t^{ADR}}.$$

When selling the shares in Argentina, we assume that the U.S. investor incurs charges in using a local broker and must pay the stock market transactions fee. Since we assume that he would like to return the profits from the sale back to the U.S., he incurs an additional tax (τ_6) for transferring the funds. Note that under

[16] It is not strictly true that U.S. investors face zero transactions costs. However, our empirical analysis focuses on the arbitrage conducted by Argentine investors during the *Corralito*, so we abstract from the relatively small U.S. transaction costs for simplicity.

the *Corralito* repatriating the dollars directly is illegal. Presumably there are other means of circumventing the controls, but by ignoring these restrictions we are in effect understating the transactions costs faced by U.S. investors.

A risk-neutral investor will cancel an ADR when $E_t R_I \geq E_t R_{II}$ *or:*

$$(7) \qquad E_t \xi \, p^{\mathrm{L}}_{t+n} \; (1 - \tau_1 - \tau_2)(1-\tau_6) S_{t+n} - \quad p_t^{ADR} \geq 0$$

This suggests that if local prices (expressed in dollars) exceed the ADR price investors should buy ADRs, convert them back to local shares and sell them in Argentina.

Arbitrage bounds

The trade-offs faced by Argentine and U.S. investors yield arbitrage bounds for capital inflow into and outflow from the Argentine market. Equation (4) can be re-written to show the bound facing an Argentine investor who is contemplating converting his local stocks into an ADR:

$$(8) \qquad \frac{(1-\tau_1-\tau_2)}{(1-\tau_3)(1-\tau_5)} + \frac{\tau_4}{(1-\tau_3)(1-\tau_5) E_t \xi p^L_{t+n} S_{t+n}} - 1 \geq \frac{E_t p^{ADR}_{t+n} - E_t \xi p^L_{t+n} S_{t+n}}{E_t \xi p^L_{t+n} S_{t+n}}$$

Capital outflows to the U.S. will not occur if the transaction costs on the left-hand-side of (8) (which are a function of the local price and the exchange rate) exceed the returns to the conversion. The data below will show that local prices moved well outside of the arbitrage bands because of the value investors attached to being able to convert their frozen bank deposits into dollars in overseas accounts.

Equation (9) shows the corresponding arbitrage bound for capital inflows into Argentina. Transactions costs faced by a U.S. investor that exceed the returns of selling ADRs for local shares will choke off capital inflows into Argentina.

$$(9) \qquad (1-\tau_1-\tau_2)(1-\tau_6) - 1 \geq \frac{E_t \xi p^L_{t+n} S_{t+n} - E_t p^{ADR}_{t+n}}{E_t \xi p^L_{t+n} S_{t+n}}$$

If the ADR premia/discount lies between the bounds in (8) and (9) neither investor would engage in arbitrage between the markets. Premia outside of the bounds should, in principle, be arbitraged away.

In our empirical analysis of ADR premia/discounts below, we include the transactions costs faced by investors in the U.S. and Argentina conducting arbitrage between the two markets. Table 1 shows transaction cost ranges that reflect amounts that were charged to both small and large Argentine investors. The standard length of time required for an ADR conversion was nine days. Large investors, such as institutional investors and bankers faced substantially lower costs than smaller investors, and could also complete the ADR conversion in a shorter period of time.[17]

[Table 1 here]

3. ADR and CEDEAR discounts during the Corralito

Table 2 provides a list of the 12 ADRs listed in Argentina as of December 1, 2001 and traded on either the NYSE or Nasdaq.[18] In November 2001 trade in these 12 ADRs accounted for 36% percent of the Merval Index and 27% of total market volume. Table 2 also provides pre-*corralito* information on each ADR's market capitalization and trading volume as a percent of the market, as well as the mean and standard deviation of returns (over the period January 2001 to November 2001).

[Table 2 here]

During the *Corralito*, cross-listed securities played three roles for Argentine investors. Cross-listed securities provided (1) **liquidity value** (they allowed asset transformation of bank deposits – which could potentially be expropriated by the government or lost in a full-scale bank run -- into stocks); (2) **capital control circumvention value** (they allowed investors to legally deposit dollars abroad); and (3) **hedge value** (against the likely devaluation of the dollar value of the peso). The first effect, asset transformation, should increase the value of all Argentine stocks during the *Corralito*, and the premium associated with asset transformation should remain until all depositors in Argentina have re-optimized their savings portfolios or the deposit restrictions are removed. The second effect, capital outflow, should appear as an additional premium in cross-

[17] The costs reported in the table are based on phone interviews with portfolio managers and investors in Buenos Aires and on information published on the websites of various Argentine brokerages advertising the ADR-conversion process.

[18] There are also 11 ADR shares that we do not include in our analysis because they are only traded over the counter (Rule 144a and OTC stocks) and as such are not required to meet U.S. accounting standards. We also dropped Nortel from our ADR portfolio even though it is not an OTC stock because it is a preferred stock with very few transactions over this period.

listed share prices over non-cross listed prices in Argentina, and again should last until all Argentine investors are indifferent between holding their assets at home or abroad. This could be achieved either when all of the available funds have left the country, or the cost of moving funds becomes prohibitively high. The third effect, the exchange rate hedge, is an additional premium associated with cross-listed shares until the devaluation takes place. The source of this hedge is that holders of cross-listed stocks have the contractual right to a dollar-denominated security. If the official exchange rate differs from the market's expectation of the exchange rate, investors will be willing to pay a premium for the ability to obtain dollars through the exchange of cross-listed stocks.

Figure 3 shows price indices for value-weighted portfolios of ADRs[19] and all other Argentine stocks over the July 1, 2001 to October 18, 2002 period. Both portfolios reverse their downward trend in the pre-*Corralito* period, increasing immediately following the freezing of bank accounts and the imposition of capital controls. The ADR portfolio experiences a bigger increase than the non-ADR portfolio, reflecting the capital outflow and exchange rate hedge values of cross-listed stocks. The additional premium on ADR stocks over non-ADR stocks remains until May 2002.

[Figure 3 here]

We also observe a dramatic change in the trading volume in cross-listed shares in Argentina over this period. Although the aggregate trading volume on La Bolsa shows a steady decline, the fraction of ADRs in the total volume traded jumps dramatically at the time of the *Corralito* from roughly 40 percent of the total volume to over 80 percent. Perez Companc alone accounted for nearly 50 percent of the total volume of trading in the month of December 2001. In late February 2002, volume in the ADR market leveled off.[20] Although the *Corralito* continued to be in effect, several regulatory changes, starting in February 2002, may have diminished investor's incentives to use the stock market as a means to gain access to frozen assets.[21] At the same time as interest in ADRs was stalling, volume in the CEDEAR market began to rise dramatically, so much so that by

[19] The figure using price indices for equal-weighted portfolios of ADRs and non-ADRs is qualitatively similar.

[20] This is particularly true in New York where ADR volume declines steadily from its peak in December 2001. Volume in February 2002 was 18 percent lower than the previous December, and by May 2002, volume was a mere 23% of what it had been in December 2001.

[21] In February investors were allowed to withdraw (once and for all) 7,000 U.S. dollars from any of their bank accounts. In March investors were given the option to convert deposits into bonds (in pesos or dollars) and they were allowed to use their deposits to purchase properties and subsequently cars.

May 2002 volume in CEDEARs accounted for approximately 70 percent of all trading on La Bolsa.[22]

[Figure 4 here]

Changes in prices of cross-listed securities

Table 3 examines statistically what we saw visually in figure 3. The table presents data on the changes in ADR and non-ADR portfolio price in Argentina and New York following the imposition of the *Corralito*. (All prices are measured in U.S. dollars). On the day following the imposition of the *Corralito*, the ADR portfolio price in Argentina jumped 2.7 percent while the portfolio of non-ADRs jumped by 0.5 percent. If we measure the change in ADR and non-ADR portfolio prices over the week after the imposition of the *Corralito* the ADR portfolio price change is even more dramatic, increasing by 14 percent, while the non-ADR portfolio rise is 8 percent.

Tests for the deviation of the post-*corralito* return from the pre-*corralito* distribution of returns on the ADR and non-ADR portfolios (both equal-weighted and value-weighted) on the day and week after the imposition of the *Corralito* are all highly significant. We also find that the difference between the ADR and non-ADR portfolio price changes (after the imposition of the *Corralito*) is statistically significant. In the lower panel of Table 3 we examine the same ADR and non-ADR portfolio price changes, though using the New York prices for ADRs rather than prices in Buenos Aires. We find that the ADR portfolio price in New York increases too, but not as much as the portfolio price increase in Argentina. We also find that the one-day difference between the ADR portfolio price in New York and the non-ADR portfolio price (in Buenos Aires) is insignificant. The difference in New York ADR portfolio price and non-ADR portfolio price in the week after the imposition of the *Corralito* is actually negative (and statistically significant) suggesting that the New York price on the ADR portfolio fell below non-ADR portfolio price during this period.

[Table 3 here]

ADR discounts

Changes in Argentine prices during the *Corralito* tell only part of the story. We now turn to the arbitrage premia (discount) on ADR shares in Buenos Aires relative to their price in New York. Figures 5 and 6 show local and U.S. prices in

[22] During the period of the *Corralito* there were 216 CEDEARs listed in Buenos Aires.

dollars and the ADR discounts for two (Perez Companc and Siderca) of the 12 companies in our sample of ADRs over the July 1, 2001 to May 31, 2002 period.[23] The figures also show the arbitrage bounds based on our estimates of transactions costs (described in Table 1).[24] Table 4 summarizes the maximum and average discounts during pre-*Corralito*, *Corralito* pre-devaluation and post-devaluation periods for each company and the averages across the twelve companies. The top panel of the table calculates the discounts excluding transactions costs and the bottom panel includes transactions costs.[25]

[Figures 5 and 6 here]

[Table 4 here]

The information in Table 4 and the plots indicate that the average pre-*Corralito* premium for all companies was close to zero, suggesting that arbitrage between Argentina and the U.S. kept prices in close alignment. During the C*orralito*, the average ADR discount (the local price less the ADR price) jumped to 18 percent (excluding transaction costs). And, even after the devaluation in January the average ADR discount remained at just under 5% (or 10% including transactions costs), well outside the arbitrage bounds. Unfortunately many of the ADRs traded only sporadically over this period, so that it is not possible to do a full-fledged event study analysis of the impact of the *Corralito* and the devaluation on the ADR discounts, but to get a sense of whether the changes in discounts over this period are statistically significant we provide t-statistics that suggest that the discounts that arose in the *Corralito* period are far outside the range that we would have expected based on the distribution of pre-*Corralito* discounts.

Figures 5 and 6 suggest that the ADR discounts were relatively small at the beginning of the *Corralito* and peaked just prior to the devaluation. One interpretation of this evidence is that the shadow value of the exchange rate hedge via ADRs increased as the devaluation became more likely in early

[23] Similar figures for the rest of the ADRs are available upon request.

[24] The transactions costs we use in the calculations are: $\hat{\theta}_1$=.3025 $\hat{\theta}_2$=.1025 $\hat{\theta}_3$=.3025 $\hat{\theta}_4$=.15 $\hat{\theta}_5$=1.0. We ignore the time delay in our calculations of premia/discounts. The difference between the lower bound and upper bound in our estimations is around 500 basis points. Rabinovitch, Silva and Susmel (2000), using data for 6 Argentinean stocks with ADRs for the period 1993-2000 estimate arbitrage bands of around 270 basis points, suggesting both that transactions costs increased during the *Corralito* and that the transactions fees we use in our calculations provide maximum arbitrage bands.

[25] We use the same transactions costs for the pre-*Corralito* and post-*Corralito* periods for consistency, even though it is likely that these costs increased substantially after the imposition of the *Corralito* (so that we are biasing our results against finding differences in the two periods).

January 2002. At their peak, the discount reached close to 40 cents on the dollar for Banco Frances, Banco Galicia, Perez Companc and Siderca.[26]

The Emergence of CEDEARs

Before the imposition of the *Corralito* Argentine investors should have preferred to hold foreign stocks directly (and in dollars) rather than as a CEDEAR in pesos, especially given that they had to pay high conversion fees for the CEDEARs. However, after the imposition of the *Corralito* investors were no longer able to use dollars to purchase non-Argentine stocks. Indeed, one of the few ways investors were able to gain access to their frozen bank deposits was to purchase shares on La Bolsa. For this reason we might have expected Argentine demand for CEDEARs to have increased during the *Corralito* because underlying CEDEAR assets are denominated in dollars (although CEDEARs are priced in pesos), and because holding shares of non-Argentine firms would serve as a better means of hedging against the looming economic crisis. The supply of CEDEARs, however, did not immediately pick up in large part because Argentine brokers were initially not able to send dollars abroad to buy the underlying stocks and convert them to CEDEARs, and there was little incentive for investors outside of Argentina to convert U.S. stocks into peso denominated CEDEARs before the devaluation.[27]

Starting in late February 2002, however, liquidity in CEDEAR stocks gradually increased. Discussions with brokers in Argentina suggest that the increase in CEDEAR liquidity came from two sources. First, using operations called "via cable" brokers bought foreign bank checks that allowed them to purchase the underlying U.S. shares, convert these into CEDEARs, and then sell the CEDEARs (at a premium) in Argentina for pesos.[28] Second, mutual funds, pension funds and other institutional investors are required to hold assets rated above BBB, and at this time all Argentine stocks and bonds were below the minimum ranking, forcing these funds to purchase non-Argentine securities. Since the *Corralito*

[26] According to brokers and the financial press, the most demanded ADRs have been (in order of importance): Perez Companc (PC), Grupo Financiero Galicia, Siderca and Telecom. In December 2001, the number of shares of PC traded in NYSE increased 170%.

[27] Traders had little incentive to convert U.S. stocks into CEDEARs prior to the devaluation both because of peso value uncertainty and because the *Corralito* restricted repatriation of any peso returns.

[28] Another way that CEDEARs may have been created is through a practice termed "pre-releasing" where the Depositary Bank lends out the underlying securities that make up the CEDEAR to brokers in the market. The brokers then sell the CEDEARs to investors who pay in pesos and then request that the broker convert the CEDEARs back into the underlying U.S. shares (and sell them in New York for dollars).

disallowed direct purchases of foreign assets CEDEARs were among the few assets that they could acquire.

Once liquidity in the CEDEAR market was established, investors had an alternative means of escaping the *Corralito*, by purchasing CEDEARs in Argentina for pesos, converting them back to the underlying dollar denominated stocks, and selling them in New York for dollars (that then are deposited in dollar accounts).[29,30] The transaction costs of CEDEAR conversion are similar to those in the ADR market[31], and the increased demand for CEDEARs in Argentina led to similar price spreads on CEDEARs in Argentina relative to the underlying prices of the stocks in New York. Table 5 shows that before the *Corralito*, the mean CEDEAR discount was approximately zero, but during the period March 2002 through September 2002 the average discount increased to 3.3 percent (excluding transactions costs) with a maximum increase of 13 percent.[32]

[Table 5 here]

There is clear indication that the Argentine government understood that CEDEARs were serving a similar purpose as ADRs in allowing investors to transfer funds (legally) outside of Argentina. On March 25, 2002 a report in the official BCRA press communication suggests that the government considered adopting new measures to avoid capital outflows using ADR and CEDEAR transactions. However, no restrictions were imposed at that time. In September 2002, regulations were changed that increased the cost and difficulty of CEDEAR

[29] Investors also purchased (in pesos) dollar denominated Argentine government bonds (specifically Global 2008s) and re-sold them in New York (for dollars) for similar reasons.

[30] It is interesting to note that the two most frequently traded CEDEARs in the post-*Corralito* period, Lockheed and Avon, were rarely traded before the capital controls were imposed. The apparent reason for this shift in preference is that they each have low conversion ratios and high dollar prices (for the underlying shares) in the U.S., which in turn meant that these securities sold at high prices in pesos in Argentina. Higher nominal peso prices meant that fewer of these CEDEARS had to be acquired to transfer a given amount of funds (and with fewer transactions investors incur lower conversion costs).

[31] The transactions costs we use in the calculations are: $\hat{o}_1$=.3025 $\hat{o}_2$=.1025 $\hat{o}_3$=.3025 $\hat{o}_4$=.09 $\hat{o}_5$=1.0. We ignore the time delay in our calculations of premia/discounts. Note that the conversion fee, $\hat{o}_4$, is lower for CEDEARs than ADRs (where it is .15). Conversations with brokers suggest that transactions costs rose in the post-*Corralito* period but for consistency we use the same costs for both the pre- and post-*Corralito* period, biasing our results against finding differences in the two periods.

[32] Liquidity for many of the CEDEARs in Buenos Aires remained low even after March 2002, in Table 5 we include the 15 most frequently traded CEDEARs (out of the 216 listed CEDEARs) and we calculate the discount for each of the CEDEARs only on the days when there was a closing price in both markets. The index is then the average of the daily premia.

conversions.[33] The last column in Table 5 shows that CEDEAR discounts increased substantially after September 2002, as would be predicted if conversions became more expensive.

Expected Devaluation

By late December 2001, it was clear that a devaluation of the Argentine peso was imminent. Under the assumption that the shadow value of ADRs as a means of converting bank deposits and for capital outflow over the period remained constant, the difference in the cross-listed premium post- and pre-devaluation yields the market forecast of the magnitude of the devaluation. In effect, prior to the devaluation the stock market served as a shadow foreign exchange market and we exploit this to back out expectations of the devaluation. After the devaluation there still exists exchange rate risk, but it is now priced in the foreign exchange market rather than in the stock market.

The top panel of table 6 provides one set of estimates of the market's expectation of the magnitude of the devaluation. [34] Using the discounts just before and just after the devaluation (January 11th) as our measure, we calculate an average expected devaluation of between 35 and 40 percent, depending on whether we include all observations of ADR discounts or exclude observations for ADRs that did not trade in one of the markets on January 4th (the last trading day before the devaluation). Over this period there are days when only the U.S. market is open (although there still exists a price in Argentina based on the previous trading day) as well as days when particular ADRs did not trade in one or both markets. Depending on which observations we use in our calculations, our measure of expected devaluation changes. If we calculate changes in the ADR discounts on January 17th (when the Argentine stock market reopened) rather than January 11th, the average change in the ADR discount ranged between 32 and 39 percent (again depending on whether we include observations for ADRs that did not trade in one of the markets on January 4th). These changes in discounts are significantly larger than the typical daily or weekly discount changes in the pre-*Corralito* period, though they suggest that the market slightly under-predicted the magnitude of the official devaluation (which was 40%).

The bottom panel of table 6 presents an alternative measure of the market's expectation of the magnitude of the devaluation based on the implicit exchange rate Argentine investors faced in their ADR conversions (including transactions

[33] See the entry for September 2002 in Appendix 1.

[34] The devaluation was announced on January 7th and took place on January 11th (to a new exchange rate of 1.4). The free float started on February 11th. See appendix 2 for more information regarding exchange rate developments over this period.

costs). The first column in this second panel provides each ADR's implicit exchange rate on the day before the devaluation was announced, and the second column reports the expected devaluation contained in this implicit rate. Of course the implicit exchange rate also contains a "cost of capital outflow", or a *Corralito* avoidance price. We estimate this capital-outflow cost component (reported in the third column) for each ADR by subtracting the average implicit exchange rate in the first week of the *Corralito,* when expectations of a devaluation were still relatively low, from the official exchange rate. The estimates suggest that on average investors were willing to pay 14 cents for every dollar they sent abroad. When we subtract the cost of capital outflow from the implicit exchange rate on the eve of the devaluation our measure of the market's expected devaluation ranges between 40 and 42 percent.

[table 6 here]

Figure 7 presents the actual peso-dollar exchange rate over the period January 2001 through December 2002 along with the average implicit exchange rate faced by investors using the ADR and CEDEAR channels to convert peso assets into dollar assets. The figure clearly shows that the cost of using cross-listed securities to bring dollars outside of Argentina exceeded the actual peso-dollar exchange rate over this period.

[figure 7 here]

Magnitude of Capital Outflow using ADRs

In addition to calculating the expected magnitude of the devaluation, we can use ADR transactions data to estimate the magnitude of capital outflow. The most accurate measure of the volume of outflow would be to use the volume of ADR conversions that occurred after the imposition of the *Corralito*. The NYSE collects the number of ADR conversions on a quarterly basis, which unfortunately makes it impossible to back out the number of conversions during the peak period of December of 2001 and January 2002. The data suggest that between the end of December 2001 and the end of March 2002, approximately 26 million shares of Argentine stock were converted to ADRs. Since we do not know in which month those shares were converted, and because share prices changed dramatically in this period it is difficult to assign a value to this flow.

An alternative measure of capital outflow is to take the post-*Corralito* cumulated volume of sales of Argentine ADRs in New York, under the assumption that all ADR sales reflect cashing out by Argentine investors. This figure comes to $835

million.[35] This is likely to be an underestimate of the volume of outflow, since many investors may simply hold the stock rather than sell at depressed prices. Another measure is the cumulated volume of purchases of local stocks with associated ADRs in Buenos Aires over this period. Under the assumption that all these purchases are intended for ADR conversion, the value of capital outflow comes to $3.4 billion dollars. This is likely an overestimate, since Argentines may have had other reasons for purchasing these stocks besides ADR convertibility.

On the one hand, a capital outflow of even $3.4 billion seems to be small given the magnitude of the crisis and the desire of Argentines to find a way to move wealth abroad. On the other hand, the fact that the volume is small is consistent with the fact that, unlike many unofficial channels for capital outflow, the value of the ADR loophole was priced by the market. It appears that the increase in local share prices effectively choked off the flow. This may have been why, in the midst of all of the other events taking place during the Corralito, the government did not appear to be much concerned about closing the ADR loophole.

4. Market Factors and the Pricing of ADRs

Until this point, we have analyzed the time series of ADR and local prices in isolation. We now turn to the pricing of ADR stocks in the context of overall market movements in Argentina and New York.

In theory, in a fully liberalized and integrated financial environment, we would expect ADRs to be priced based on global market factors. Investors with access to global assets should expect returns to be based on covariances of individual stocks and the global market portfolio. That said, in practice, Karolyi and Stulz (2002) find that home bias tends to increase local influences on asset prices. They find that local market portfolios often better explain the cross-sectional variation in expected returns for local stocks, though they also find that equity flows and cross-country correlations increase global influences on asset prices.[36] The pricing of Argentine ADRs provides an interesting natural experiment in the context of this literature. Prior to the imposition of the *Corralito*, Argentina's financial markets were considered fully liberalized. The *Corralito*, although allowing ADR transactions to continue, was intended to control capital outflows and therefore

[35] This is the cumulated sum between December 1, 2001 and May 31, 2002.

[36] Also see Errunza and Losq (1985), Eun and Janakiramanan (1986) and Alexander et al (1987) who examine the pricing of ADR portfolios in the context of the market model and generally find evidence that global market factors dominate local factors in explaining ADR returns.

presumably led to a less globally integrated Argentine capital market.[37] In terms of the market model, we should therefore expect that local market factors in Argentina became more important in pricing stocks with associated ADRs during the period in which capital controls were in force.

We test whether the imposition of the *Corralito* led to changes in the pricing of Argentine stocks with associated ADRs using a standard market model; where R_{it} is the return on asset i at time t, R_{mt}^{G} is the return on the global market portfolio at time t, R_{mt}^{L} is the return on the local market portfolio at time t, and ÄS$_t$ is the change in the exchange rate:

$$R_{it} = \beta_0 + \beta_1 R_{mt}^{G} + \beta_2 R_{mt}^{L} + \beta_3 \Delta S_t + \varepsilon_{it} \tag{10}$$

Evidence of market segmentation would be indicated by a significant coefficient on the local market index, $\hat{\alpha}_2$. Table 7 presents daily time series results[38] from regressions of returns from the value-weighted ADR portfolio (in Argentina and the U.S.) on the Morgan Stanley Capital International (MSCI) world index, an orthogonalized local Argentine value-weighted portfolio index (excluding the stocks with associated ADRs), and the change in the peso-dollar exchange rate.[39] Regression results are presented both for the period prior to the imposition of the

[37] Schmukler and Kaminsky (2001), however, find little evidence that capital controls (in six emerging market economies during the 1990s) effectively segmented domestic markets especially over longer horizons.

[38] Daily returns correspond to close-to-close prices including dividends and excluding weekends and holidays. A potential problem with daily market model regressions is the occurrence of non-overlapping trading hours across markets due to different time zones, trading schedules and country-specific holidays. In our study, the extent of non-synchronous trading across national stock markets is compounded by the fact that the Argentine stock market was closed for several days during the height of the crisis and many stocks were traded infrequently over this period. In order to determine whether non-frequent trading introduces bias in our regression results, we re-estimated equation (10) using the Scholes and Williams (1977) non-synchronous trading correction. Specifically, we estimate equation (10) allowing for up to 10 lags and leads of the local and global market portfolios. We compute $\beta_n^{SW} = \frac{\sum_{i=-n}^{n} \beta_i}{1 + \sum_{i=1}^{n} 2\rho^i}$ where ñ is the autocorrelation coefficient. We find that the local market portfolio beta is robust to the choice of leads and lags, whereas the global market portfolio beta is sensitive to the lag specification in the post-*Corralito* period, though the main qualitative results remain robust. These lead and lag estimates of the betas are available upon request.

[39] We orthogonalize the non-ADR Argentine portfolio by regressing it on the MSCI (separately over the pre- and post-*Corralito* subperiods) and use the residuals from these first stage regressions for R_{mt}^{L} in the estimation of equation (10).

Corralito (specifically October 1997 through November 2001) and for the post-*Corralito* period (December 2001 through July 2002).

[Table 7 here]

The results in table 7 suggest that both local (Argentine) market factors and global market factors were important in pricing Argentine stocks with associated ADRs even before the imposition of the *Corralito*. Our estimates of the betas on the global market portfolio are close to one while the betas on the local market factor are 0.9 for the ADRs in Argentina and 0.8 for the ADRs in the U.S. Focusing first on the results for the regression using the ADR portfolio price in Argentina we find that in the post-*Corralito* period the local market portfolio beta rises (both in absolute magnitude and in relation to the beta on the global market portfolio) following the imposition of the *Corralito,* indicating that stocks with associated ADRs magnified Argentine market movements in this period. These results confirm our initial hypothesis that local market factors in Argentina became more important in pricing stocks with associated ADRs (and presumably all Argentine stocks) during the period in which capital controls were in force.

The model in section 2 and the data description in section 3 of this paper suggest that the pricing of ADR stocks in Argentina and New York may have diverged during the *Corralito* period. And, in particular, we might expect that while local factors influenced prices in Argentina, they may not have been as important for prices of the same stocks sold in New York (given that investors in New York were not subject to the restrictions of the *Corralito*). Indeed, we find that in the regressions using ADR portfolio returns in New York that the beta on the local market portfolio falls dramatically from .80 in the pre-*Corralito* subperiod to .18 in the post-*Corralito* period.[40] The beta on the global market portfolio also falls in the post-*Corralito* period (from 1.04 to 0.62) though it remains large relative to the beta on the local market factor.[41] These results suggest that after the imposition of the *Corralito* Argentine market factors no longer had as much influence on the pricing of Argentine ADRs in New York. Or, put another way, ADRs in New

[40] The regression goodness of fit also falls dramatically from .60 in the pre-*Corralito* period to .19 in the post-*Corralito* period.

[41] We analyze beta stability in the post-*Corralito* period by running recursive least squares regressions. These estimates (available upon request) suggest that in the first two months following the imposition of the *Corralito* (and when the volume in the ADR market was at its peak) neither the global market index nor the Argentine market index explain ADR portfolio returns in New York (whereas in Argentina local market factors become more important in explaining the pricing of stocks with associated ADRs over this period). In the subsequent two-month rolling subsamples the global market index beta regains statistical significance and rises in magnitude for the ADR portfolio returns in New York.

York became less like other Argentine stocks (including those with associated ADRs) with the advent of capital controls.

5. Conclusions

Argentina in late 2001 and early 2002 provides an unusual opportunity to analyze the reactions of investors to capital controls. The *Corralito*, originally put in place to stave off a devaluation of the peso, effectively served to provide incentives for Argentines to invest in the Argentine stock market, helping to fuel a boom in La Bolsa even as the Argentine economy was headed toward collapse. The *Corralito* also provided a new role for cross-listed shares as a (legal) mechanism for capital flight. Investors were able to purchase cross-listed stocks for pesos in Argentina, convert them into ADRs or CEDEARs, re-sell them in New York for dollars and deposit the dollar proceeds in U.S. bank accounts.

In the paper we show that ADR discounts went as high as 45% in the pre-devaluation period, indicating that Argentine investors were willing to pay significant amounts in order to move their funds abroad and to hedge the dollar value of their assets. In effect, the stock market served as a shadow exchange market, which allows us to back out the market's implicit forecast of the size of the devaluation. On the eve of the devaluation, we estimate that the market anticipated a devaluation in the range of 32 to 42 percent.

We also test whether the imposition of the *Corralito* led to changes in the underlying pricing structure of ADR stocks in Argentina and New York. The *Corralito*, although allowing ADR transactions to continue, was intended to control capital outflows and therefore should have led to a less globally integrated Argentine capital market. We find strong evidence of an increase in Argentine market segmentation after the imposition of the *Corralito*. We find that local market factors in Argentina became more important in pricing peso denominated stocks with associated ADRs, though we find that the same ADRs in New York are mainly priced based on global factors.

Argentine investors continued to use financial markets, and increasingly the CEDEAR market, to gain access to their frozen bank deposits and to place their assets abroad in dollar accounts throughout 2002. We estimate that capital outflow using only the ADR market over the December 2001 to May 2002 period amounted to $835 million to $3.4 billion. If we include capital outflows via CEDEARs and other cross-listed securities, it is likely that the amount of capital that has (legally) left Argentina during the *Corralito* is many times higher.

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Table 1 Transaction Cost Ranges for ADR Settlement Cycle

Location of Trade or Activity	Parameter	Description	Estimated Range of Values (percent of total value of stock market transaction, except where noted)
Buenos Aires Stock Market	τ_1	The brokerage fee is not regulated in Argentina, but for market operations larger than 10,000 pesos, the fee is in the range [0.25% , 1%] of total settlement, before Value Added Tax. During December most of the capital control-evading transactions were settled for amounts larger than 10,000 pesos.	[0.3025, 1.21]
	τ_2	Fee that the Buenos Aires stock exchange market charges for every transaction.	0.1025
American Depositary Bank	τ_4	**ADR issuance (conversion) fee** charged by the broker. During this period, brokers charged big markups over the typical US$ 0.04-0.05 conversion fees charged by depositary banks.	[0.10 dollar, 0.20 dollars]
NYSE Stock Market	τ_3	Argentinean brokers selling the ADR in the U.S. are charged the same fee as they are when buying or selling stocks in the local market.	[0.3025, 1.21]
	τ_5	Approximate cost of opening a banking account in the U.S. and wire transferring the foreign currency to a U.S. bank.	1
Argentinean Bank	τ_6	Approximate cost of transferring money from Argentina to the U.S.. During the capital controls period these transactions were not allowed.	1

Note: The transaction costs ranges account for the wide dispersion of brokerage and conversion fees across size and institutional affiliation of investors, and across time. Large investors faced substantially lower costs than smaller ones, and could also complete the ADR conversion in a shorter period of time.

Source: All transaction cost information, in particular ADR conversion fees, were obtained from personal interviews in Buenos Aires and/or direct communication with brokers at *InvertirOnline, ElAccionista, CapitalMarkets Argentina and ArgentineReserach* and web-adversitements at portfoliopersonal.com.

Table 2: Pre-Corralito ADR and CEDEAR Information (January 2001-November 2001)

Name	RATIO ADR:ORD	Industry	Market Cap as % of Total Market (Nov 30, 2001)	Trading volume as % Market (monthly)	Mean Return (daily)	standard deviation (daily)
ALTO PALERMO S.A.	1.4	Real Estate	0.03%	0.15%	-0.70%	2.63%
BBVA BANCO FRANCES	1.3	Banking	0.26%	1.92%	-0.40%	4.76%
CRESUD S.A.C.I.F. Y A.	1.10	Food-Agribus-Tobacc	0.04%	0.39%	-0.06%	1.64%
FINANCIERO GALICIA	1.10	Fin Serv-Investment	0.22%	7.09%	-0.54%	4.24%
IRSA INVERSIONES	1.10	Real Estate	0.06%	0.60%	-0.44%	2.79%
METROGAS S.A.	1.10	Oil & Gas-Service	0.15%	0.06%	-0.13%	2.39%
PEREZ COMPANC	1.10	Util-Gas,Elec&Water	1.03%	9.82%	-0.18%	3.17%
SIDERCA S.A.I.C	1.10	Steel	0.61%	2.75%	-0.16%	2.62%
TELE ARG STET-FRANCE	1.5	Telecom-DatNtwk	0.61%	3.43%	-0.35%	3.82%
TELEFONICA DE ARGEN.	1:10	Telecom-DatNtwking	1.42%	0.03%	-0.31%	3.41%
TGS	1.5	Oil & Gas-Service	0.39%	0.84%	-0.11%	2.88%
YPF S.A.	1.1	Oil & Gas-Service	3.11%	0.09%	-0.21%	1.74%
All ADRs			7.94%	27.19%	-0.30%	1.83%*

Note: The standard deviation for the "all ADRs" row is for an equal-weighted ADR portfolio.
Source: Bank of New York and Bolsar

Table 3: Price Impact of Corralito on ADRs in Argentina and New York

I. PERCENT CHANGE IN ARGENTINE PRICES (IN $US)

	day before to day after	t-stat	day before to week after	t-stat
EQUAL WEIGHTED PORTFOLIOS				
ADRs (ARG)	2.69	-25.20	14.47	-59.18
NON-ADRs	0.48	-15.27	8.40	-78.97
Difference Between ADRs (ARG) and Non-ADRs (ARG)	2.21	-18.45	6.07	-22.79
VALUE WEIGHTED PORTFOLIOS				
ADRs (ARG)	1.67	-17.76	23.21	-98.39
NON-ADRs	0.27	-6.02	16.13	-89.94
Difference Between ADRs (ARG) and Non-ADRs (ARG)	1.40	-11.47	7.09	-24.05

II. PERCENT CHANGE IN NEW YORK PRICE (IN $US)

EQUAL WEIGHTED PORTFOLIOS				
ADRs (NY)	0.54	-7.34	1.95	-11.83
Difference Between ADRs (NY) and Non-ADRs (ARG)	0.06	-1.30	-6.44	19.95
VALUE WEIGHTED PORTFOLIOS				
ADRs (NY)	0.37	-5.66	0.13	-5.09
Difference Between ADRs (NY) and Non-ADRs (ARG)	0.10	-1.31	-16.00	51.70

Note: t-stats are tests for differences in return relative to average (daily or weekly) pre-Corralito returns. "Day before to day" is the return between 12/3/2001 and 11/30/2001; "Day before to week" is the return between 12/7/2001 and 11/30/2001
Source: Economatica

Table 4: ADR Discounts (local price in dollars minus U.S. price, in % of local price)

	PRE-CORRALITO	CORRALITO PRE-DEVAL			CORRALITO POST-DEVAL		
	Jan 1, 2000 - Nov 30, 2001	Dec 1, 2001 - Jan 10, 2002			Jan 11, 2002 - May 31, 2002		
	mean	max	mean	t-stat	max	mean	t-stat
A. Excluding transactions costs							
BBVA BANCO FRANCES	-0.02	38.42	20.43	6.22	21.89	7.00	9.86
CRESUD S.A.C.I.F. Y A.	0.01	28.82	21.47	4.81	22.61	3.27	3.55
FINANCIERO GALICIA	0.38	40.28	20.04	5.99	18.42	3.66	4.16
IRSA INVERSIONES	0.09	25.93	15.74	6.28	14.11	2.01	2.37
METROGAS S.A.	-0.84	25.00	10.94	4.02	19.63	-1.05	-0.19
PEREZ COMPANC	0.09	43.40	19.56	6.17	23.36	6.36	9.66
SIDERCA S.A.I.C	0.14	40.07	20.35	5.32	24.85	6.77	9.71
TELE ARG STET-FRANCE	0.14	34.80	19.23	6.20	23.56	5.64	7.55
TELEFONICA DE ARGEN.	-0.49	20.91	13.95	5.52	17.39	-14.25	-6.88
TGS	0.24	36.62	20.14	6.84	19.94	4.36	5.07
YPF S.A.	-0.08	31.79	15.96	4.94	24.72	8.14	8.63
PORTFOLIOS							
Equal-weighted	0.02	32.89	17.93	6.86	19.88	4.71	6.92
Value-weighted	0.00	35.12	17.64	10.47	20.49	4.58	15.10
B. Including transactions costs							
BBVA BANCO FRANCES	3.19	41.37	24.15	5.75	27.55	14.84	12.59
CRESUD S.A.C.I.F. Y A.	4.14	32.41	25.35	4.10	26.38	7.91	3.59
FINANCIERO GALICIA	4.08	44.88	25.36	5.76	30.09	16.60	12.05
IRSA INVERSIONES	3.38	29.66	20.04	5.41	19.06	7.28	4.10
METROGAS S.A.	3.64	29.11	15.26	3.27	24.50	6.42	2.45
PEREZ COMPANC	3.50	45.71	22.62	5.75	26.45	10.48	9.37
SIDERCA S.A.I.C	3.49	42.24	23.14	4.92	27.48	9.86	8.16
TELE ARG STET-FRANCE	3.46	37.98	23.23	5.71	27.44	13.59	11.30
TELEFONICA DE ARGEN.	2.51	24.26	17.39	4.65	20.41	-9.72	-7.14
TGS	4.72	40.24	24.79	6.19	26.17	14.34	8.92
YPF S.A.	2.84	34.09	18.74	4.59	27.31	11.22	7.63
PORTFOLIOS							
Equal-weighted	3.49	36.14	21.81	6.33	24.61	11.66	10.73
Value-weighted	2.84	37.68	20.23	10.28	23.62	9.51	16.24

Note: Discount is calculated only for days where the security was traded in both markets. Local prices are adjusted for ADR conversion ratio. T-stats are tests for the difference in mean discount relative to the pre-corralito period mean. Transaction costs are assumed to be the same in the pre- and post-*Corralito* periods.
Source: Bloomberg and Economatica

Table 5: CEDEAR Discounts (local price in dollars minus U.S. price, in % of local price)

	PRE-CORRALITO Jan 1, 2000 - Nov 30, 2001	POST-CORRALITO Mar 3, 2002 - Sep 6, 2002			POST-CORRALITO Sep 11, 2002 -Dec 31, 2002		
	mean	max	mean	t-stat	max	mean	t-stat
A. Excluding transactions costs							
AMERICAN INTERNATIONAL GROUP INC.	0.35	10.23	4.50	10.80	19.57	9.00	11.59
AVON PRODUCTS INC.	-0.37	11.25	3.60	15.71	8.96	4.52	12.37
ANHEUSER-BUSCH COMPANIES INC.	0.06	11.91	4.21	12.76	9.01	5.61	9.69
CITIGROUP INC.	-0.18	11.12	3.81	10.34	7.19	4.89	9.58
DU PONT DE NEMOURS & Co.	0.20	9.74	4.21	10.84	13.08	8.10	12.73
FEDERAL EXPRESS Co.	2.32	9.00	4.70	6.62	16.37	7.70	9.06
GENERAL ELECTRIC Co.	0.07	9.53	3.21	9.74	12.97	4.90	7.83
THE HOME DEPOT INC.	1.13	12.40	4.98	8.79	10.28	5.01	6.67
INTERNATIONAL PAPER Co.	-0.03	11.33	3.98	12.31	9.59	4.77	7.83
JOHNSON & JOHNSON	-0.18	11.49	3.32	11.60	9.87	5.41	9.28
LOCKHEED MARTIN Co.	0.36	9.05	2.76	10.29	12.98	5.51	14.84
PEPSICO INC.	-0.27	10.17	3.38	12.56	8.83	4.16	13.89
ROYAL DUTCH PETROLEUM Co. (ADR)	-0.18	9.25	4.78	14.14	24.08	10.59	11.58
UNITED TECHNOLOGIES Co.	0.06	9.80	4.16	11.83	11.55	4.82	7.64
EXXON MOBIL Co.	0.16	12.80	3.63	10.22	9.17	5.11	8.56
PORTFOLIOS							
Equal-weighted	0.02	11.28	3.29	13.24	12.74	6.42	22.11
Volume-weighted	-0.02	10.39	3.24	13.70	9.34	4.99	19.51
B. Including transactions costs							
AMERICAN INTERNATIONAL GROUP INC.	3.24	13.07	7.46	6.09	22.17	11.88	15.56
AVON PRODUCTS INC.	2.25	13.58	6.10	10.40	11.36	7.01	11.62
ANHEUSER-BUSCH COMPANIES INC.	3.33	14.68	7.20	8.33	11.87	8.55	12.62
CITIGROUP INC.	4.14	15.32	8.26	6.55	12.31	9.76	12.24
DU PONT DE NEMOURS & Co.	3.62	12.89	7.51	5.28	16.17	11.31	15.89
FEDERAL EXPRESS Co.	5.17	11.52	7.34	4.35	18.73	10.27	12.21
GENERAL ELECTRIC Co.	3.42	13.05	6.94	6.62	16.60	8.88	6.66
THE HOME DEPOT INC.	4.28	15.22	8.19	5.51	13.84	8.53	6.26
INTERNATIONAL PAPER Co.	3.37	14.28	7.14	8.53	12.76	8.03	4.53
JOHNSON & JOHNSON	3.10	14.30	6.42	6.98	12.81	8.47	8.65
LOCKHEED MARTIN Co.	2.95	11.40	5.25	7.96	15.26	7.96	16.91
PEPSICO INC.	2.57	12.69	6.08	8.06	11.50	6.89	15.85
ROYAL DUTCH PETROLEUM Co. (ADR)	2.72	11.94	7.57	10.04	26.52	13.34	14.36
UNITED TECHNOLOGIES Co.	3.18	12.56	7.13	6.60	14.42	7.85	4.84
EXXON MOBIL Co.	3.63	15.86	7.08	5.94	12.64	8.67	8.45
PORTFOLIOS							
Equal-weighted	3.63	14.04	6.29	10.79	15.47	9.30	23.00
Volume-weighted	3.50	13.20	5.97	10.07	12.09	7.63	17.21

Note: Discount is calculated only for days where the security was traded in both markets. Local prices are adjusted for CEDEAR conversion ratio. T-stats are tests for the difference in mean discount relative to the pre-corralito period mean. Transaction costs are assumed to be the same in the pre- and post-*Corralito* period.
Source: Economatica

Table 6: Expected Devaluation

INDIVIDUAL ADRS	DIFFERENCE IN ADR DISCOUNTS AROUND THE TIME OF THE DEVALUATION			
	Jan 11, 2002 to Jan 4, 2002		Jan 17, 2002 to Jan 4, 2002	
	*day before to day after (all obs)**	*day before to day after (excluding obs)***	*day before to day after (all obs)**	*day before to day after (excluding obs)***
ALTO PALERMO S.A.	59.99%		90.00%	
BBVA BANCO FRANCES	19.29%	19.29%	28.40%	28.40%
CRESUD S.A.C.I.F. Y A.	58.82%	58.82%	27.94%	27.94%
FINANCIERO GALICIA	33.29%	33.29%	36.13%	36.13%
IRSA INVERSIONES	28.64%	28.64%	27.61%	27.61%
METROGAS S.A.*	23.72%	23.72%	35.34%	35.34%
PEREZ COMPANC	22.62%	22.62%	33%	33%
SIDERCA S.A.I.C	45.52%	45.52%	35%	35%
TELE ARG STET-FRANCE	76.00%		45%	
TELEFONICA DE ARGEN.*	29.13%	29.13%	26%	26%
TGS	38.97%	38.97%	31%	31%
YPF S.A.	48.72%	48.72%	40%	40%
Average	40.39%	34.87%	37.93%	31.99%

	IMPLICIT EXCHANGE RATE MEASURES ON JANUARY 4, 2002					
	INCLUDING COST OF CAPITAL OUTFLOW			EXCLUDING COST OF CAPITAL OUTFLOW		
	Implicit Exchange Rate	Implicit expected devaluation	Cost of capital outflow	Implicit exchange rate	Implicit devaluation (all obs)*	Implicit devaluation (excluding obs)**
ALTO PALERMO S.A.						
BBVA BANCO FRANCES	1.62	62%	0.22	1.40	39.88%	39.88%
CRESUD S.A.C.I.F. Y A.	1.47	47%	0.03	1.43	43.11%	43.11%
FINANCIERO GALICIA	1.79	79%	0.21	1.58	58.14%	58.14%
IRSA INVERSIONES	1.37	37%	0.14	1.23	23.03%	23.03%
METROGAS S.A.*	1.10	10%	0.05	1.05	5.17%	5.17%
PEREZ COMPANC	1.82	82%	0.16	1.66	66.48%	66.48%
SIDERCA S.A.I.C	1.68	68%	0.12	1.56	56.05%	56.05%
TELE ARG STET-FRANCE	1.25	25%	0.09	1.16	15.98%	
TELEFONICA DE ARGEN.*	1.66	66%	0.24	1.42	41.99%	41.99%
TGS	1.60	60%	0.19	1.41	40.78%	40.78%
YPF S.A.	1.50	50%	0.03	1.47	47.15%	47.15%
Average		53.31%	0.14		39.80%	42.18%

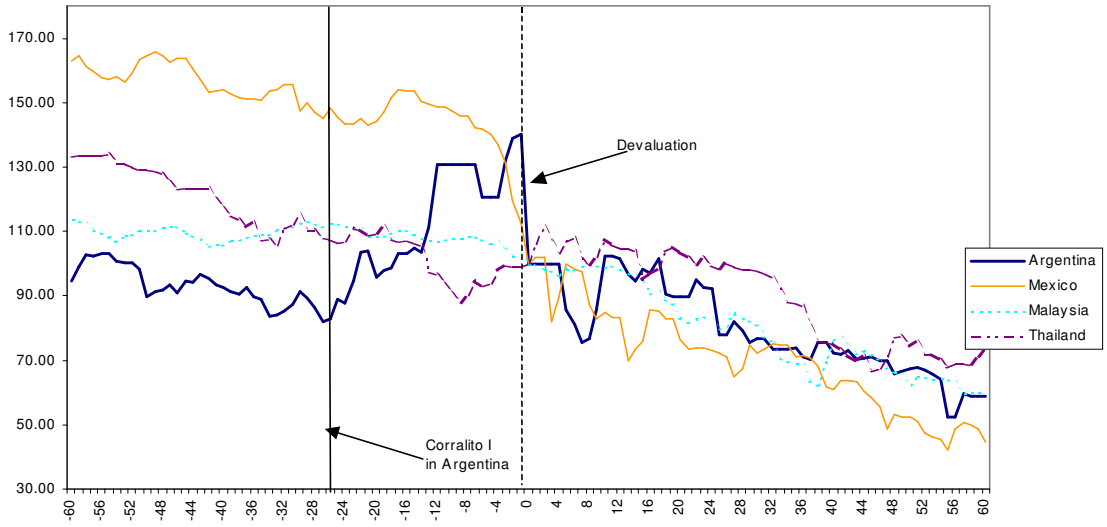
Note: * denotes a measure that includes all observations, ** denotes a measure that excludes observations on January 4th when the ADR was not traded in both markets
Source: Economatica

Table 7 Explaining ADR portfolio returns in Argentina and the U.S. using a Global Market Portfolio and an Argentine (Non-ADR) Local Market Portfolio over the Pre-*Corralito* and Post-*Corralito* periods

Variable	Pre-Corralito		Post-Corralito	
	ARG	US	ARG	US
Constant	0.0001	0.0003	-0.0008	-0.0032**
	(-0.00039)	(-0.0004)	(-0.0021)	(-0.0016)
Local Market Portfolio	0.936***	0.802***	1.022***	0.180***
	(-0.0254)	(-0.0264)	(-0.0782)	(-0.0477)
Global Market Portfolio	1.036***	1.039***	0.567**	0.620***
	(-0.0394)	(-0.0402)	(-0.2268)	(-0.1737)
Exchange Rate Change			0.1070	-0.0070
			(-0.0811)	(-0.0314)
Dummy for Devaluation Day			0.038***	0.0000
			(-0.0134)	(-0.0110)
number of obs	1038	1054	124	145
R-squared	0.6639	0.6028	0.7776	0.1944
Adjusted R-squared	0.6632	0.6020	0.7701	0.1714
F-statistic	1023	798	104	8
Log likelihood	3080	3094	299	374
Durbin-Watson stat	1.9759	1.9685	1.7204	1.5383

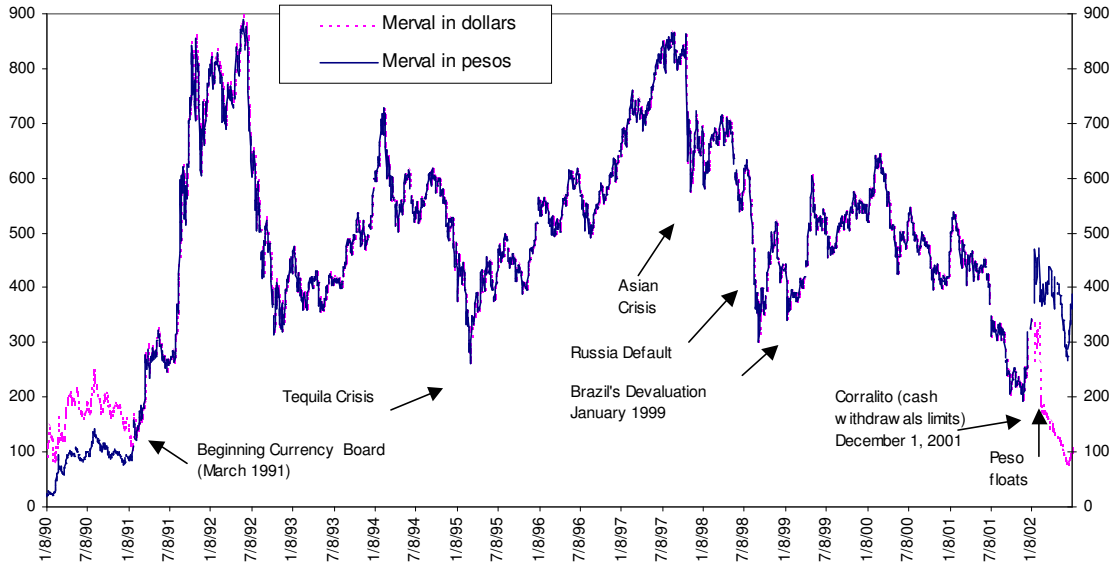
Note: The global market portfolio is the MSCI world index return and the local market index is an orthgonalized value-weighted portfolio (in dollars) of all the stocks traded in Buenos Aires except those with an associated ADR. The dependent variable is the return in Argentina or the U.S. on a value-weighted portfolio of the 12 stocks with associated ADRs. Standard errors are in parentheses. The pre-*Corralito* period is 10/1/1997 to 11/30/2001 and the Post-*Corralito* period is 12/3/2001 to 7/1/2002. The "dummy for devaluation day" take the value of 1 on the day when the Argentine stock market opened after the devaluation. *** denotes significance at the 1% level, ** denotes significance at the 5% level and * denotes significance at the 10% level.
Data source: Economatica.

Figure 1 Emerging Markets' Stock Market Response During Currency Crises
60-day window centered on the corresponding devaluation date
(Dollar Stock Market Indices; Base=100 on the day of the devaluation)



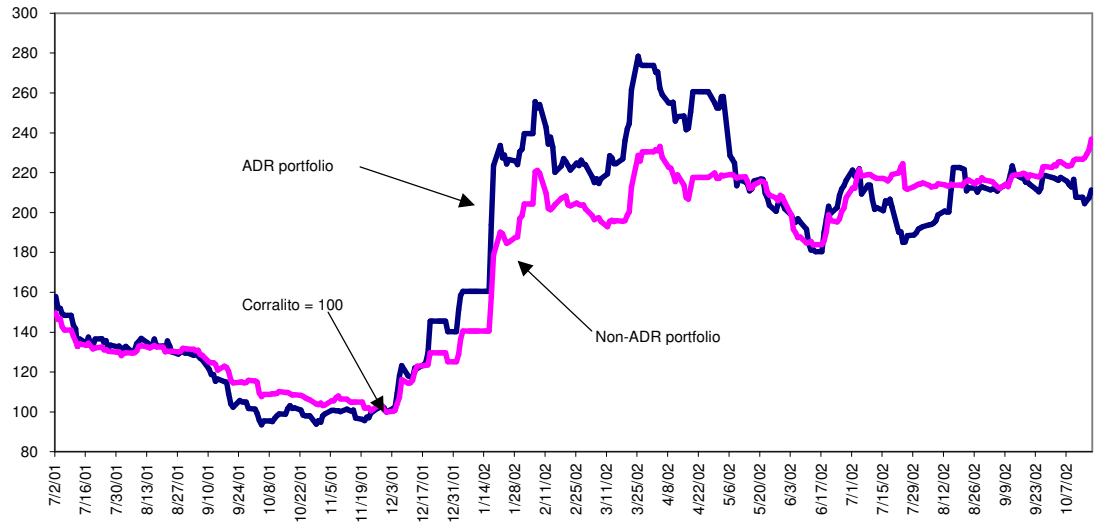
Source: Datastream

Figure 2 Argentine Merval Index (January 1990-June 2002)



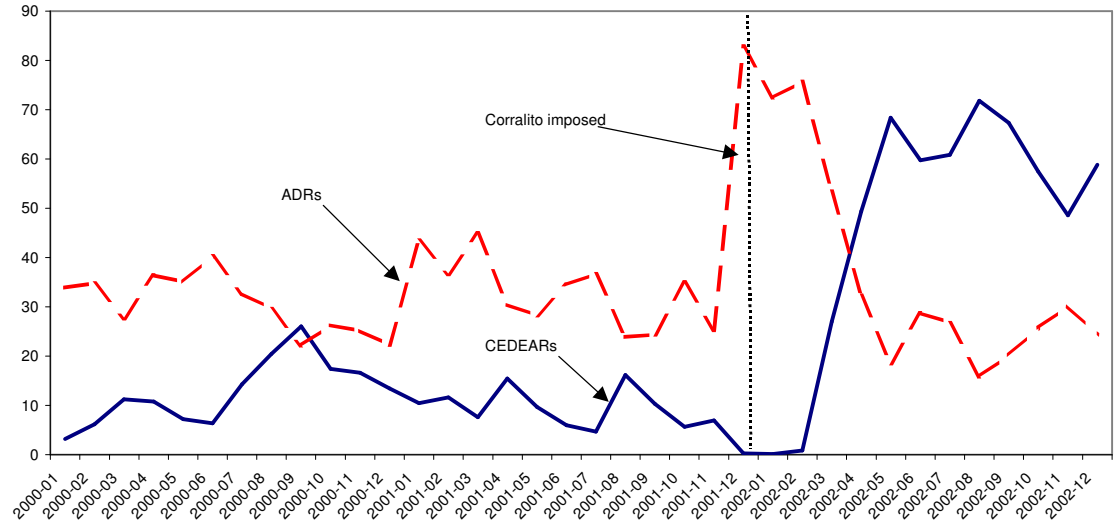
Source: Datastream

Figure 3 Prices of ADR and non-ADR Portfolios, Value Weighted
July 1, 2001-October 18, 2002 (Value at the time of the imposition of Corralito, November 30, 2001=100)



Source: Economatica

Figure 4 Volume Traded in Home Shares with ADRs and CEDEARs as a Fraction of Total Volume Traded in Ordinary and Cross-listed Stocks in Buenos Aires (monthly frequency, in %)



Source: Bolsar

Figure 5 Argentine and U.S. Prices and Premia for Perez Companc (U.S. Dollars)

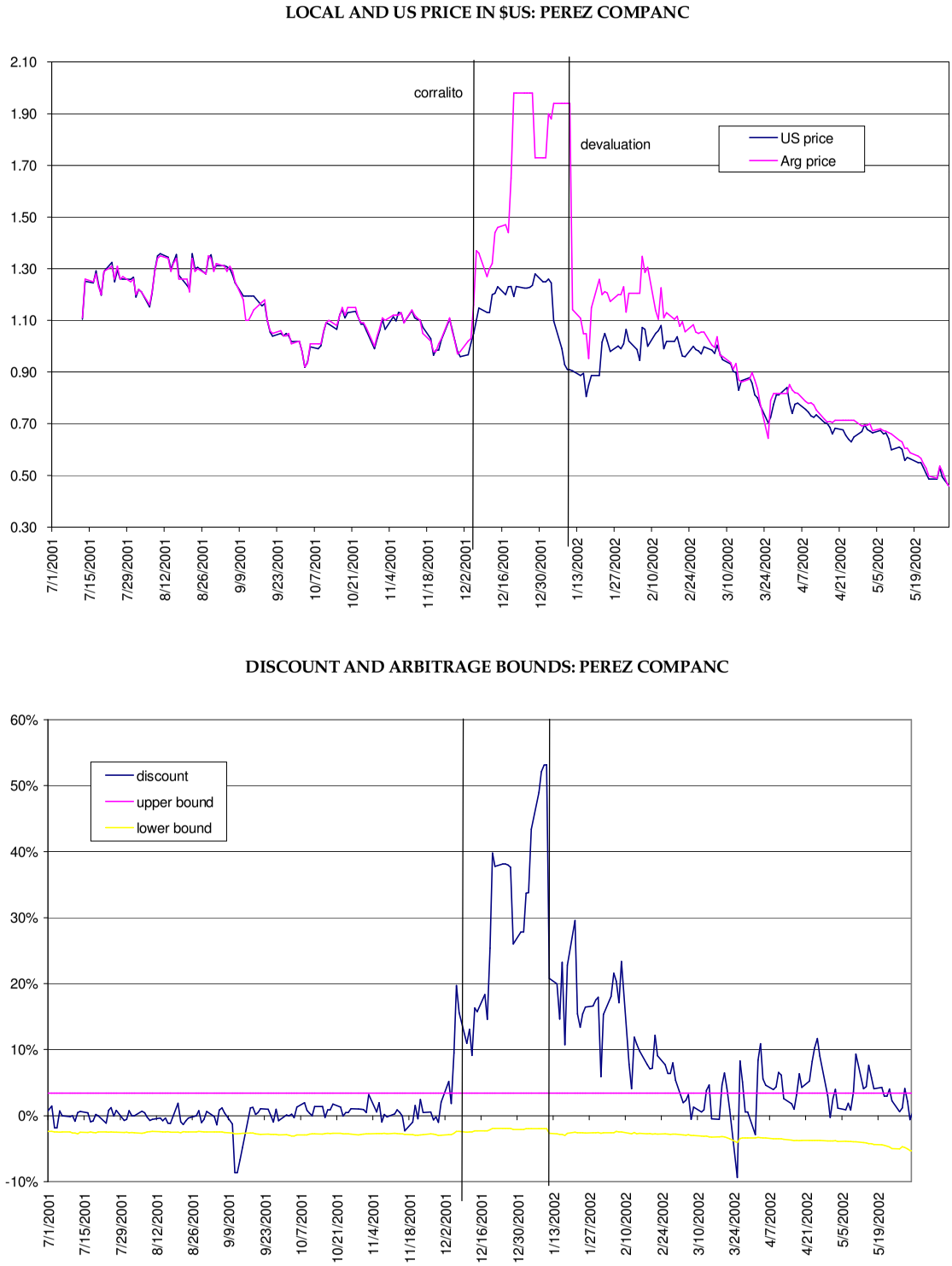


Figure 6 Argentine and U.S. Prices and Premia for Siderca (U.S. Dollars)

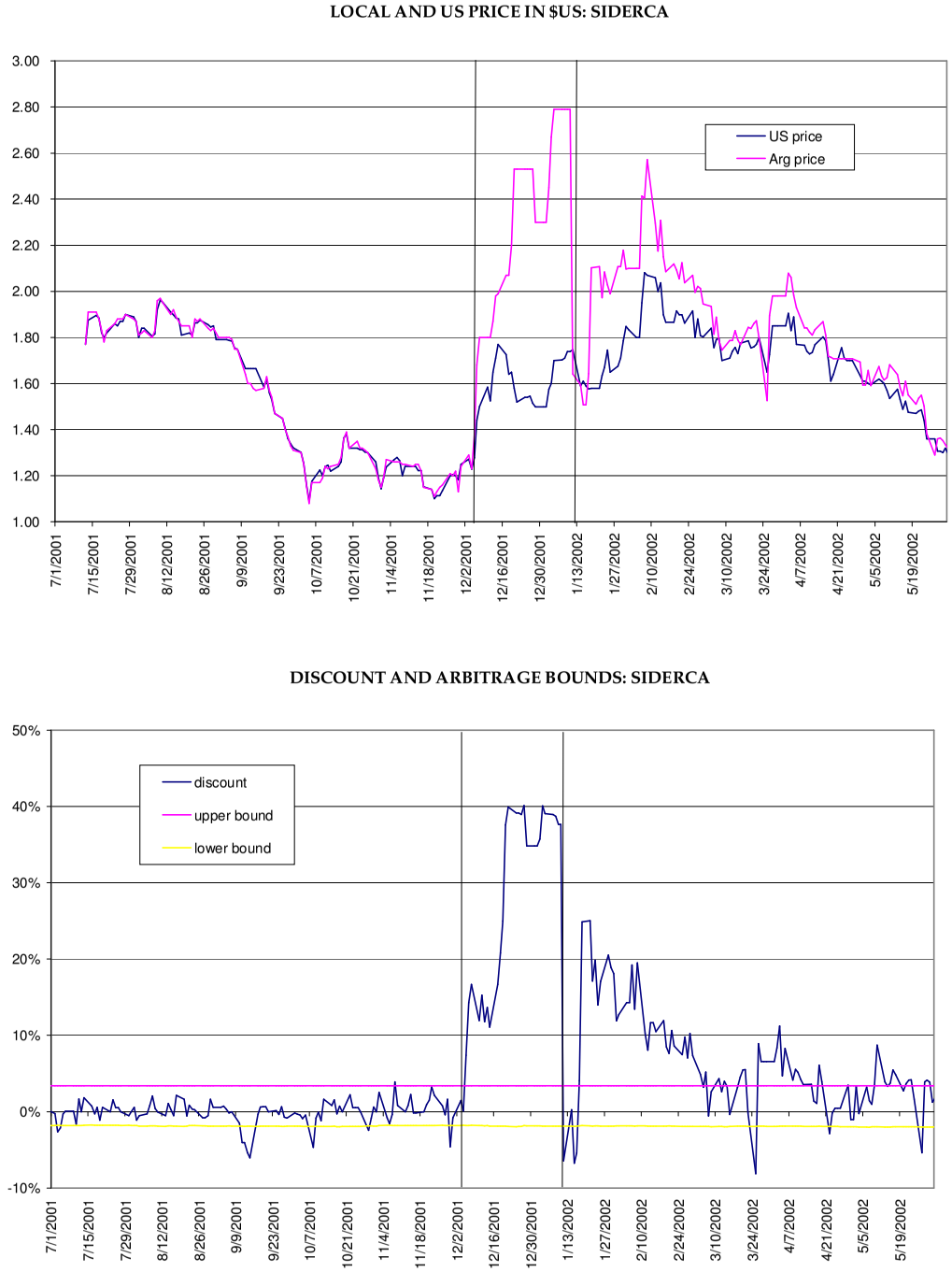
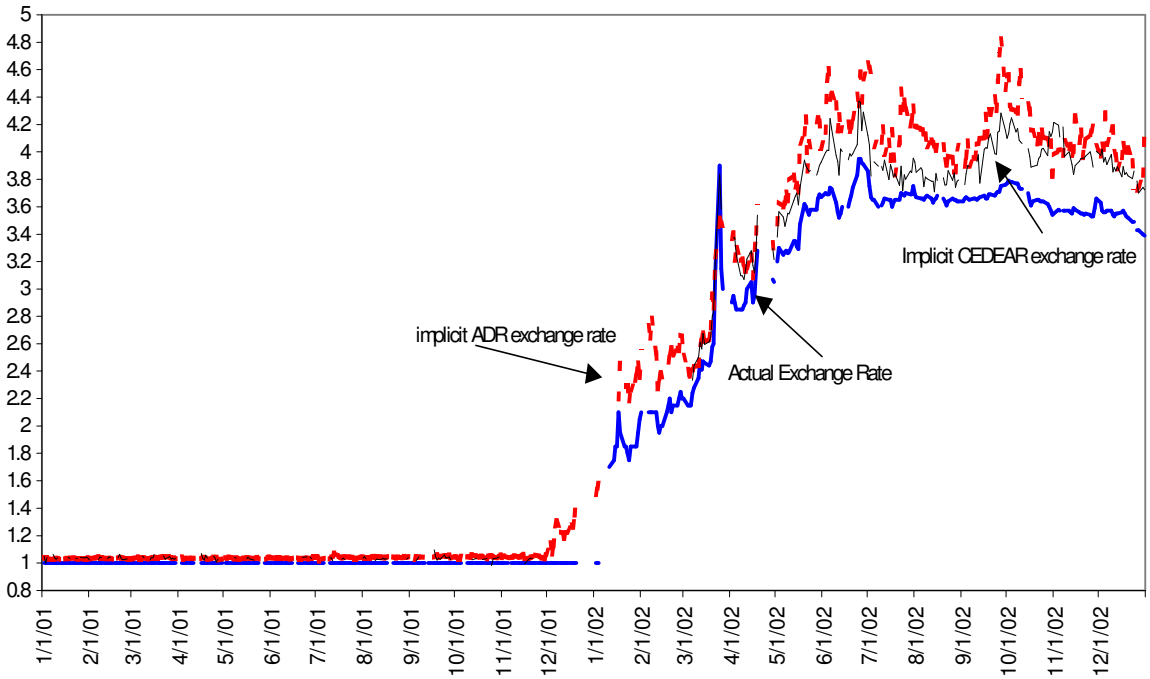


Figure 7 Implicit Exchange Rates on ADR and CEDEAR Transactions (including transactions costs) Relative to the Actual Spot Exchange Rate,
January 1, 2001 to December 31, 2002



Source: Bloomberg and Economatica
Note: implicit exchange rates are calculated as simple averages across ADR and CEDEAR securities on days when the securities were traded in both markets.

Appendix 1
Argentina's Financial Market Event Time Line

October 28, 2001	Minister Cavallo starts negotiations with the IMF and the U.S. Treasury to purchase collateral for new bonds to be issued in an exchange for the nearly $100 billion of local and external debt.
October 29, 2001	Mr. Cavallo defines the debt exchange operation as voluntary. The old debt would exchange for bonds paying seven percent per year and be guaranteed by tax revenues. The IMF and U.S. Treasury ask for compliance with a zero deficit and an agreement with the provinces on tax revenue sharing before any kind of financial support is given.
November 19, 2001	The IMF announces it will not make any new disbursements (around 1.3 billion dollars) without being satisfied that the country has secured the goals previously designated.
November 30, 2001	End of a debt swap with local banks and pension funds for more that 55 billion (over a total public debt of 160 billions).
December 2, 2001	The government announces cash withdrawal limits (*Corralito*) and limits dollar transfers abroad as a last-ditch effort to fend off a devaluation and prevent a major banking crisis. Withdrawals are limited to 250 pesos (dollars) per week per account. Depositors, however, may still access their funds for larger purchases through checks or debit cards and transfer their money among banks. Holders of deposits may also exchange them for federal bonds (BODENs) maturing in 2005, 2007 or 2012 in a Canje exchange. No limits are placed on domestic payments through the use of checks, credits, debit cards and electronic MEP (*Metodo Electronico de Pagos*) payments. Initially the government stated that the *Corralito* would last 3 months.
December 3, 2001	The measures announced on Dec 2nd come into full effect through Decree 1570-01 on Dec 3rd. They can be summarized as follows: a) Wire transfers are not allowed without prior Central Bank approval. b) Cash withdrawals from the Banking System will be limited to US$ 1000 per month. c) Financial Argentine institutions may not participate in foreign currency futures transactions. d) Financial Argentine institutions are prohibited from issuing new bank loans denominated in Argentine Pesos. All new loans must be issued in U.S. dollars and existing peso loans must be converted to U.S. dollar loans at a one to one rate. e) Foreign investors trading in the Argentine Securities Market are subject to the repatriation restriction. Funds related to securities transactions must remain in the country until government approval is obtained or the measure is officially revoked.
December 4, 2001	The Merval Index (Buenos Aires Stock Exchange) increases 6%. According to the local press, there was incipient trading in ADRs.

December 7, 2001	Following Decree 1570, the Central Bank established an information procedure for the processing of automatic and non-automatic authorizations of repatriation. According to this rule, coupon payments on National Government Bonds have automatic transfer authorization and all other types of payments and repatriations of U.S. dollars are subject to Central Bank approval.
December 19, 2001	Mr. Cavallo and all other ministers resign.
December 20, 2001	President Dela Rua resigns and Mr. Ramon Puerta becomes interim president. Country Risk reaches 4618 points**.** Global (sovereign) bond yields reach their historical maximum of 49% annual return in dollars.
December 21, 2001	The official Foreign Exchange Rate market is closed until the 10th of January, 2002.
December 23, 2001	Mr. Rodriguez Saa, governor of one of the provinces, becomes the new interim president for 60 days, until elections are called in March, 2002. He declares the suspension of external debt payments for at least 60 days, totaling $166bn in federal and provincial debt.
December 24, 2001	The government announces that a new fiat currency (i.e., without foreign-currency backing) would be created (the *argentino*).
December 30, 2001	Interim president Mr. Rodriguez Saa resigns and the legislative assembly elects Mr. Eduardo Duhalde as new president.
December 31, 2001	In the midst of political instability and closed foreign exchange markets, the peso trades on the black market at 1.35 pesos per dollar.
January 2, 2002	Mr. Duhalde assumes power.
January 7, 2002	The new Minister of Finance, Mr. Lenicov, announces the devaluation of the peso and a new dual foreign exchange rate regime, to be implemented on the 9th of January, 2002.
January 11, 2002	After several delays, the exchange rate market re-opens and the new dual exchange rate system is put in place, under the "Public Emergency and Exchange Regulations" approved by Congress. The main articles and measures are the following: a) 1 Argentinean peso= 1 U.S. dollar parity (Convertibility Plan) is abolished. For emergency reasons, the Executive Power- President- has been authorized to determine both the new official rate of exchange between the Argentinean peso and foreign currency and exchange rate regulations. b) All debts (capital and interests) agreed in ARG currency with financial entities - converted into U.S. dollars according to the Decree 1570/2001- will be reconverted into the original currency agreed (pesos). c) The official, fixed conversion rate - 1 U.S Dollar=1.4 pesos will be relevant for foreign trade operations. The free or floating rate will be used for all other transactions and freely determined by the market. The peso was quoted at 1.8 per dollar at money-changers in Buenos Aires. The peso' s decline was limited by the gover**n**ment' s decision to reduce the amount of money in circulation through a freeze on deposits, withdrawal restrictions and a central bank order blocking banks from selling the U.S. currency via electronic transactions.

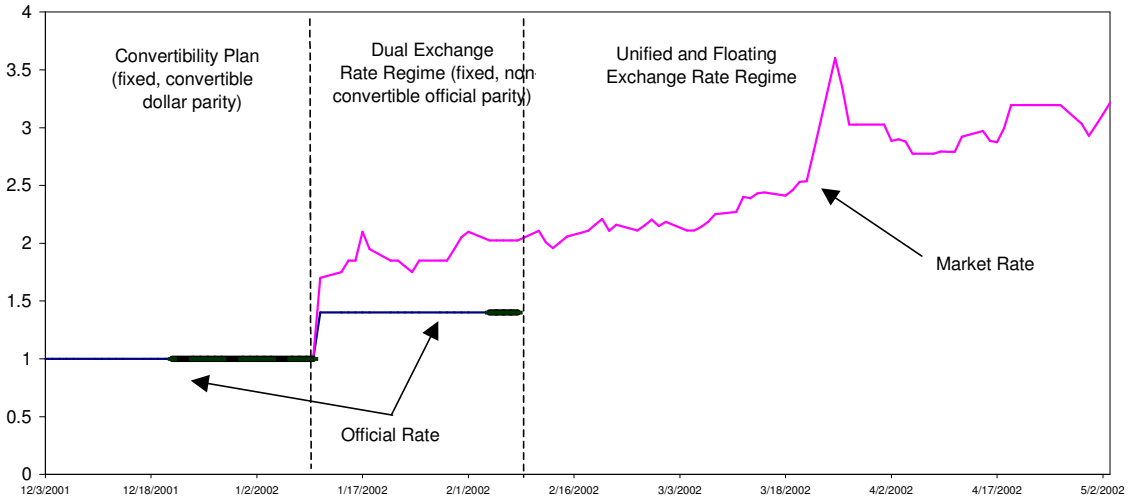
January 21, 2002	The government announces the easing of bank withdrawal restrictions: a) Up to 7,000 pesos can be withdrawn from term deposits in pesos (transferring that money to a checking account) b) Up to 5,000 dollars can be withdrawn from term deposits in dollars (transferring that money to a checking account at the official exchange rate, 1.40). c) Up to 5,000 dollars in a saving account can be *pesofied* at the official exchange rate.
February 3, 2002	Mr. Lenicov announces an asymmetric *pesofication* and the end of the dual exchange rate regime. The fundamental economic measures were the following: a) *pesofication* of all dollar deposits at 1.4 pesos per dollar. b) corporate and consumer debts are also *pesofied*, but at the exchange rate prevailing during the Convertibility period. Both deposits and credit will be indexed to inflation. c) the end of the dual exchange rate regime and a unified floating exchange rate determined by market forces. d) the right to withdraw wage and pension income from the *corralito* without any amount restrictions (before workers could only extract up to 1.500 pesos). *Corralon* starts which freezes bank term deposits (holders of term deposits had the option to convert them into CEDROs or BODENs maturing in 2007 or 2012 in a Canje exchange).
February 4, 2002	The official foreign exchange market is closed again until the 11th of February.
February 8, 2002	While the foreign exchange market is closed and before devaluation uncertainty is resolved, the stock market index increases. The *pesification* of all debts announced in Argentina drives up share prices of firms heavily indebted in pesos and banks. The mix of announced policy measures not yet implemented, (including the pesification of all debts and the prospects of a large devaluation once the market re-opened) and the non-operation of the exchange rate market, induce some investors to reverse the capital-outflow process, converting ADRs back into underlying shares and selling them in the Argentinean market. The implicit dollar rate obtained through this operation was 2.56 pesos (above the 2.35 pesos in the black market) and allowed the repayment of *pesofied* corporate debt.
February 11, 2002	The BCRA establishes a new unified free foreign exchange market, which replaces the two markets - official and free - implemented in January. The exchange rate market re-opens and the floating dollar exchange rate reaches 2.1 pesos, well below the devaluation expectations built-into asset prices.
February 12, 2002	The stock market drops an accumulated 18% in the two business days following the launching of the new exchange rate regime.

March 26, 2002	The Central Bank announces new measures related to foreign exchange transactions and ADR/CEDEAR conversions. According to the press release, these were aimed at improving the functioning of the foreign currency market and regulating the buying and selling of foreign currency by order and for the account of the Central Bank. The press communication also mentions that there will be coordination between the *Comision Nacional de Valores* (CNV) - the equivalent to the SEC in the U.S. - and the *Bolsa de Comercio de Buenos Aires* (BCBA) - the Buenos Aires Stock Exchange - in order to adopt new measures to regulate capital outflows via ADR and CEDEAR transactions.
September, 2002	The central bank passed a very restrictive regulation (circular #3723) that mandated that every stock be traded in its underlying currency. After intense opposition from the financial community, the central bank rescinded #3723 and instead passed a resolution (circular #3727) that forbids "contra cable" operations. These operations allowed brokers to sell stocks purchased in Buenos Aires instantaneously in New York (or any foreign market) using the Mercado de Valores as a clearinghouse. Under #3727 it was still possible for investors in Argentina to convert CEDEARs and sell them in New York, but this new restriction significantly increased the transactions costs to do so.
December 2, 2002	Corralito rescinded.

Sources: Ambito Financiero, La Nacion and Clarin (various issues) and Pictet.

Appendix 2
Argentine Exchange Rate Market Developments

FOREIGN EXCHANGE MARKET REGIMES IN ARGENTINA
Daily Exchange Rate in Pesos per Dollar: December 3rd 2001 - 31st of May 2002
(solid black line denotes period when official market was closed)



The Argentine foreign exchange rate market was closed (*feriado cambiario*) from the 21st of December until the 10th of January (inclusive). During this period the shadow (or parallel) market exchange rate quoted at around 1.5-1.6 pesos per dollar, well above the official parity of 1 peso per dollar prevailing before markets were closed.

On January 4th the Minister of Finance announced the discontinuation of the currency board and on January 7th, the Minister of Finance announced the devaluation of the peso and a new exchange rate regime. The new exchange rate regime was a dual one, featuring an official, fixed non-convertible rate of 1.4 pesos per dollar (relevant for exporters and financial institutions) and a free or floating dollar, for all other operations and determined by supply and demand. This new dual regime *came into full effect* on Friday the 11th of January when the markets were re-opened.

On January the 11th there were two different values for the free exchange rate: dollars purchased with cash at 1.7-1.8 "free pesos" per dollar, and a higher exchange rate for dollars purchased with checks from funds in the *corralito* (1.9-2 "trapped pesos" per dollar).

Exchange rate market operations were again suspended from the 4th of February to the 8thth of February, inclusive. On Sunday, February 3rd, the new Minister of Finance announced the end of the dual exchange rate regime and a unified floating exchange rate was put in place on Monday, February 11th. On the 11th, the floating exchange rate opened at 2.10 pesos per dollar.