# TRADING COSTS FOR EMERGING MARKET STOCKS

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**Abstract**

Low   liquidity   and high trading costs characterize emerging stock markets.
However,  not all emerging markets are equal and investors need to identify how
much  return they give up when they participate in such markets.         In  this paper, we
estimate  a comprehensive measure    of  round-trip  trading costs    that  includes the
explicit,  implicit and opportunity costs involved in trading securities.      We  apply the
Lesmond  et al.   (1999)  limited dependent variable model of returns to stocks
trading  at the four main Latin American stock ma         rkets.  The  sample includes 4,728
stock-years  from Argentina, Brazil, Chile and Mexico for the 1992         -2001  period.
Liquidity  is analyzed by directly comparing trading costs across countries for three
sets  of samples -  large, medium and small firm sizes     -  matched  by market value and
year  of trading.   Across   market comparisons are performed while controlling for
variations   in the economic variables that affect trading costs using regression
models  as in Bessembinder and Kaufman (1997a,b).     We  find that trading costs   for
large   and medium size firms are significantly higher for Brazil and Mexico than
for   Argentina and Chile.      This   result is interesting given that the two former
markets are, by far, the most active markets in Latin America.

**Keywords**

Trading Costs, Emerging Markets, Market Microstructure, Stock Markets

## 1.   INTRODUCTION

Capital markets are key for sustainable country development since they facilitate the access of funds that firms need to undertake investments [Levine and Zerbos (1998), Rajan and Zingales (1998)]. However, many of the countries that need this access the most, emerging countries, also have capital markets characterized by low liquidity and high trading costs. At the country level, high trading costs preclude investments and, consequently, economic development. At the firm level, high trading costs raise the cost of capital and reduce market value. At the investor level, trading costs play an important role in investment strategies because they reduce the notional paper return. Thus, a complete estimation and comparison of these costs across markets is particularly useful for market microstructure design and the financing and allocation of funds.

In this paper, we evaluate trading costs for stocks that list in the four main Latin American markets: Brazil, Mexico, Chile and Argentina. We seek to answer the following questions: What is the magnitude of total trading costs in these markets? Within each market, is there variation across stocks? Do the economic variables that determine trading costs in developed markets also explain the variation in trading costs for stocks in Latin markets? How do the main markets of Latin America compare in terms of trading costs? Can differences across markets be entirely attributed to specific stock characteristics? Finally, for Latin firms that list abroad as American Depositary Receipts (ADRs), are trading costs lower in the ADR market relative to the local market? Can differences across these two markets be explained by economic variables?

Trading costs include the costs charged *explicitly* to traders, such as broker commissions and fees, as well as those charged *implicitly* through the prices at which trades are executed. However, both cost measures are difficult to obtain. Explicit costs are reported only to traders and are not generally publicly accessible. Implicit cost measures require intraday trade and quote information not available for all markets. Even when data is available there is disagreement over how to best measure implicit costs. Earlier studies focused on the quoted bid-ask spread [Demsetz (1968), Stoll (1989)]. However, the quoted spread does not consider that some trades are executed at prices within the quotes [Petersen and Fialkoswski (1994), Lee (1993)]. Other studies consider the effective spread, which reflects savings due to trading inside the spread [Lee (1993), Huang and Stoll (1996)]. However, the effective spread requires the matching of trades and quotes. This matter is further complicated by delays of random length in the reporting of trades [Schultz (1997), Bessembinder et al (1997a,b)]. Others consider market impact, the price impact of a trade, as the relevant implicit cost measure [Berkowitz et al. (1988), Chan and Lakonishok (1993)]. However, different benchmark prices needed to compute price impact yield different estimates [Keim and Madhavan (1996, 1998)]. An additional problem with these implicit cost measures is that they do not consider opportunity costs such as failure to completely execute an order or delays in execution with prices moving against the trade [Perold (1988), Berkowitz et al (2001)].

Reflecting the difficulties in measuring trading costs, the literature is limited on emerging markets. Domowitz et al. (2001) document higher trading costs in emerging markets than in developed markets, after controlling for variation in market capitalization and volatility. Their measure of trading cost, obtained from Elkins/McSherry Co, is reported by a group of large institutional investors. The measure includes commission, fees and market impact. The average

estimate of round -trip costs is 1.9% of value traded for emerging markets, and 1.7% for Latin America. These estimates are based on two years plus a quarter of data and aggregated at country level. Also based on institutional trading, Master (2000) estimates average round -trip trading costs of 3.65% of value for emerging markets. However, the trading costs reported by these studies probably represent the lower bound for Latin America because institutional investor s have been historically interested in blue -chips, which present higher liquidity and lower trading costs than the rest of the market. In addition, these estimates do not include opportunity costs, an important component of the cost of trading in emerging markets. The most comprehensive study of trading costs in emerging markets is Lesmond (2002). He estimates total trading costs for 31 emerging markets using the Lesmond et al. (1999) model and concludes that Latin American markets present higher trading co sts than any other region.

We estimate trading costs using the same comprehensive measure developed by Lesmond et al. (1999). This measure includes explicit, implicit and opportunity costs of trading. Since implicit and explicit costs are related [Keim an d Madhavan (1997)], a separate estimation of both measures may lead to biased results when comparing trading costs across markets. In addition, this estimation requires only daily stock price information, a specially useful feature when analyzing emerging market data since intraday price information is not always available. In contrast to Lesmond (2002), we focus on directly comparing trading costs across matched samples of Latin American stocks while also controlling for variation in economic variables that affect trading costs.

Our analysis involves two stages. First, after estimating trading costs for all firms in our sample, we compare these costs across countries for three sets of samples - large, medium and small firm sizes- that are matched by ma rket value and year of trading. We examine samples of different firm size because trading costs may vary differently with size across countries. We find that for all size samples, Brazil presents the highest trading costs. Second, we perform the same compa risons while controlling for differences in the economic variables of stocks that trade in each market using regression models as in Bessembinder and Kaufman (1997a,b). This allows us to isolate the effect of country of listing from the effect of stock cha racteristics. We find that, for large and medium stocks, trading costs are significantly higher in Brazil and Mexico than in Argentina and Chile. This result is interesting given that the two former markets are, by far, the most important in Latin America in terms of volume traded.

This paper is organized as follows. In the next section, we discuss issues related to the market structure of Latin American stock markets. Section 3 describes the data. Section 4 presents the method of analysis and the estima tes of total trading costs by country and market value group. Section 5 analyzes the effect of stock characteristics on trading costs. A comparison of trading costs across countries is contained in Section 6. Section 7 concludes the paper.

## 2.    LATIN AMERICAN MARKETS

This  section provides an overview of the four Latin stock markets covered in this study. Besides descriptive  information, we include a  brief        summary  of the general trading environment and of regulation   regarding investor protection, market            transparency and foreign investments. This information  is relevant since there is agreement among both academics and practitioners that regulatory  regimes affect trading costs [Green et al (2000), Brockman and Chung (2003)], and more broadly, financial market development [La Porta et al. (1997, 1998)].

Latin  American emerging stock markets have experienced significant changes during the last decade.  Table 1 shows descriptive information for 1992 and 2001. The market capitalization of Argentina  grew from    19  to 192 billion dollars, Brazil from 45 to 186, Chile from 30 to 56, and Mexico  from 139 to 126. By 2001, the four markets represented approximately         92% of the total market   capitalization and 98% of trading volume in Latin America. These stock markets, however,  are still small when measured relative to their underlying economies. The total market capitalization  of the four markets amounted to only 38% of their combined total gross domestic product  in 2001. In addition, the number of listings have declined            during the decade under study. The  table shows that the number of listed companies dropped 37% in Argentina, 24% in Brazil, and  14% in Mexico. The only exception is Chile, with a marginal increase of 2%. On the other hand,  the concentration of volume grew       during the decade so that, by 2001, most of the trading in these markets was generated by a handful of large firms.

The  variation over time in the number of listings and total trading volume is presented in figure 1.  The number of listings have experien        ced  a sharp decline during the period, specially for Argentina  and Brazil. Trading volume also exhibits a negative trend, which is more pronounced during  the last half of the period. The figure evidences the negative effect of financial crises, such  as the   Mexican peso crisis of 1994 and the emerging market crisis of 1998 and 1999, on trading   volume and number of listings. It is interesting to note, however, that some countries were  less affected than others. Chile was not affected by the 1994 Tequila crisi         s,  perhaps due to capital controls and the general health of its financial system.

In  this context, crises tend to expose underlying weaknesses in financial markets. An investment environment   characterized by inadequate corporate governance and low marke                t transparency may  well exacerbate the negative impact of a crisis [Lemmon and Lins (2003), Johnson et al. (2000)].  Thus, the trend towards de      -listing  and low turnover that Latin markets have experienced are  associated with the low degree of market transpa          rency  and investor protection provided by even  the largest and most active countries in this region            [1]. These characteristics are ultimately reflected  in the cost of trading borne by investors, thus placing Latin markets at a competitive disadvantage  with re  spect  to more developed markets. A reversal of this trend must begin with reforms   in market design and corporate governance. The four countries in our study have recently undertaken changes in this direction.

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[1] According to international fund managers and regulators, the abuse of minority shareholders by controlling groups  has contributed to the decline of equity Latin American markets over the last decade. See, among others, "Storming the Castle", LatinFinance (1999), "Brazil´s new rules", LatinFinance (2000), and      "Bringing back Brazilian equity", a supplement to LatinFinance (2000).

## 2.1. Argentina

Though there are several stoc k markets in Argentina, the Buenos Aires Stock Exchange accounts for more than 95% of volume traded. Less active stocks are traded electronically in morning sessions using a matching system called SINAC, and, in the afternoons, on the floor through open-outcry. The most liquid stocks are only traded electronically.
Adequate corporate governance and market transparency have not been present in Argentina. Information disclosure by controlling groups has been insufficient, and fraudulent market operations have rarely been sanctioned. A law that would increase market transparency and protect the interests of minority shareholders was approved in 2001. The new law penalizes insider trading and regulates the market for corporate control, among other changes.

On the other hand, Argentina has been a very open market during the last decade in terms of foreign investment. There have been no limits on foreign ownership of equity or capital controls.

## 2.2. Brazil

In the year 2000, Brazil's stock markets were integrated and the trading of equity securities consolidated at the Stock Exchange of Sao Paulo (Bovespa). Transactions at Bovespa are carried out on the floor of the exchange through open -outcry and, since 1991, through an electronic trading system (CATS). Currently, only the most liquid stocks are traded on open -outcry sessions[2].

Brazil ranks poorly in terms of corporate governance. According to Claessens et al. (2000), Brazil has the weakest corporate governance of all four countries in our study. Stati stics of corporate governance by financial institutions such as Merrill Lynch and Credit Lyonnais concur. Though market reforms have been discussed in Brazil for several years, regulation in place does not yet protect minority shareholders and ensure marke t transparency. An important corporate governance problem is the existence of share classes with different voting rights. In fact, most of the shares traded at Bovespa are non -voting. This allows the entrenchment of shareholder groups that do not necessari ly own a majority of the capital. In addition, there are neither tag-along rights for minority shareholders nor minimum free -float requirements. This allows abuses by controlling shareholders during situations of changes in control. To compensate for the flaws in market regulation, Bovespa created in 2000 a new listing segment (Novo Mercado) that distinguishes firms that voluntarily adopt higher standards of corporate governance and information disclosure than required by legislation.

In terms of foreign investment restrictions, a regulation was in place, until the year 2000, that prevented foreigners to invest directly in the Brazilian capital markets. Only foreign institutional investors were allowed to participate through special investment vehicles. Cu rrently, foreign investment has been liberalized and only investments in certain strategic sectors require approval by the government.

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[2] There is an increasing use of electronic trading: 40% of volume traded in 2000, and 60% in 2001

## 2.3. Chile

The Santiago Stock Exchange, with 90% of volume traded, is the main stock market in Chile. In 1993, the least liquid stocks were incorporated into electronic trading, while the rest remained in an open-outcry system. Over time, the remaining stocks have been gradually incorporated into the electronic trading system. Currently, the traditional floor is used for trading a handful of very active stocks during a very short period of time. Most of the trading is done electronically.

The level of investor protection is relatively high in Chile. Regulations are in place to assure the quality of information disclosure and corporate governance by Chilean firms. For instance, firms must comply with minimum corporate –governance requirements before institutional investors are allowed to invest in their shares.

On the other hand, the Chilean capital market has been subject to stringent capital controls during the 1992-2000 period. Foreign investments were subject to unremunerated reserve requirements until September 1998, and to a one-year minimum holding period until May 2000. In addition, Chile has been the only country in the region that has maintained capital gains taxes for foreigners during the whole decade. In fact, Chile has been a very restrictive capital market during the nineties[3].

## 2.4. Mexico

Trading at the Mexican Stock Exchange, the only securities market in Mexico, is fully automated. The process started in 1993, when less active stock were incorporated into an electronic limit book, and ended in January 1999, when the 32 most active stocks that composed the market index entered the automated system.

In terms of investor protection and corporate governance, the Mexican capital market has been documented to be one of the weakest in the world (see Lopez-de-Silanes, 2000). Mexican firms have been characterized by high ownership concentration and low transparency in their administration. As in Brazil, firms have been allowed to issue shares with different voting rights and foreign ownership restrictions. Moreover, there is empirical evidence of uncontrolled insider trading at the Mexican market (Bhattacharya, 2000).

Market reform came in June 2001. The law limits non-voting shares to 25% of capital, requires the presence of independent directors on the board, allows minority investors to elect directors, and gives more power to market regulators so that are better able to enforce rules.

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[3] Mobius, money manager, cited (1999): "Only China is more restrictive than Chile"

## 3.    DATA AND DESCRIPTIVE STATISTICS

The primary source of data for this study relies on 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 retur n 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.

Table 2 provides descriptive statistics of the data. Results are provided by country and by common market value of equity deciles. Grouping by common market value allows the comparison of stocks from different countries. The market value of equity across countries for all deciles are similar, except for the largest decile where Brazilian and Mexican firms have higher market values than their Argentinean and Chilean counterparts. Argentinean stocks present the highest trading volume (or turnover) in small and medium stocks up to decile 7, whereas Mexican stocks are more active in the largest deciles. Chilean stocks have the lowest trading activity in all deciles but the largest, and also the lowest volatility of returns. Brazilian stocks have the highest return volatility in every size decile. Mexican stocks present higher volatility than Chilean and Argentine an stocks in all deciles but the largest. Similar to results from studies of more developed countries, trading volume increases and return volatility decreases with market value. Contrary to these studies, however, the price level does not increase with ma rket value.

## 4.    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 th e 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

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

*where*

$$R_{it} = R^*_{it} - a_{1i} \qquad if \qquad R_{it}^* < a_{1i} \; , \qquad a_{1i} < 0$$

$$R_{it} = 0 \qquad if \qquad a_{1i} < R_{it}^* < a_{2i}$$

$$R_{it} = R^*_{it} - a_{2i} \qquad if \qquad R_{it}^* > a_{2i} \; , \qquad a_{2i} > 0$$

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 exce eds 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 ar e equal to the true returns up to the value of transaction costs. The parameter $a_{1i}$ measures the trading cost threshold that must be exceeded before investors act on negative information for stock $i$, while $a_{2i}$ measures the trading cost threshold on positi ve information. Thus, $a_{1i}$ and $a_{2i}$ 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., $a_{1i} < R_{it}^* < a_{2i}$), 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 $a_{1i}$ and $a_{2i}$, 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 3 shows average estimates of proportional trading costs for sell $(\alpha_1)$, buy $(\alpha_2)$ and roundtrip $(\alpha_2 - \alpha_1)$ transactions for stocks grouped by country and market value decile. Sell, buy, and roundtrip trading costs monotonically decrease with firm size within each country. Thus, results are as expected and con sistent with previous evidence of the negative relation between the size of a firm and its trading cost [Demsetz (1968), Lesmond et al (1999), among others].

Our table shows that it can be costly to trade stocks at Latin American markets. Mean round -trip trading costs are around 6% of value traded for stocks in the Argentinean, Chilean and Mexican samples and 13% for Brazilian stocks. It is also evident that there is wide variation in trading costs across markets and across stocks within each market. Brazi lian stocks present the highest magnitude of trading costs in every size decile. Mexican stocks follow Brazil with the second highest trading costs in 7 out of 9 comparable deciles [4]. Within each country, there is

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[4] Decile 10 is not comparable across countries in terms of mean market value.

considerable  difference in trading costs be        tween  large and small stocks. For instance, roundtrip trading  costs for Mexican stocks range from 1% for the largest stocks to 23% for the smallest. Finally,  it is worth mentioning that trading costs for the sale of stocks are higher than those for the  purchase  of stocks in every country and size group. This result is consistent with previous work  by Berkowitz et al (1988), and with the idea that sales are done in larger quantities and with more haste than purchases.

There  is also variation in trading cost        s  over time, within each country. Table 4 shows that trading costs  increase during the years of financial turmoil in Latin American markets. In Argentina, for instance,  the years of highest trading costs are 1995 and 2001, which coincide with a banking crisis  and an insolvency crisis, respectively. Brazil had an economic crisis in 1992, was affected by  the Russian crisis in 1998, and had a financial crisis in 1999. The Mexican peso crisis started on   December of 1994, and Mexico was probably the Latin countr                y  most affected by the uncertainty  surrounding September 11, 2001. The last column of table 4 shows that 1998 and 1999,  the two years of the so called emerging market crisis, and 2001, the turbulent year of September 11, present the highest trading costs f or the whole sample.

## 5.   TRADING COSTS AND VARIATION IN ECONOMIC VARIABLES

The  differences in trading costs across countries and individual securities documented in the previous   section can be explained by variations in stock characteristics. Previous                work with developed  country data indicates that, in addition to firm size, variables such as trading activity, return  volatility and stock price level affect trading costs       [5]. We use these four stock characteristics as auxiliary variables to explain the var iation of trading costs across stocks in our sample.

The  auxiliary variables affect trading costs in different ways. Trading costs are expected to decrease  with  firm  size  because it is easier to find a counterpart for larger firms. In addition, there  is  more   public information available for these firms, and accordingly, less information asymmetry.  Trading costs should decrease with the level of trading activity          , because it is easier to  find a counterpart for more active stocks, and also because there may          be  economies of scale in trading.  Trading costs should increase with return volatility because it is more costly to hold inventory  for more volatile stocks, and also because the cost of dealing with informed traders is higher.  Finally, results from US stud     ies  show that trading costs decrease with       price level  because the  minimum price variation allowed, the tick size, imposes a constraint on bid              -ask  spreads (Harris,  1994). This binding constraint is more pronounced for low          -priced  stocks because tick size as   a  fraction of price, the relative tick, is higher for these stocks. In addition, it has been argued  that low  -priced  US stocks are riskier (Stoll, 2000). In our study, however, the expected effect  of price level on trading costs is not clear because minimum           price variation rules differ from those of U.S. markets, and also across the four countries in our sample (Table A).

Table A.

As  shown in following table, the relative tick is 1% of price for Argentinean stocks. For Brazilian stocks the tick size is a  lways R$0.10. For Chilean and Mexican stocks, the tick size  depends on price level, and thus, the relationship between price and relative tick is not continuous.

|            | Stock Price | Price Increment |
|------------|-------------|-----------------|
| Argentina[*] | any price level | $0.01 per $1 of price |
| Brazil     | any pr ice level (except penny stocks) | R$0.10 per 1000 share lot |
| Chile      | $0       to   $99.99 | $0.001 |
|            | $100     to   $999.99 | $0.01 |
|            | $1,000   to   $9999.9 | $0.1 |
|            | >$10,000 | $1 |
| Mexico[*]  | $0.01    to   $0.20 | $0.001 |
|            | $0.21    to   $5 | $0.01 |
|            | $5.02    to   $20 | $0.02 |
|            | $20.05   to   $50 | $0.05 |
|            | >$50.10 | $0.10 |

* regulations for Argentina and Mexico changed in April 1999 and July 2000, respectively

In  addition, we have previously shown in section 3 that the stock price level in th              ese  markets does  not increase with market value and trading activity. Thus, low               -price  stocks need not be

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[5] Please refer to Stoll (1985, 2000), Harris (1994), Bessembinder and Kaufman (1997), among others.

riskier than high -price stocks, as has been documented for the US. The impact of share price on trading cost is therefore left to be determined by our empirical analysis.

Results of pooled cross -sectional time series regressions of percentage round -trip trading costs against our four auxiliary variables, by country, are presented in table 5. The explanatory variable firm size is number of shares times closing price in dollars, at the end of the year. Trading activity is measured as yearly turnover and computed as annual trading volume divided by market value at year end. Price level is average dollar closing price during the year, and volatility is stan dard deviation of daily returns for each year. To facilitate the interpretation of results, the explanatory variables firm size, turnover, and price level are log scaled. Since residuals for the same stock may be correlated across years, significance level s of coefficient estimates are evaluated with a bootstrap methodology. For each country, we generate a bootstrap sample by drawing, randomly and with replacement, from the residuals of the original regressions. Regressions are then re -estimated using the bootstrap sample of residuals as the dependent variable. By replicating this procedure one thousand times, we obtain a large number of bootstrap coefficient estimates that allow us to approximate the actual distribution of coefficient estimates under the nu ll, while preserving the non -independence of the original residuals. The achieved significance level shown in table 5 is the proportion of replications in which the absolute value of the bootstrap coefficient estimate is greater than or equal to the estima te obtained from the original sample.

As expected and consistent with other studies, trading costs decrease with firm size and trading activity. In general, a 1% increase in market value or turnover implies a decrease in trading costs of approximately 2% of value traded. These magnitudes are statistically and economically significant. Also as expected, trading costs increase with return volatility. Volatility coefficient estimates are positive and statistically significant in every country with trading cos ts increasing between 1.14 and 2.5 times each unit increase in volatility. Our empirical results indicate that trading costs increase with price level; the coefficient estimate of share price is positive and statistically significant in all countries excep t Chile. A 1% increase in price level implies an increase of trading costs of, at most, 0.6% of value traded. Finally, adjusted R -squares ranging from 56 to 77% show that the explanatory variables are able to explain an important part of the variation in trading costs across stocks within each country.

Since we estimate cross -sectional, time series regressions, it is possible that the panel structure of our data obscures the influence of economic variables across stocks. Thus, we estimate a series of pure cross-sectional regressions, one per year. As table 6 shows, the results are basically unaltered. Market value and trading activity (volatility) remain negatively (positively) related to trading costs. Price level, however, remains positively and signifi cantly related to trading costs for most of the years in Brazil, but not in the other three countries. Finally, we also estimate the model by Weighted Least Squares, where the weights are proportional to the number of observations used in estimating the de pendent variable. Results are qualitatively the same and available upon request.

## 6.     COMPARING COSTS ACROSS COUNTRIES

Sections 4 and 5 show that there is variation in trading costs across markets and, within each market, across individual stocks. Additio     nally, we have shown that the characteristics of stocks trading in each market are important in explaining this variation. We now directly compare trading costs across countries while controlling for differences in the characteristics of the stocks that trade in each market. This is done by performing the matching procedure and regression analysis explained below.

We first construct three samples to separately analyze large, medium and small firms. For this purpose, we select the 150 largest stock      -years in Argentina and find a match in each of the other three countries[6]. The matched stock  -years are the ones that minimize the difference in market value across countries and that satisfy two conditions: (1) they have a "year" value that lies within a +/ - 1 ra nge with respect to the Argentinean stock's year (an Argentinean stock with year=1998 can be matched with a stock from another country with year=1997, 1998 or 1999) and (2) they have a market value that differs by at most 7.5% with respect to the Argentine              an stock. To construct the small     -firm sample, we select the 150 smallest stock      -years in Argentina and find a market value match in the other three countries following the same procedure. Finally, the medium size sample is constructed by selecting the 150                Argentinean stocks that lie exactly between the largest and smallest stock samples, excluding the 25 stocks closest in size to the small stocks and the 25 closest to the large stocks.

Table 7 shows the size    -matched samples. Panel A shows that the large        -firm sample, with 472 observations, presents a mean market value of 1,305 million dollars (this size is considered large even for US stocks). Panel B shows that the medium             -firm sample has 420 observations and a mean market value of 168 million dollars. The                small-firm sample, shown in panel C, has 204 observations and a mean market value of approximately 31 million dollars. The table shows that, within each size sample, market value is equivalent across countries, but trading activity is not. Trading activity is higher for Mexican stocks than for stocks of equivalent size in the rest of the countries. Brazilian stocks present the highest volatility and trading costs in each of the three size samples. An interesting observation is that Mexican stocks consisten              tly present the second highest trading costs in spite of being the most actively traded.

We now perform a regression analysis following Bessembinder and Kaufman (1997a,b) and Bessembinder (1999). Trading costs are modeled as a function of stock character              istics and a set of dummy variables that identify the listing market as follows:

$$TC_{it} = \boldsymbol{a_1}D^{AR}_{it} + \boldsymbol{a_2}D^{BR}_{i\,t} + \boldsymbol{a_3}D^{CH}_{it} + \boldsymbol{a_4}D^{MX}_{it} + \sum \boldsymbol{a_j}X_{jit} + e_{it} \qquad (2)$$

where for each stock      $i$ during year    $t$, $TC$ is the percentage roundtrip trading cost, the D      ´s are dummy variables that represent the four countries (i.e.,              $D^{AR}$ is equal to one for stocks from Argentina and zero otherwise), and the X´s are the set of stock characteristics. Since observations for each stock characteristic are adjusted by subtractin              g the variable's sample mean (computed across the four markets), the inclusion of one intercept for each market allows the

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[6] Argentina is selected as benchmark for the matching procedure because it is the sample with the smallest number of observations. Thus, this country determines the maximum possible number of matches across all countries.

comparison of trading costs for a hypothetical stock that presents a firm size, trading activity, volatility and price level equal to that of the sample mean. Regression model (2) is estimated separately for the large -, medium- and small -firm samples. As before, since residuals for the same stock may be correlated across time, we implement a bootstrap methodology to evaluate the significance levels of coefficient estimates. This bootstrap procedure is explained in detail in Bessembinder and Kaufman (1997a,b).

Panel A of Table 8 shows mean trading costs in each market after controlling for stock characteristics. Since testing the hypothe ses that mean trading costs are equal to zero is of little interest, we present significance levels for the null that mean trading costs are equal between each country and Brazil [7]. Results for the large -firm sample show that the mean trading cost for a hypothetical stock with each economic variable of equal magnitude to that of the variable's sample mean is 1.5% of value traded in Argentina, 1.6% in Chile, 2.3% in Brazil, and 2.8% in Mexico. For the medium -firm sample, the estimated mean trading costs are 3.3% for Argentina and Chile, 5.4% for Brazil and 6% for Mexico. For both of these samples, trading costs in Argentina and Chile are significantly different from those of Brazil. However, we cannot reject the null that trading costs are equal in Mexico and Brazil. For the small -firm sample, mean trading costs are 9.85% for Argentina, 10.13% for Brazil, 11.48% for Chile and 10.45% for Mexico. None of the countries present significant differences with respect to Brazil. Panel B shows the coefficient estimates for each stock characteristic. The magnitudes and signs of these coefficients are similar to those reported in section 5 for each individual country. All coefficients are statistically significant with the exception of price level, which remains significan t only for large firms. Adjusted R-squares ranging from 77 to 87% indicate that country and economic variable effects are able to explain most of the variation in trading costs [8].

Table 9 summarizes our results by comparing pair -wise differences in tradin g costs between countries before and after controlling for variation in stock characteristics. When we compare raw sample means for large and medium firms, Brazilian stocks present significantly higher trading costs than the rest of the markets. However, when we adjust for differences in stock characteristics, mean trading costs are of similar magnitude in Brazil and Mexico and significantly higher than those in Argentina and Chile. Thus, results for large and medium size firms indicate that, besides the effect of economic variables, country -specific effects are responsible for differences in trading costs across markets. The highest trading costs observed for the Mexican and Brazilian markets is surprising given that these are the two more active markets in the region. Results for the small -firm sample are summarized in the last two columns of the table. When comparing raw sample means, trading costs are again higher for Mexico and Brazil than for Argentina and Chile. However, these differences disappear wh en we adjust for variations in stock characteristics. Thus, for small firms, the variation in trading costs across countries is related to differences in the characteristics of the stocks that trade in each market and not to country-specific factors.

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[7] We use this country as benchmark because our previous results show that Brazil has the highest trading costs. Table 9 completes this information comparing all four markets to one another.

[8] To check the robustness of our results, we also estimate regression (2) with a two-way random effects model for unbalanced panel data. Results, available upon request, are not altered.

## 7.  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: Argent        ina,  Brazil, Chile and Mexico. Our sample includes 4,728  stock-years  and covers 10 years (1992       -2001)  of data. Mean trading cost comparisons for stocks   grouped by country and market value deciles indicate that trading costs monotonically decrease  with firm    size  within each country. Also, Brazilian stocks present the highest trading costs  in every size decile. To analyze the variation in trading costs across individual stocks in each   country, we estimate pooled cross       -sectional  time series regressions of tradi      ng  costs using market    value, turnover, volatility and price level as explanatory variables. Consistent with previous   work, we find that trading costs decrease with firm size and trading activity, and increase  with the volatility of returns. In contrast to               previous  work and with the exception of Chilean   stocks, trading costs increase with price level. Our models show that the auxiliary variables   used here are able to explain an important portion of the variation in trading costs across individual stocks in t hese markets (adjusted R-squares range from 56 to 77%).

We  compare trading costs across countries for three sets of market           -value  matched samples using a    regression model [Bessembinder and Kaufman (1997a,b)] that includes country                 -related dummies   and the    set  of stock characteristics. Our results indicate that, besides the variation in stock   characteristics, there are country specific factors that explain the differences in trading costs   across markets. For large and medium size firms, and once we control fo             r  stock characteristics,   Brazil and Mexico present higher trading costs than Chile and Argentina. For small   firms, the variation in trading costs across countries is related to differences in the characteristics of the stocks that trade in each market and  not to country-specific factors.

Findings   for large and medium size firms are interesting given that Brazil and Mexico, the markets   with the highest trading costs for equivalent securities, are also the largest and most active  capital markets in the regi     on.  Our results evidence the influence of market specific factors, such   as regulatory environment and/or market microstructure on market liquidity. Mexican results   are consistent with previous evidence regarding the existence of a large asymmetric information  component of the spread for stocks trading at the Mexican stock market [Silva and Chavez  (2002)]. The presence of information asymmetry at the Mexican market has also been documented   by Bhattacharya et al., (2000), evidencing the existence of unrestric              ted  insider trading  at the Mexican market. Brazilian results are consistent with evidence of a weak            corporate governance environment (Claessens et al, 2000).

Finally,   our results for small firms have implications for investment strategies. Though it is qu                ite costly   to trade small firms, these costs are of similar magnitude across the four countries. Thus, while   there may be country    -related  cost advantages for investors targeting medium and blue         -chip firms, these advantages disappear for the smaller, less k nown stocks.

**Figure 1**

This figure presents annual total trading volume in millions of dollars (vertical bar) and number of stock listings (line).
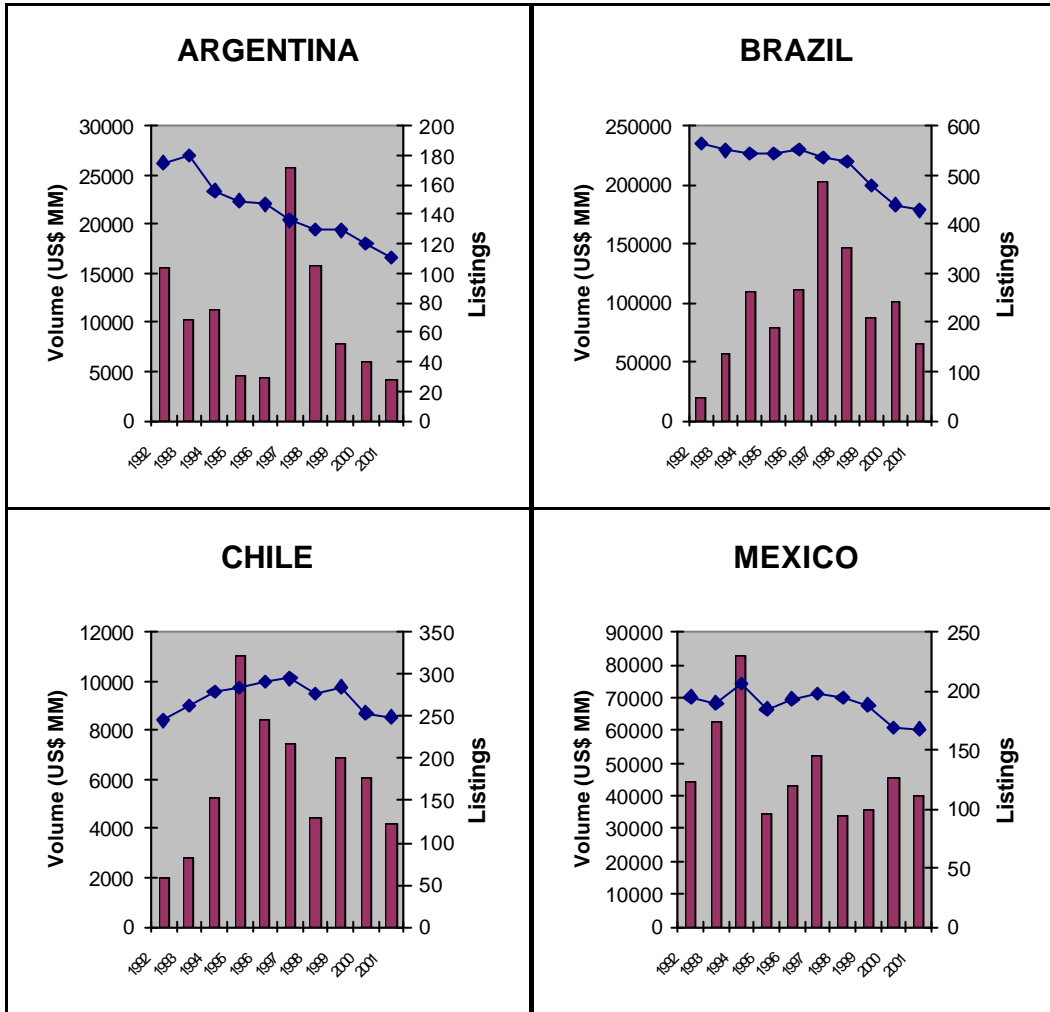
**Table 1 :  Latin Stock Markets Information**

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 % |

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

**Table 2. Data Description by Country and Market Value Deciles**

Reported  values are sample averages by country, and by market value decile. Deciles are formed o       n a common  value of market capitalization for all countries. Market value, in millions of dollars, is number of shares issued times closing price at the end of the year. Volume, measured in millions of dollars, is annual trading volume. Turnover  is compute d 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 local daily returns measured over the year. N is the number of stock years.

| Country | | Market Value Deciles | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Overall | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| Argentina | | | | | | | | | | | | |
| Market Value | 704 | 7.37 | 24.33 | 54.11 | 99.79 | 169.40 | 274.71 | 445.41 | 798.42 | 1,681 | 6,616 | |
| Volume | 106.33 | 3.25 | 8.90 | 25.47 | 36.27 | 83.17 | 112.75 | 148.88 | 197.69 | 216.70 | 470.42 | |
| Turnover (%) | 36.96 | 63.03 | 38.07 | 43.83 | 35.52 | 47.22 | 41.54 | 32.90 | 27.29 | 13.67 | 7.87 | |
| Share Price | 6.96 | 1.63 | 9.75 | 5.34 | 5.37 | 21.01 | 6.89 | 2.71 | 3.15 | 3.21 | 8.68 | |
| Volatility (%) | 2.96 | 3.37 | 3.29 | 3.00 | 2.69 | 3.00 | 2.89 | 2.82 | 2.83 | 2.67 | 2.55 | |
| N | 499 | 44 | 75 | 74 | 37 | 51 | 48 | 60 | 40 | 41 | 29 | |
| Brazil | | | | | | | | | | | | |
| Market Value | 3,875 | 5.56 | 24.72 | 56.08 | 100.98 | 165.12 | 266.39 | 429.12 | 775.47 | 1,807 | 34,308 | |
| Volume | 138.62 | 2.25 | 6.07 | 10.78 | 16.84 | 26.96 | 38.07 | 74.24 | 112.05 | 364.70 | 792.60 | |
| Turnover (%) | 22.59 | 54.62 | 25.79 | 19.48 | 17.01 | 16.07 | 14.53 | 17.17 | 14.76 | 19.51 | 10.07 | |
| Share Price | 3.72 | 4.29 | 4.99 | 2.76 | 2.63 | 2.62 | 2.10 | 1.59 | 1.66 | 2.51 | 10.55 | |
| Volatility (%) | 5.81 | 9.43 | 6.70 | 5.88 | 5.20 | 4.94 | 4.70 | 4.17 | 4.33 | 5.71 | 4.94 | |
| N | 2535 | 367 | 278 | 217 | 252 | 251 | 249 | 223 | 228 | 207 | 263 | |
| Chile | | | | | | | | | | | | |
| Market Value | 559 | 7.28 | 26.32 | 56.96 | 99.74 | 162.68 | 262.79 | 434.45 | 786.93 | 1,685 | 4,234 | |
| Volume | 52.30 | 1.36 | 4.64 | 7.62 | 12,42 | 19.18 | 23.60 | 35.60 | 56.67 | 129.45 | 483.28 | |
| Turnover (%) | 11.23 | 17.47 | 17.51 | 13.75 | 12.67 | 11.62 | 9.00 | 8.28 | 7.37 | 8.03 | 12.01 | |
| Share Price | 2.02 | 0.21 | 0.70 | 1.41 | 2.97 | 2.19 | 2.10 | 1.66 | 2.49 | 2.60 | 2.57 | |
| Volatility (%) | 2.06 | 3.28 | 2.36 | 2.07 | 1.93 | 2.03 | 1.90 | 1.90 | 2.06 | 1.96 | 1.86 | |
| N | 989 | 45 | 72 | 131 | 136 | 121 | 120 | 110 | 122 | 88 | 44 | |
| Mexico | | | | | | | | | | | | |
| Market Value | 2,592 | 8.86 | 24.16 | 54.81 | 103.15 | 167.66 | 278.47 | 433.04 | 784.67 | 1,873 | 10,511 | |
| Volume | 457.14 | 1.43 | 9.44 | 16.04 | 32.76 | 61.90 | 104.90 | 158.23 | 224.33 | 403.06 | 1,638 | |
| Turnover (%) | 27.77 | 15.08 | 36.39 | 27.59 | 31.24 | 35.54 | 40.33 | 34.65 | 28.17 | 22.45 | 18.33 | |
| Share Price | 1.68 | 0.10 | 0.30 | 0.59 | 1.34 | 1.35 | 1.25 | 2.17 | 2.22 | 2.25 | 2.03 | |
| Volatility (%) | 3.32 | 8.43 | 5.26 | 4.41 | 3.32 | 3.59 | 3.33 | 3.05 | 2.85 | 2.76 | 2.48 | |
| N | 705 | 17 | 48 | 52 | 47 | 49 | 56 | 80 | 83 | 136 | 137 | |

**Table 3: Trading Costs Estimates by Country and Market Value Deciles**

Reported values are sell, buy, and roundtrip mean trading cost estimates, as percentage of value t raded, by market value deciles. Trading costs are estimated using the Lesmond et al. (1999) methodology. Deciles are formed based on a common value of market capitalization for all countries. N is the number of stock years.

| Country | | | Market Value Deciles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trading costs (%) | Overall | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Argentina | | | | | | | | | | | | |
| | Sell ($\alpha_1$) | -3.58 | -8.15 | -6.10 | -4.61 | -3.26 | -2.31 | -1.77 | -1.97 | -2.30 | -1.50 | -1.17 |
| | Buy ($\alpha_2$) | 2.34 | 5.74 | 4.32 | 3.04 | 2.14 | 1.48 | 0.96 | 1.13 | 1.34 | 0.71 | 0.56 |
| | Roundtrip | 5.92 | 13.89 | 10.42 | 7.66 | 5.40 | 3.79 | 2.73 | 3.10 | 3.64 | 2.21 | 1.74 |
| | N | 499 | 44 | 75 | 74 | 37 | 51 | 48 | 60 | 40 | 41 | 29 |
| Brazil | | | | | | | | | | | | |
| | Sell ($\alpha_1$) | -8.43 | -17.74 | -11.22 | -9.41 | -7.68 | -7.05 | -6.31 | -4.70 | -4.55 | -5.15 | -4.81 |
| | Buy ($\alpha_2$) | 4.59 | 10.51 | 6.18 | 5.05 | 4.15 | 3.73 | 3.26 | 2.24 | 2.14 | 2.32 | 2.68 |
| | Roundtrip | 13.02 | 28.25 | 17.40 | 14.46 | 11.83 | 10.78 | 9.58 | 6.94 | 6.70 | 7.46 | 7.49 |
| | N | 2535 | 367 | 278 | 217 | 252 | 251 | 249 | 223 | 228 | 207 | 263 |
| Chile | | | | | | | | | | | | |
| | Sell ($\alpha_1$) | -3.48 | -9.43 | -4.74 | -4.39 | -4.16 | -3.11 | -3.15 | -2.51 | -2.65 | -1.62 | -0.84 |
| | Buy ($\alpha_2$) | 2.34 | 7.20 | 3.41 | 3.16 | 2.90 | 1.96 | 2.02 | 1.52 | 1.60 | 0.84 | 0.45 |
| | Roundtrip | 5.82 | 16.63 | 8.15 | 7.55 | 7.06 | 5.07 | 5.17 | 4.03 | 4.25 | 2.46 | 1.29 |
| | N | 989 | 45 | 72 | 131 | 136 | 121 | 120 | 110 | 122 | 88 | 44 |
| Mexico | | | | | | | | | | | | |
| | Sell ($\alpha_1$) | -3.42 | -13.43 | -7.67 | -6.44 | -4.61 | -4.54 | -3.98 | -2.73 | -2.25 | -2.18 | -0.84 |
| | Buy ($\alpha_2$) | 2.20 | 9.84 | 5.56 | 4.39 | 3.21 | 3.01 | 2.49 | 1.58 | 1.33 | 1.22 | 0.34 |
| | Roundtrip | 5.62 | 23.27 | 13.23 | 10.83 | 7.82 | 7.55 | 6.47 | 4.31 | 3.58 | 3.40 | 1.18 |
| | N | 705 | 17 | 48 | 52 | 47 | 49 | 56 | 80 | 83 | 136 | 137 |

**Table 4: Trading Costs over Time**

Reported values are mean round-trip trading costs, as percentage of value traded, by country and year. Trading costs are estimated using the Lesmond et al. (1999) methodology. N is the number of stocks. The mean reported for each country is estimated using an arithmetic average across the 10 years.

| Year | ARGENTINA | | BRAZIL | | CHILE | | MEXICO | | ALL COUNTRIES |
|---|---|---|---|---|---|---|---|---|---|
| | N | Trading cost (%) | N | Trading cost (%) | N | Trading cost (%) | N | Trading cost (%) | Trading cost (%) |
| 1992 | 24 | 2.56 | 230 | 18.58 | 61 | 3.75 | 29 | 2.11 | 6.75 |
| 1993 | 45 | 6.13 | 249 | 16.46 | 66 | 3.95 | 35 | 2.34 | 7.22 |
| 1994 | 53 | 5.34 | 267 | 13.43 | 96 | 6.02 | 48 | 3.73 | 7.13 |
| 1995 | 51 | 7.27 | 240 | 10.57 | 105 | 4.26 | 62 | 6.26 | 7.09 |
| 1996 | 60 | 5.94 | 261 | 11.41 | 111 | 4.29 | 70 | 4.49 | 6.53 |
| 1997 | 65 | 5.49 | 259 | 10.70 | 119 | 5.53 | 86 | 4.40 | 6.53 |
| 1998 | 60 | 6.14 | 226 | 14.11 | 112 | 7.83 | 94 | 5.33 | 8.35 |
| 1999 | 52 | 5.77 | 292 | 14.20 | 117 | 8.58 | 107 | 7.64 | 9.05 |
| 2000 | 47 | 5.2 | 282 | 9.85 | 102 | 5.81 | 93 | 6.41 | 6.82 |
| 2001 | 42 | 8.09 | 229 | 11.57 | 100 | 6.32 | 81 | 7.94 | 8.48 |
| Mean | | 5.79 | | 13.08 | | 5.63 | | 5.06 | 7.40 |
| Maximum | | 8.09 | | 18.58 | | 8.58 | | 7.94 | 9.05 |
| Minimum | | 2.56 | | 9.85 | | 3.75 | | 2.11 | 6.53 |

**Table 5: Determinants of Trading Costs.  Pooled Cross-sectional Time Series Regressions, by Country**

The  dependent variable is proportional round  -trip trading cost over the year estimated with the Lesmond et al. (1999) method. 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 the end of the year. 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. N is the number of stock-years. Significance levels are evaluated with a bootstrap methodology (bootstrap p  -values are in parentheses).

| | COUNTRY | | | |
|---|---|---|---|---|
| EXPLANATORY VARIABLE | ARGENTINA | BRAZIL | CHILE | MEXICO |
| Intercept | 0.40805 * (0.000) | 0.47104 * (0.000) | 0.3210 * (0.000) | 0.2796 * (0.000) |
| Market value | -0.02325 * (0.000) | -0.02697 * (0.000) | -0.01932 * (0.000) | -0.01629 * (0.000) |
| Trading activity | -0.02843 * (0.000) | -0.02593 * (0.000) | -0.01850 * (0.000) | -0.02187 * (0.000) |
| Share Price | 0.00249 ^ (0.086) | 0.00235  ^ (0.030) | 0.00008 (0.905) | 0.00602 * (0.002) |
| Volatility | 1.14152 * (0.000) | 1.81892 * (0.000) | 2.47593 * (0.000) | 1.84437 * (0.000) |
| Adj R2 (%) N | 70 499 | 73 2535 | 56 989 | 77 705 |

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

**Table 6: Determinants of Trading Costs. Crosssectional Regressions, by Country and Year**

Results are for pure cross-sectional regressions, by country and year, of proportional round-trip trading costs against stock characteristics. Trading costs are estimated with the Lesmond et al. (1999) method. Market value is number of shares issued times closing price at year end. Trading activity is yearly turnover computed as annual trading volume divided by market value at year end. Price is the average dollar closing price during the year. Market value, turnover and price are log scaled. Volatility is the standard deviation of local daily returns measured over the year. N is the number of stocks. P-values are in parentheses.

| COUNTRY | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|---|
| ARGENTINA | | | | | | | | | | |
| Intercept | 0.157* | 0.404* | 0.3810* | 0.5691* | 0.4104* | 0.3436* | 0.3616* | 0.3534* | 0.3492* | 0.6645* |
| | (0.004) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Market value | -0.009* | -0.021* | -0.0201* | -0.0354* | -0.0239* | -0.0205* | -0.0226* | -0.0235* | -0.0176* | -0.0341* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Trading activity | -0.007^ | -0.025* | -0.0252* | -0.0442* | -0.0309* | -0.0271* | -0.0360* | -0.0368* | -0.0200* | -0.0227* |
| | (0.03) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) | (0.000) |
| Share Price | -0.0005 | -0.002 | 0.0000 | 0.0002 | 0.0002* | 0.0082* | 0.0029 | 0.0117^ | -0.0012 | 0.0198^ |
| | (0.683) | (0.472) | (0.993) | (0.968) | (0.000) | (0.001) | (0.403) | (0.021) | (0.876) | (0.058) |
| Volatility | 0.735^ | 0.271 | 0.5778 | 2.1721* | 1.2452* | 1.4326^ | 1.5629* | 2.2518* | -0.1567 | -0.0431 |
| | (0.05) | (0.648) | (0.190) | (0.000) | (0.010) | (0.013) | (0.000) | (0.000) | (0.857) | (0.968) |
| Adj R2 (%) | 75.52 | 77 | 81.59 | 76.40 | 83.23 | 82.04 | 79.31 | 77.93 | 43.32 | 52.00 |
| N | 24 | 45 | 53 | 51 | 60 | 65 | 60 | 52 | 47 | 42 |
| BRAZIL | | | | | | | | | | |
| Intercept | 0.483* | 0.425* | 0.3338* | 0.3394* | 0.1391^ | 0.2584* | 0.3427* | 0.2270* | 0.2363* | 0.324* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.023) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Market value | -0.034* | -0.028* | -0.0230* | -0.0212* | -0.0113* | -0.0159* | -0.0227* | -0.0163* | -0.0155* | -0.0196* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Trading activity | -0.051* | -0.034* | -0.0298* | -0.0204* | -0.0200* | -0.0174* | -0.0259* | -0.0060^ | -0.0134* | -0.0189* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.085) | (0.000) | (0.000) |
| Share Price | 0.001 | 0.0020 | 0.0043^ | 0.0034* | 0.0043* | 0.0024^ | 0.0109* | 0.0102* | -0.0013 | -0.0043* |
| | (0.595) | (0.469) | (0.026) | (0.001) | (0.007) | (0.025) | (0.000) | (0.000) | (0.195) | (0.001) |
| Volatility | 2.082* | 2.361* | 2.6554* | 2.4291* | 3.4165* | 2.4356* | 3.5184* | 4.0539* | 2.3858* | 1.6342* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Adj R2 (%) | 61 | 44 | 58.45 | 76.60 | 74.96 | 82.85 | 58.45 | 77.77 | 81.97 | 97.23 |
| N | 230 | 249 | 267 | 240 | 261 | 259 | 226 | 292 | 282 | 229 |
| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
| CHILE | | | | | | | | | | |
| Intercept | 0.202* | 0.254* | 0.3266* | 0.2983* | 0.2643* | 0.2756* | 0.4610* | 0.4061* | 0.2908* | 0.3322* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Market value | -0.0124* | -0.0138* | -0.0208* | -0.0173* | -0.0146* | -0.0165* | -0.0263* | -0.0254* | -0.0179* | -0.0193* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Trading activity | -0.0122* | -0.0140* | -0.0210* | -0.0151* | -0.0163* | -0.0183* | -0.0157* | -0.0226* | -0.0153* | -0.0182* |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Share Price | 0.0026^ | 0.0010 | 0.0009 | 0.0019 | -0.0018 | -0.0030^ | 0.0025 | 0.0031 | 0.0012 | -0.0015 |
| | (0.057) | (0.419) | (0.596) | (0.212) | (0.112) | (0.083) | (0.342) | (0.419) | (0.528) | (0.432) |
| Volatility | 1.7789* | 0.6027 | 2.9862* | 1.9162* | 0.9760* | 2.3401* | 2.8085* | 4.1320* | 3.3687* | 2.1002* |
| | (0.000) | (0.156) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) |
| Adj R2 (%) | 65.59 | 61.82 | 82.12 | 61.71 | 68.19 | 64.02 | 51.60 | 46.06 | 62.92 | 65.72 |
| N | 61 | 66 | 96 | 105 | 111 | 119 | 112 | 117 | 102 | 100 |
| MÉXICO | | | | | | | | | | |
| Intercept | 0.1386^ | 0.1618* | 0.3609* | 0.3576* | 0.2318* | 0.2154* | 0.2967* | 0.2953* | 0.3104* | 0.4041* |
| | (0.011) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Market value | -0.0055^ | -0.0082* | -0.0179* | -0.0219* | -0.0137* | -0.0136* | -0.0176* | -0.0177* | -0.0181* | -0.0230* |
| | (0.014) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Trading activity | -0.0019 | -0.0083* | -0.0164* | -0.0328* | -0.0185* | -0.0217* | -0.0207* | -0.0230* | -0.0199* | -0.0299* |
| | (0.563) | (0.006) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Share Price | -0.0019 | 0.0001 | -0.0047 | 0.0013 | 0.0014 | 0.0072* | 0.0076^ | 0.0061 | 0.0127^ | 0.0186* |
| | (0.534) | (0.953) | (0.280) | (0.799) | (0.701) | (0.005) | (0.029) | (0.162) | (0.014) | (0.008) |
| Volatility | -0.0165 | 1.1222^ | 1.1819^ | 2.3025* | 2.1660* | 2.1665* | 1.7378* | 2.0481* | 2.0751* | 1.6754* |
| | (0.787) | (0.083) | (0.071) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Adj R2 (%) | 18.49 | 66.27 | 61.96 | 76.04 | 80.22 | 86.12 | 85.71 | 83.26 | 74.62 | 68.56 |
| N | 29 | 35 | 49 | 62 | 70 | 86 | 94 | 107 | 93 | 81 |

**Table 7: Data Description for Samples Matched by Market Value Across Countries**

Panels A, B and C present mean values for stock characteristics and trading costs for large, medium and small firm samples, respectively. Reported values are averages across stocks for each country. N is the number of stock years.

Market value, in millions of dollars, is number of shares issued times closing price at the end of the year. Volume, measured in millions of 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 local daily returns measured over the year. Trading costs are round-trip costs as percentage of value traded and are estimated with the Lesmond et al. (1999) methodology.

| COUNTRY | N | Market Value | Volume | Turnover (%) | Share Price | Volatility (%) | Trading Costs (%) |
|---|---|---|---|---|---|---|---|
| Panel A: Large-Firm Sample | | | | | | | |
| ARGENTINA | 118 | 1,296 | 218 | 24 | 3.24 | 2.76 | 2.76 |
| BRAZIL | 118 | 1,309 | 165 | 14 | 3.81 | 3.56 | 4.74 |
| CHILE | 118 | 1,314 | 120 | 9 | 2.85 | 1.91 | 2.73 |
| MÉXICO | 118 | 1,300 | 301 | 27 | 2.62 | 2.89 | 3.40 |
| ALL | 472 | 1,305 | 201 | 19 | 3.13 | 2.78 | 3.41 |
| Panel B: Medium-Firm Sample | | | | | | | |
| ARGENTINA | 105 | 167 | 54 | 33 | 5.62 | 2.84 | 4.34 |
| BRAZIL | 105 | 167 | 38 | 24 | 2.34 | 3.93 | 9.11 |
| CHILE | 105 | 167 | 25 | 14 | 3.44 | 1.96 | 4.73 |
| MEXICO | 105 | 169 | 73 | 40 | 1.29 | 3.28 | 6.51 |
| ALL | 420 | 168 | 47 | 28 | 3.17 | 3.00 | 6.17 |
| Panel C: Small-Firm Sample | | | | | | | |
| ARGENTINA | 51 | 30.62 | 7.71 | 25 | 1.93 | 2.97 | 9.33 |
| BRAZIL | 51 | 30.88 | 5.78 | 18 | 2.31 | 5.78 | 17.11 |
| CHILE | 51 | 30.78 | 4.96 | 16 | 1.07 | 2.36 | 9.62 |
| MEXICO | 51 | 30.63 | 8.34 | 25 | 0.43 | 5.17 | 13.94 |
| ALL | 204 | 30.73 | 6.70 | 21 | 1.43 | 4.07 | 12.50 |

**Table 8: Country and Economic Variables Effects**
This table reports regression coefficients of trading costs against country indicators and the set of economic variables for the following model:

$$TC_{it} = a_1 D^{AR}{}_{it} + a_2 D^{BR}{}_{it} + a_3 D^{CH}{}_{it} + a_4 D^{MX}{}_{it} + \sum a_j X_{jit} + e_{it.}$$

The dependent variable is proportional round -trip trading cost for stock i during year t estimated with the Lesmond et al. (1999) me thod. The D´s are dummy variables that represent each country, and the X´s are the set of stock characteristics . Panel A shows estimated coefficients for country indicators. Panel B reports slope coefficients for the economic variables. Market value, in mi llions 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 the end of the year. Share price is the average dollar closing p rice 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 the number of stock -years. Significance levels are ev aluated with a bootstrap methodology (bootstrap p -values are in parentheses). The null for country indicator coefficients is that there is no difference in mean trading costs between each country and Brazil.

|  | Large-Firm Sample | Medium-Firm Sample | Small-Firm Sample |
|---|---|---|---|
| Panel A:  Country indicators (%): |  |  |  |
| ARGENTINA | 1.51 ^ <br> (0.025) | 3.34 * <br> (0.000) | 9.85 <br> (0.818) |
| BRAZIL | 2.30 | 6.14 | 10.13 |
| CHILE | 1.60^ <br> (0.100) | 3.33 * <br> (0.001) | 11.48 <br> (0.253) |
| MÉXICO | 2.79 <br> (0.231) | 5.37 <br> (0.152) | 10.45 <br> (0.759) |
| Panel B:  Economic variables: |  |  |  |
| Market value | -0.01401 * <br> (0.000) | -0.01941 * <br> (0.000) | -0.03367 * <br> (0.000) |
| Trading activity | -0.01845 * <br> (0.000) | -0.02461 * <br> (0.000) | -0.02869 * <br> (0.001) |
| Share price | 0.00394 * <br> (0.005) | 0.0018 <br> (0.215) | 0.00324 <br> (0.166) |
| Volatility | 1.60199 * <br> (0.000) | 1.12007 * <br> (0.000) | 2.10259 * <br> (0.000) |
| Adj R-Sq | 77 | 81 | 87 |
| N | 472 | 420 | 204 |

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

**Table 9: Trading Costs Differences Between Countries Before and After Adjusting   for Variations in Stock Characteristics**

This table presents pair-wise differences in mean trading costs between countries before adjusting for stock characteristics across markets (differences in raw sample means) and after adjusting for stock characteristics with regression analyses (differences in adjusted sample means). Trading costs are estimated using the Lesmond et al. (1999) methodology. Differences in trading costs are expressed as percentage of value traded. Significance levels are evaluated with a bootstrap methodology (bootstrap p-values are in parentheses).

| Pair-wise Differences in Trading Costs | Large-Firm Sample N=472 | | Medium-Firm Sample N=420 | | Small-Firm Sample N=204 | |
|---|---|---|---|---|---|---|
| | Differences in Raw Sample Means (%) | Differences in Adjusted Sample Means (%) | Differences in Raw Sample Means (%) | Differences in Adjusted Sample Means (%) | Differences in Raw Sample Means (%) | Differences in Adjusted Sample Means (%) |
| ARGENTINA-BRAZIL | -1.976 ^ (0.000) | -0.785 ^ (0.025) | -4.766 * (0.000) | -2.799 * (0.000) | -7.784 * (0.005) | -0.276 (0.818) |
| ARGENTINA – CHILE | 0.03 (0.925) | -0.089 (0.814) | -0.393 (0.487) | 0.011 (0.975) | -0.295 (0.804) | -1.634 (0.164) |
| ARGENTINA – MÉXICO | -0.645 (0.169) | -1.285 * (0.000) | -2.172 * (0.004) | -2.027 * (0.000) | -4.616 * (0.000) | -0.603 (0.607) |
| BRAZIL-CHILE | 2.006 * (0.000) | 0.696 ^ (0.100) | 4.373 * (0.000) | 2.810 * (0.001) | 7.489 * (0.003) | -1.358 (0.253) |
| BRAZIL-MEXICO | 1.331 ^ (0.013) | -0.50 (0.231) | 2.594 * (0.000) | 0.772 (0.152) | 3.168 (0.191) | -0.327 (0.759) |
| CHILE-MEXICO | -0.675 ^ (0.089) | -1.196 * (0.004) | -1.779 * (0.000) | -2.038 * (0.000) | -4.321 * (0.005) | 1.031 (0.372) |

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

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