MARKET SEGMENTATION AND THE RELATIVE COST OF TRADING AMERICAN DEPOSITORY RECEIPTS

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Abstract

We compare trading costs between local stocks and their corresponding NYSE ADRs for Argentina, Brazil, Chile and Mexico. Results show that local stocks trading in Mexico and Chile exhibit higher costs than their ADRS, while Brazilian local stocks cost less. Argentina presents no significant differences. When we control for stock characteristics, the previous difference disappears for Brazilian and Chilean securities, while it is accentuated for Mexico. Local Mexican stocks are almost 3% of value traded more costly than their corresponding ADRs. Thus, Mexico presents cost barriers that inhibit the implementation of arbitrage transactions that facilitate stock price alignment.

INTRODUCTION

Since it started issuing American Depository Receipts in 1988, the Latin American region has become one of the most important ADR participants. Mexico was the first Latin American issuer, with the remaining countries progressively doing likewise. Though Brazil had listed the highest number of ADR securities by 2001, it was one of the smallest issuers until 1998. The last three rows of table 1 show ADR data for the four mail Latin American markets for the years 1992 and 2001. The number of ADRs listed at NYSE increased from 8 to 94 securities during this period. By 2001, the dollar volume of ADR trading at the NYSE represented more than 80% of the total trading volume at the local markets of Argentina, Chile and Mexico, and 56% of the Brazilian market. The increased interest in Latin securities in the form of ADRs has generated a growing concern for the migration of trades to the more developed US markets[1]. One of the most cited explanations for this order flow migration is the higher cost of trading in local markets. However, up to our knowledge, there is no study that presents a comprehensive comparison of total trading costs between ADRs and their underlying local issues. The only other study that attempts this is the work by Sanvicente (2000) using one year of data for 13 Brazilian ADRs. In contrast, we analyze 10 years of data (1992 through 2001) for the four main Latin American markets: Argentina, Brazil, Chile and Mexico.

The benefits of trading ADRs have been widely documented in the literature. The positive price reaction observed in the market when cross listings occur [Foerster and Karolyi (1999), Jayaraman et al. (1993), Errunza and Losq (1989)] have been explained by the benefits these listings provide: cost of capital reductions, diversification possibilities, investor recognition (Merton (1987)), and a larger shareholder base and liquidity (Amihud and Mendelson (1986))[2]. With multiple trading locations, even if informed traders have several channels through which they can exploit their information, competition among market makers lowers transaction cost and thus acts as a deterrent of insider trading [Chowdhry and Nanda (1991), Alexander et al. (1988)]. In spite of this, non-U.S. securities trading in the U.S. still have been documented to present wider spreads and less depth than U.S. stocks [Bacidore and Sofianos (2002)] due to higher information asymmetry.

Still another advantage of issuing ADRs is the possibility of overcoming international barriers that impede trading. An international security trading in the New York Stock Exchange provides investors with easier access to the ownership structure of a firm that may otherwise have been more difficult to access due to country specific characteristics such as the regulatory or tax environment or inadequate investor protection laws. In this context, a body of work has studied whether investment barriers exist. Theoretically, if international capital markets are integrated, the same asset trading in different locations should not be priced differently. If prices are different but these differences cannot be arbitraged away due to barriers, then markets are said to be segmented.

In spite of a clear trend towards more open capital markets, the literature contains evidence that global integration is still a "work in progress". Patro (2001), Errunza et al. (2000) and

[1] The international and local media, as well as regulators, have raised the issue of order flow migration and its impact on the local markets. See, among others, "The Incredible Shrinking Markets", Latin Finance (1999), "Death of a Market", Euromoney (2000), and "El Mercado de Capitales Argentino en su Encrucijada", by C. Weitz , president of National Securities Commission in Argentina, BID seminar (2001).

[2] Also see Alexander et al. (1987) and Miller (1998).

Bekaert and Harvey (1995) indicate that segmentation is still a characteristic of many markets. Vaihekoski and Nummelin (2001) provide evidence of segmentation in Finland, while Domowitz (1998) and Stultz and Wasserfallen (1996) do the same for Mexico and Switzerland, respectively. In the U.S., Foerster and Karoly (1999) indicate that the price changes that occur around cross listings in the U.S. markets are evidence of market segmentation, while Kim et al. (2000) study Japan, UK, Sweden, Netherlands, Australia and document that ADR prices show underreaction relative to their underlying shares. Gultekin et al. (1989), however, study Japan and the U.S. and show governments to be the source of market segmentation, since the elimination of regulatory barriers allow the integration of previously segmented markets. Thus, we would expect to observe a higher degree of integration as regulatory regimes facilitating less constrained capital flows are implemented around the world.

Comparing ADRs with underlying assets is important for international investment strategies as well. Rabinovitch et al.(2003) calculate the returns that must be added in order to allow for arbitrage profits in both Argentina and Chile. They conclude that investors may in fact prefer Argentina, since the implied cost to trade is lower than that of Chile. In this context, our work also confirms these previous findings for Chile and Argentina.
In this paper, we compare trading costs across local stocks and their NYSE traded ADRs. This is done for the four largest Latin American Markets: Argentina, Brazil, Chile and Mexico. These comparisons are of interest given the importance of ADRs issuance during the last decade in Latin America and the growing concern for order flow migration to more developed markets. Since we compare trading costs between markets trading equivalent securities, our ADR analysis also relates to research concerned with the integration between developed and emerging capital markets. The results presented here provide international investors and issuers with trading cost measures that facilitate comparisons across markets and across individual stocks. These measures also allow us to proxy for the degree of market integration thus far achieved.

Results show that local stocks trading in Mexico and Chile exhibit higher costs than their ADRs, while Brazilian local stocks cost less. Argentina presents no significant differences. However, when we control for stock characteristics, the previous difference disappears for Brazilian and Chilean securities, while it is accentuated for Mexico. Local Mexican stocks are almost 3% of value traded more costly than their corresponding ADRs. This result is consistent with previously documented segmentation for Mexico (Domowitz, 1989).
This paper is organized as follows. Section 2 describes the data. Section 3 presents the method of analysis and the estimates of total trading costs by country and security type. Section 4 analyzes the effect of stock characteristics on trading costs for both local and ADR securities. The sensitivity of our models to the selection of the benchmark index is presented in Section 5. Section 6 concludes the paper.

1. DATA AND DESCRIPTIVE STATISTICS

The primary source of data for this study is Economatica, a firm that compiles Latin American financial information. We gather daily stock price and market index information beginning January 1992, date for which data is available for all four countries, until December 2001. We also gather auxiliary information to estimate the determinants of

trading costs. The auxiliary data are stock market value (in dollars) at the end of the year, total annual dollar trading volume, average dollar closing price during the year, and standard deviation of daily returns over the year. For each year, stocks are included in the analysis if they are listed for the whole year, have at least 24 return data, and present a complete set of auxiliary variables. From an original sample of 8,782 stock-years we obtain a final sample of 4,728 stock-years.

From our local samples, we select all stock-years that had an ADR trading at the NYSE for the whole year. This selection yields 431 local-ADR pairs. Trading costs are then estimated using the market model as explained below. We use the local market index in local currency for local stocks and in US dollars for ADRs. The selection of a local market index as benchmark for the market model in the estimation of trading costs for both types of securities is discussed later in the paper.

2. MAGNITUDE OF TRADING COSTS

In this section we use the Lesmond, Ogden and Trzcinka (1999) limited dependent variable threshold model (LDV) to estimate trading costs for the stocks in our sample. This model of trading costs is based on the occurrence of zero returns. That is, investors will trade on information concerning the value of the stock only when the return generated by the trade exceeds the costs associated with trading. Otherwise, investors will not trade, and the observed return on that stock will be zero. Thus, trading costs are a threshold that must be exceeded before investors trade upon information.

The LDV model assumes that the market model is the generation process for returns, subject to transaction costs. That is, the true return on a security, R_i*, the observed return, R_i , and the market return, R_m, are related as

$$R_{it}^* = \beta_i R_{mt} + e_{it}, \qquad (1)$$

where

$$R_{it} = R^*_{it} - \alpha_{1i} \quad \text{if} \quad R_{it}^* < \alpha_{1i}, \quad \alpha_{1i}<0$$

$$R_{it} = 0 \quad \text{if} \quad \alpha_{1i} < R_{it}^* < \alpha_{2i}$$

$$R_{it} = R^*_{it} - \alpha_{2i} \quad \text{if} \quad R_{it}^* > \alpha_{2i}, \quad \alpha_{2i}>0$$

The first equation of model (1) describes the return generation process for the true return of stock *i*. In a market with no trading costs, returns would immediately reflect contemporaneous market-wide and firm-specific information. However, in the presence of trading costs, observed returns reflect new information up to the value of trading costs and only when the value of the information signal exceeds the cost of trading. The constraints of the model describe the relationship between the true and the observed return. In the first and last constraints, where the absolute value of the true return exceeds the trading cost threshold, observed returns are equal to the true returns up to the value of transaction costs.

The parameter α_{1i} measures the trading cost threshold that must be exceeded before investors act on negative information for stock *i*, while α_{2i} measures the trading cost threshold on positive information. Thus, α_{1i} and α_{2i} represent the proportional trading cost for selling and buying stock *i,* respectively. When the true return does not exceed the transaction cost threshold (i.e., $\alpha_{1i} < R_{it}^* < \alpha_{2i}$), the observed return on stock *i* is zero.
This model for stock returns is thus a limited dependent variable model, censored in the middle, with two unknown parameters α_{1i} and α_{2i}, that represent trading costs. The model is estimated by maximum likelihood using one year of daily returns for each stock-year in the sample. For each country, the market return is proxied by a broad stock market index. That is, we use the IGBC for stocks trading in Argentina, IGPA for Chile, and INMEX for Mexican stocks. We use a more selective index for Brazil, the Bovespa, because the broader market index, IBX, starts in 1996. Nevertheless, we do estimate trading costs for Brazilian stocks using the IBX index and price data for 1996-2001 and obtain results that are equivalent to those generated with the more selective Bovespa for the same time period. For robustness, we also estimate trading costs using a selective market index for each country in our sample. Results are not altered and available upon request.

Table 2 compares stock characteristics and round-trip trading costs for the underlying local stocks and their NYSE ADRs. Local stocks show significantly lower trading activity, return volatility and price level than their ADRs. Though the difference in average trading costs between local stocks and ADRs is not statistically significantly when all countries are analyzed, there is wide variation across individual countries. Argentinean securities present mean trading costs of 1.92% of value traded for local stocks and 1.66% for ADRs, the difference of 0.26% is not statistically significant. The mean trading cost of 1.55% for Brazilian local stocks is significantly different when compared to the 3.01% for their ADRs. Chilean and Mexican local stocks present costs that are significantly higher than those of their ADRs. In Chile, mean trading costs are 2.99% for local stocks and 2.44% for ADRs. Mexican securities present mean trading costs of 4.02% for local stocks and 2.95% for ADRs. Our results so far indicate that the premise that trading costs for local stocks in emerging markets are higher than those of their ADRs does not hold for every country. While it does hold for Chile and Mexico, this is not the case for Argentina and, specially, Brazil.

The premise of higher local costs does not hold for every year either. Table 3 presents trading cost estimates for local stocks and ADRs, by year. The table shows there is variation over time in the relative magnitude of trading costs for local stocks versus ADRs. The table also shows how trading costs for ADR issuers reflect the uncertainty surrounding periods of emerging market crises and that the impact of crises is more pronounced for underlying stocks. For instance, trading costs for all local stocks in our sample increased by 73% during the emerging market crisis of 1998 while ADR costs increased by 27%. In fact, the last column shows that the 1998-1999 period presents the largest difference in trading costs between stocks and ADRs. The variation in trading costs over time is also observed in figure 1. For Argentina, the graph shows a more dramatic increase of local costs during the 2001 solvency crisis. The same occurs for Brazil, Chile and Mexico during the emerging market crisis of 1998. It is interesting to note that Brazilian ADR costs exceed those of local stocks for every year except 1998. Since the corporate law of the issuer's home country determines the rights of ADR holders, the combined effect of

Brazil's weak corporate governance environment (Claessens et al, 2000) and the fact that most Brazilian ADRs have limited or non-existent voting rights[3] may be the cause of higher ADR costs.

3. THE EFFECT OF STOCK CHARACTERISTICS

The variation in trading costs that we find between the local and ADR markets may be related to differences in regulatory environment and market microstructure. However, the characteristics of the securities that trade in each market may also explain the results. For this reason, we isolate the effect of market location for each country by comparing trading costs between stocks and ADRs for a hypothetical security that has equal characteristics across the local and ADR markets. Using a regression model as in Bessembinder and Kaufman (1997a,b) and Bessembinder (1999), we include dummy variables that identify securities as either local stocks or ADRs and, also, the set of demeaned economic variables. The model estimated for each country is:

$$TC_{it} = + \alpha_1 D^{LOCAL}_{it} + \alpha_2 D^{ADR}_{it} + \sum \alpha_j X_{jit} + e_{\text{it}} , \qquad (2)$$

where D^{LOCAL}_{it} is a dummy for local stocks, D^{ADR} is a dummy for ADRs, and the X´s are the set of stock characteristics. As before, the inclusion of one intercept for each dummy allows the comparison of mean trading costs while controlling for differences in stock characteristics across the local and US markets.

Table 4 presents our results. Estimated slope coefficients are of expected signs and, with the exception of share price, statistically significant in every country. Indicator variable estimates show that when the variation in stock characteristics is accounted for, ADRs from Argentina present trading costs that are less than one percent of value traded higher than those of their underlying stocks. For the cases of Brazil and Chile, the difference in mean trading costs between the local and ADR markets is no longer statistically significant. Thus, the higher trading costs previously presented in Table 2 for Brazilian ADRs do not seem to be related to market location since this differential is no longer significant when we adjust for stock characteristics. The corporate governance issues that exist in Brazil did not seem to be driving our previous results. For the case of Mexico, the costs of trading local stocks are 2.9% of value traded higher than those of their NYSE ADRs. This difference is both economically and statistically significant. Our Mexican regression results, the finding of differences in trading costs across two markets trading equivalent securities, support the existence of segmentation between the US and Mexican markets previously reported by Domowitz (1998).

In contrast to our findings for Mexico, the other three countries present lower trading costs. Thus, an arbitrage opportunity in Argentina, Brazil and Chile would need to present lower expected returns than would be the case in Mexico, given that the former 3 countries have lower costs. For example, assuming an arbitrage transaction in the local and ADR markets, the cost hurdles that would have to be overcome in Argentina, Brazil and Chile are 0.86%,

[3] Even the holders of Brazilian ADRs that have voting rights have been repeatedly exposed to unfavorable treatment (Mobius, Mark, "Getting Brazil to Clean Up Its Act", Latin Finance, 2000).

1.41% and 1.70%[4], respectively. In contrast, an arbitrage opportunity using Mexican stocks would have to offer a return greater than 1.92% in order for it to be economically worthwhile.

We also check for the robustness of our results by estimating regression (2) with a two-way random effects model for unbalanced panel data. Results, available upon request, are not altered for Brazil, Chile and Mexico. For Argentina, however, the differences in trading costs between local stock and ADRs become statistically insignificant.

4. SELECTION OF MARKET INDEX

Incorporating ADRs in our analysis implies resolving the additional issue of whether a local market index is the adequate market benchmark for these depository securities of international scope. Since being traded at the NYSE implies a global presence, ADR returns may be responsive to the returns of a US or world market portfolio in addition to the relevant local market index. In fact, the returns of the underlying local stocks may be affected by these global indexes as well. To analyze the sensitivity of security returns to the local, US, and world markets, we estimate the following single and multi-factor market model regressions:

$$R_{it} = \alpha + \beta R_{mt} + e_{it} \quad (3)$$

$$R_{it} = \alpha + \beta_1 R_{LIt} + \beta_2 R_{SPt} + e_{it} \quad (4)$$

$$R_{it} = \alpha + \beta_1 R_{LIt} + \beta_2 R_{MSCIt} + e_{it} \quad (5)$$

$$R_{it} = \alpha + \beta_1 R_{LIt} + \beta_2 R_{SPt} + \beta_2 R_{MSCIt} + e_{it} \quad (6)$$

where R_{it} is the average return of an equally-weighted portfolio composed of either stocks or ADRs from each country. Thus, each regression is executed for both a local stock sample with local currency returns and an ADR sample using U.S. dollar returns. In the single factor model represented in equation (3), R_{mt} is the return of a market index that is either the local market index (LI), the SP500 (SP) or the Morgan Stanley World Index (MSCI). Index returns are calculated using local currency prices for stock regressions and U.S. Dollars for ADR regressions. Equations 4, 5 and 6 are estimated to evaluate the incremental explanatory power of global indexes when a local market index is included. We implement this analysis for the complete 1992-2001 period covered by our data, as well as for the 1992-1996 and 1997-2001 sub-periods. This is done in an effort to isolate the latter half of the 1990's, given that this was a specially unstable period for Latin markets.

Table 5 presents our results for local stocks in Panel A and ADRs in Panel B. In Panel A, we observe that for all countries and time periods, adjusted R-squares exceed 70% when the local index is used as a proxy for the market portfolio[5]. This contrasts with the much lower 0.30% to 28.17% range in adjusted R-squares obtained when either the SP500 or the

[4] These are averages of the local and ADR cost indicators for each country (table 4). The average value reflects the purchase (sale) on one market and a subsequent sale(purchase) in another.

[5] An exception is found in the 1992-1996 Brazilian results. During this time period, Brazil had only one ADR trading at the NYSE. Thus, though included here for completeness, the Rsquared value is not representative.

MSCI are used in single factor models. Moreover, adding one or two international indexes to the local market benchmark provides, at best, a marginal increase in explanatory power. In fact, the higher explanatory power of the local index and the reduced benefit of adding international indexes can be generalized across all time periods and also across security types, since Panel B presents similar results for ADRs.

Table 5 showed the local market index to be the better benchmark in explaining returns for ADRs, with very little contribution added by the global indexes. Table 6 shows trading cost differences between local stocks and ADRs using alternative market indexes as benchmarks in estimating costs for ADRs. Results show that differences in trading costs between local stocks and ADRs are qualitatively equivalent. That is, regardless of the market index used, local stocks from Chile and Mexico present significantly higher trading costs than their NYSE ADRs, the opposite occurs for Brazilian securities, and no significant differences are found for Argentina.

Since global indexes do not add explanatory power to return generating models and our conclusions are invariant to the choice of market index, the use of the local index as benchmark in estimating trading costs for both stocks and ADRs is justified. This choice is also supported by previous work (Patro, 2000) demonstrating that the local market index is better able to explain ADR returns than a world or a US market index.

SUMMARY AND CONCLUSIONS

In this paper, we estimate a comprehensive measure of round-trip trading costs using the Lesmond et al. (1999) limited dependent variable model of returns for stocks trading in the four main Latin American stock markets: Argentina, Brazil, Chile and Mexico. We also calculate the same costs for American Depository Receipts issued by the firms in these four countries and that trade at the New York Stock Exchange. Our sample includes 431 stock-ADR pairs obtained from 10 years (1992-2001) of data.

To explore differences in liquidity between markets, we compare trading costs between local stocks and their NYSE traded ADRs. These comparisons are important for international investors allocating funds across markets, as well as for local market regulators concerned with cross-border order flows. This information is also relevant for corporations whose cost of capital is affected by the liquidity of the securities they issue. Our results indicate that, for Chile and Mexico, local stocks present higher trading costs than their NYSE ADRs, while the opposite occurs for Brazil. Argentinean securities present similar costs in both market locations.

However, when we adjust for differences in economic variables across markets, the differences in trading costs between local stocks and ADRs disappear for Brazil and Chile. Thus, market-specific characteristics, such as weak corporate governance in Brazil, do not seem to be driving the differences found in unadjusted data. For the case of Mexico, the difference in trading costs between markets is accentuated, reaching almost 3% of value traded, when we control for stock characteristics. The Mexican results evidence the influence of market environment on trading costs. We believe that the lack of market transparency present in Mexico may explain our findings. This is supported by previous

empirical evidence showing that execution costs, measured as quoted spreads, are higher for local stocks relative to their NYSE ADRs due to a higher asymmetric information component of the spread at the Mexican stock market (Silva and Chavez, 2002). The presence of information asymmetry at the Mexican market has also been documented by earlier work (Bhattacharya et al., 2000), evidencing the existence of unrestricted insider trading at the Mexican market. Finally, our Mexican findings of differences in trading costs between markets trading equivalent securities support the hypothesis of fragmentation between the local and ADR markets for Mexican securities (Domowitz et al., 1998).

Our trading cost results indicate that roundtrip trading costs present in Argentina, Brazil and Chile, once adjusted for differences in stock characteristics, facilitate the arbitrage of disequilibrium prices when compared to Mexico. Consistent with previous work (Rabinovitch et al., 2003), Argentina provides the lowest trading costs. Thus, an arbitrage return of 0.9% would be economically significant given the low trading costs presented for Argentina. In contrast, an arbitrageur following Mexico would need to find an arbitrage return greater than 1.92% in order to overcome the high round-trip trading costs for local Mexican stocks. Because arbitrage opportunities are more easily exploitable for Argentina, Brazil and Chile, these countries seem to present a higher degree of integration with the US market. Mexico, surprisingly, presents a segmented market.

FIGURE 1

This figure shows the variation in round-trip trading costs, measured as % of value traded, for local stocks (—♦—) and their NYSE listed ADRs (—■—) for a total number of 431 ADR issuers during the 1992 to 2001 period.

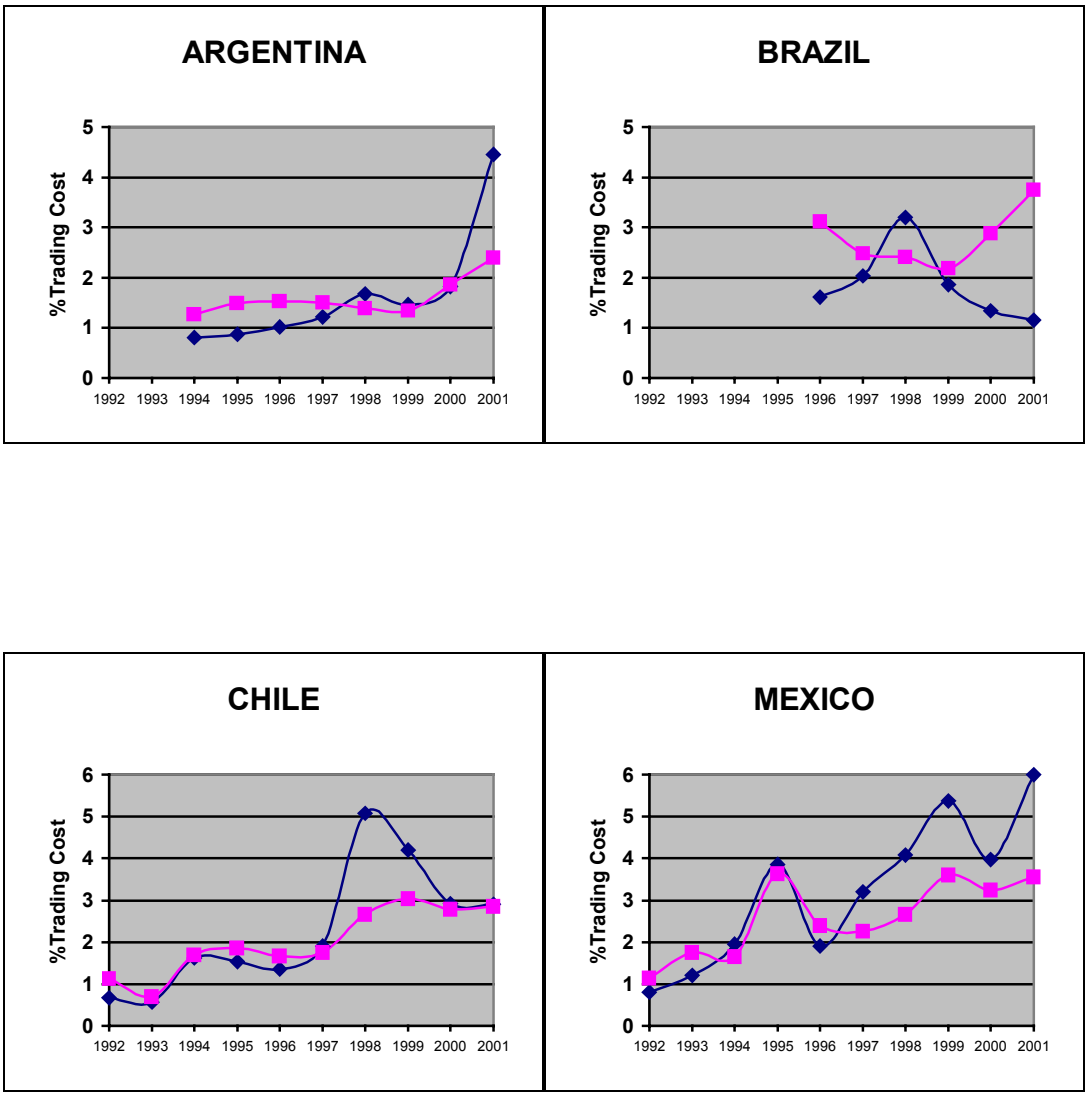

TABLE 1 : LATIN STOCK MARKETS INFORMATION

This table presents stock market information for Argentina, Brazil, Chile and Mexico for 1992 and 2001.

	Argentina		Brazil		Chile		Mexico	
	1992	**2001**	**1992**	**2001**	**1992**	**2001**	**1992**	**2001**
Market Cap (US$ MM)	18,633	192,499	45,261	186,238	29,644	56,310	139,061	126,258
Market Cap/ GDP	8.14 %	71.6 %	11.6 %	36.9 %	70.9 %	85.3 %	38.2 %	20.4 %
Number of listed companies	175	111	565	428	245	249	195	168
Volume traded ($US MM)	15,679	4,180	20,525	65,090	2,029	4,220	44,582	40,043
Turnover ratio	84 %	2 %	45 %	35 %	7 %	7 %	32 %	32 %
Average Firm Size ($US MM)	106	1,734	80	435	121	226	713	736
Volume Concentration (10 +)	67 %	81%	34 %	56 %	61 %	61 %	26 %	78 %
Number of NYSE ADR`s	0	11	1	33	1	23	6	27
ADR Volume (US$ MM)	-	3,369	129	36,352	202	3,397	24,976	35,936
ADR volume/ Bourse volume	-	81%	1 %	56 %	10 %	80 %	56 %	90 %

Sources: Emerging Market Factbook 2002, local bourses, Bank of New York, NYSE, and author's own calculations.

TABLE 2: STOCK CHARACTERISTICS AND TRADING COSTS FOR LOCAL STOCKS AND THEIR NYSE ADRS

Reported values are averages across local stocks and ADRs, by country. Market value, in millions of dollars, is number of shares issued times closing price at the end of the year. Volume, measured in millions dollars, is annual trading volume. Turnover is computed as annual trading volume divided by market value at the end of the year. Share price is the average dollar closing price during the year. Volatility is the standard deviation of daily returns measured over the year. N is number of stock-years. Round-trip trading costs are estimated using the Lesmond et al. (1999) methodology and are expressed as percentage of value traded. The hypotheses being tested are that there are no differences in the magnitude of the economic variables and trading cost between local stocks and their ADRs (bootstrap p-values in parentheses).

		N	Market Value	Annual Volume	Turnover (%)	Share price	Return Standard Deviation (%)	Round-trip Cost (%)
ARGENTINA	Local stocks	51	3,666	297	13.27	6.38	2.56	1.92
	ADRs	51		1,756	38.35	19.01	2.53	1.66
	Difference			-1,460 *	-25.08 *	-12.64 *	0.03	0.26
				(0.000)	(0.000)	(0.000)	(0.397)	(0.173)
BRAZIL	Local stocks	77	2,895	837	34.96	1.13	3.57	1.55
	ADRs	77		1,186	42.27	21.71	3.78	3.01
	Difference			-349 *	-7.30 ^	-20.57 *	-0.20 ^	-1.46 ^
				(0.002)	(0.070)	(0.000)	(0.027)	(0.041)
CHILE	Local stocks	149	1,275	193	14.12	1.60	2.14	2.99
	ADRs	149		327	32.53	17.51	2.39	2.44
	Difference			-134 *	-18.40 *	-15.9 *	-0.25 *	0.55 *
				(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
MEXICO	Local stocks	154	4,409	952	24.20	2.07	3.04	4.02
	ADRs	154		2,189	38.99	13.60	3.23	2.95
	Difference			-1,237 *	-14.80 *	-11.53 *	-0.19 *	1.07 *
				(0.000)	(0.001)	(0.000)	(0.007)	(0.003)
ALL	Local stocks	431	3,074	591	21.34	2.25	2.77	2.97
	ADRs	431		1,315	37.27	17.04	2.95	2.63
	Difference			-723 *	-15.92 *	-14.79 *	-0.19 *	0.34
				(0.000)	(0.000)	(0.000)	(0.000)	(0.139)

*, ^ significant at the 1 and 10% level, respectively

TABLE 3. MEAN TRADING COSTS FOR LOCAL STOCKS AND THEIR NYSE ADR BY YEAR

Reported values are mean round-trip trading costs, as percentage of value traded, by country, year and security type. Trading costs are estimated using the Lesmond et al. (1999) methodology. N is the number of securities.

	ARGENTINA			BRAZIL			CHILE			MEXICO			ALL			
	N	Local	ADR	N	Local	ADR	N	Local	ADR	N	Local	ADR	N	Local	ADR	Diff.
1992							1	0.67	1.13	2	0.81	1.15	3	0.76	1.15	-0.39
1993							1	0.56	0.70	4	1.20	1.75	5	1.07	1.54	-0.47
1994	2	0.81	1.26				6	1.63	1.70	7	1.95	1.66	15	1.67	1.62	0.05
1995	4	0.87	1.49				13	1.54	1.86	14	3.86	3.64	31	2.50	2.62	-0.12
1996	6	1.02	1.52	1	1.61	3.11	16	1.36	1.67	16	1.90	2.39	39	1.53	1.98	-0.45
1997	7	1.21	1.50	1	2.04	2.48	16	1.90	1.75	20	3.20	2.26	44	2.38	1.96	0.42
1998	7	1.67	1.39	6	3.20	2.41	24	5.07	2.67	21	4.08	2.66	58	4.11	2.49	1.62
1999	8	1.47	1.34	18	1.86	2.18	24	4.20	3.03	23	5.38	3.60	73	3.70	2.82	0.88
2000	8	1.83	1.86	22	1.34	2.88	25	2.92	2.79	23	3.98	3.24	78	2.67	2.85	-0.18
2001	9	4.46	2.39	29	1.16	3.75	23	2.90	2.86	24	6.23	3.56	85	3.41	3.31	0.10

TABLE 4: TRADING COSTS FOR LOCAL STOCKS AND NYSE ADRS AND ECONOMIC VARIABLES EFFECTS

This table reports regression coefficients of trading costs against security type indicators and the set of economic variables. The model estimated for each country is:

$$TC_{it} = + \alpha_1 D^{LOCAL}_{it} + \alpha_2 D^{ADR}_{it} + \sum \alpha_j X_{jit} + e_{it} ,$$

The dependent variable is proportional round-trip trading cost for stock i during year t estimated with the Lesmond et al. (1999) method. D^{LOCAL}_{it} is a dummy for local stocks, D^{ADR} is a dummy for ADRs, and the X´s are the set of stock characteristics. Market value, in millions of dollars, is number of shares issued times closing price at year end. Trading activity is measured as yearly turnover and computed as annual trading volume divided by market value at year end. Share price is the average dollar closing price during the year. Market value, turnover and share price are log scaled. Volatility is the standard deviation of local daily returns measured over the year. All economic variables are demeaned. N is number of stock-years. For the indicator variables, the hypothesis to test is that the difference between the stock and ADR indicator coefficients is equal to zero. For the economic variables, the hypothesis to test is that the associated coefficient is equal to zero. Significance levels are evaluated with a bootstrap methodology (bootstrap p-values are in parentheses).

	ARGENTINA	BRAZIL	CHILE	MEXICO	ALL COUNTRIES
Indicator variables (%):					
Local Stock Indicator	0.47	1.24	1.72	3.37	1.91
ADR Indicator	1.26	1.59	1.68	0.47	1.35
Difference	-0.79 * (0.004)	-0.35 (0.680)	0.035 (0.892)	2.90 * (0.001)	0.56 ^ (0.067)
Economic variables:					
Market value	-0.00519 * (0.000)	-0.00636 * (0.007)	-0.01002 * (0.000)	-0.01072 * (0.000)	-0.00884 * (0.000)
Trading activity	-0.00679 * (0.000)	-0.02041 * (0.001)	-0.01040 * (0.000)	-0.0117* (0.000)	-0.01134 * (0.000)
Share Price	-0.00191 (0.223)	0.00141 (0.326)	0.00015 (0.836)	0.00941 * (0.001)	0.00186 * (0.004)
Volatility	0.40 ^ (0.088)	2.53 * (0.001)	1.37 * (0.000)	1.51 * (0.000)	1.56 * (0.000)
Adj R2 (%)	78	53	90	75	69
N	102	154	298	308	862

*, ^ significant at the 1 and 10% level, respectively

TABLE 5: EXPLANATORY POWER OF LOCAL, U.S. AND WORLD MARKET INDEXES FOR THE RETURNS OF LOCAL STOCKS AND ADRS

This table presents adjusted Rsquared values for the following market model regressions:

$$R_{it} = \alpha + \beta R_{mt} + e_{it} \quad (3)$$

$$R_{it} = \alpha + \beta_1 R_{LIt} + \beta_2 R_{SPt} + e_{it} \quad (4)$$

$$R_{it} = \alpha + \beta_1 R_{LIt} + \beta_2 R_{MSCIt} + e_{it} \quad (5)$$

$$R_{it} = \alpha + \beta_1 R_{LIt} + \beta_2 R_{SPt} + \beta_2 R_{MSCIt} + e_{it} \quad (6)$$

R_{it} in the regression models is the average return of an equally-weighted portfolio composed of either stocks or ADR. Thus, each regression is executed for both a local stock sample with returns in local currency and an ADR sample with returns in U.S. dollars. R_{mt} is the return of a market index that is either a local general index(LI), the SP500 (SP) or the Morgan Stanley World Index (MSCI). Regressions for local stocks are executed with index returns in local currency, while ADR regressions are with index returns in U.S. dollars.

PANEL A	*Index Returns in Local Currency*					
Local Stocks	**1992-2001**					
	LI	SP	MSCI	LI+SP	LI+MSCI	LI+SP+MSCI
Argentina	75.55%	21.30%	22.74%	75.63%	75.58%	75.64%
Brazil	78.10%	11.83%	9.04%	78.10%	78.10%	78.10%
Chile	74.49%	8.35%	9.82%	74.71%	74.78%	74.78%
México	73.97%	17.24%	13.44%	74.04%	74.12%	74.15%
	1992-1996					
Argentina	89.41%	12.21%	4.64%	89.66%	89.42%	89.75%
Brazil	14.64%	3.13%	2.59%	15.12%	14.95%	14.76%
Chile	71.80%	1.72%	0.30%	71.86%	71.81%	71.86%
México	76.20%	1.79%	0.46%	76.20%	76.21%	76.70%
	1997-2001					
Argentina	72.58%	23.38%	26.67%	72.68%	72.64%	72.68%
Brazil	78.84%	11.92%	9.11%	78.84%	78.84%	78.84%
Chile	75.55%	10.93%	14.17%	75.81%	75.94%	75.95%
México	74.39%	28.17%	27.21%	74.70%	75.17%	75.30%
PANEL B	*Index Returns in USD*					
ADRs	**1992-2001**					
	LI	SP	MSCI	LI+SP	LI+MSCI	LI+SP+MSCI
Argentina	75.58%	21.28%	22.72%	75.60%	75.55%	75.61%
Brazil	82.60%	28.31%	31.97%	76.90%	77.00%	77.05%
Chile	74.66%	12.29%	16.38%	67.13%	67.19%	67.21%
México	69.45%	28.04%	29.05%	56.87%	57.89%	57.95%
	1992-1996					
Argentina	89.33%	12.18%	4.58%	89.59%	89.34%	89.67%
Brazil	15.04%	2.27%	1.88%	15.10%	14.92%	14.74%
Chile	71.10%	3.48%	1.48%	71.45%	71.30%	71.45%
México	58.27%	12.69%	6.54%	61.34%	59.00%	61.40%
	1997-2001					
Argentina	72.62%	23.37%	26.67%	72.72%	72.68%	72.72%
Brazil	83.30%	28.60%	32.29%	83.90%	84.31%	84.34%
Chile	76.01%	15.56%	22.29%	76.46%	76.63%	76.63%
México	73.99%	34.20%	37.51%	75.02%	76.37%	76.53%

TABLE 6: TRADING COST DIFFERENCES BETWEEN LOCAL STOCKS AND ADRS USING ALTERNATIVE MARKET INDEXES

This table presents differences in trading costs between local stocks and their NYSE ADRs for estimates of trading costs obtained with the Lesmond et al. (1999) methodology using a local market index for local stocks (L) and alternative market indexes for ADRs (A). N is the number of stock-ADR pairs. The significance level of the difference in trading costs between local stocks and ADRs is evaluated with a bootstrap methodology (bootstrap p-values are in parentheses).

		Differences in Mean Trading Costs (Local menus ADR, as % of value traded)		
	N	(L): Local Index (A): Local Index	(L): Local Index (A): SP500	(L): Local Index (A): MSCIWorld
ARGENTINA	51	0.32 (0.163)	0.23 (0.364)	-0.062 (0.814)
BRAZIL	77	-1.46 ^ (0.041)	-1.29 ^ (0.067)	-1.70 ^ (0.021)
CHILE	149	0.55 * (0.000)	0.44 * (0.008)	0.29 ^ (0.054)
MÉXICO	154	1.18 * (0.004)	1.17 * (0.004)	0.94 ^ (0.023)
ALL	431	0.36 ^ (0.089)	0.34 (0.110)	0.10 (0.640)

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NOTAS

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