

Dual-listings on international exchanges: the case of emerging markets' stocks

Ana Paula Serra*

Institute of Finance and Accounting, London Business School, Sussex Place, Regent's Park, London NW1 4SA, UK; e-mail: aserra@lbs.ac.uk

Abstract

This paper examines the effects on stock returns of dual-listing on an international exchange. My sample consists of 70 firms from 10 emerging markets that dual-listed on the NYSE, NASDAQ and SEAQ-I (London) over the period 1991–1995. I evaluate whether an international dual-listing has any significant effect on returns, for the particular case of emerging markets' firms, and I proceed to investigate whether there is evidence to support an International Asset Pricing based explanation. In addition I compare the impact of US and London SEAQ-I listings. My results confirm previous empirical findings on international listings: the firms in my sample experience significant positive abnormal returns before listing and a significant decline in returns following listing. Evidence seems to be supportive of the segmentation hypothesis: dual-listing effects are more pronounced for emerging markets' listings and that pattern is similar across exchanges.

Keywords: *international asset pricing; segmentation; dual-listings; emerging markets; event studies.*

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1. Introduction

Integration of capital markets is defined as a situation where investors earn the same risk-adjusted expected return on similar financial instruments in different national markets. In a fully integrated market only the world systematic risk factors are priced

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and the price of risk is the same world-wide. In a fully segmented market, however, only risk associated with local factors is priced and the rewards to risk may not be the same.

Dual-listing stocks are useful instruments to test international asset pricing theories. A decline in the expected return of a stock after the listing date may be explained in the following way: if markets were segmented before the dual-listing occurs and if the dual-listed security is unique, then dual-listing would mitigate segmentation by improving risk sharing.¹ In the particular case of emerging markets, where barriers to investment are more severe in the sense that international investment is, in the limit, precluded by regulatory and ownership barriers, those effects should be more pronounced.

The change in the return characteristics of a firm that cross-lists on a foreign stock exchange can be related to issues other than international capital market segmentation. A public listing on a major exchange increases investor's awareness and improves liquidity and either of the two may induce a lower required rate of return. Alternatively, post-listing returns may be low because managers of small firms, for which listing requirements may be binding, time their application for listing when firms have recently performed well.

If a foreign listing enables lowering the cost of capital, then firms have an incentive to cross-list. The choice of exchange is not neutral to the impact on the stocks' expected return. It would be difficult to understand why a firm, that could choose to trade on any international market, would not choose the New York Stock Exchange (NYSE) except for the costs involved.^{2,3} The interesting question is whether these additional costs will be more than offset by the benefits of enhanced risk sharing and superior liquidity services.

Previous literature has looked at the effects of foreign listings for the arguments outlined above. The evidence provides support for investor recognition and liquidity as sources of value but is inconclusive regarding the capital segmentation based explanation. The goal of this paper is to provide more evidence regarding the valuation impacts of emerging markets' firms dual-listings in international markets and study the link between these effects and market segmentation. If markets were segmented before the dual-listing, significant positive abnormal returns should be observed around the listing date: firms' values increase reflecting lower expected returns. Further, on the long run, significant negative abnormal returns should occur

¹ As pointed by Alexander *et al.* (1987), foreign listing by itself cannot undo *formal* barriers (for example, general or sector specific ownership restrictions). In fact, some dual-listings have effectively resulted in the removal or decrease of ownership barriers. This was the case for the South Korean dual-listings on the NYSE.

² Firms face earnings, size, shares' dispersion and other requirements to obtain a listing on a public exchange. Many firms, specially those firms originating from emerging markets, will not meet these requirements. If a firm is admitted, it must support initial and continuation fees and the costs to meet disclosure requirements. Information on the US and UK stock exchanges' requirements and fees was not included here due to space limitations but it is available upon request from the author.

³ Aggarwal and Angel (1997) suggest NASDAQ (National Association of Security Dealers Automated Quotation) provides more visibility than NYSE. Very large firms, that are able to bypass the high trading costs in NASDAQ through trading on INSTINET or POSIT, could thus have superior benefits listing on NASDAQ. See also Cowen *et al.* (1992).

reflecting a lower expected return. The magnitude of the abnormal returns should vary in the same direction of the severity of segmentation and depend on the stock's idiosyncratic features.

My analysis focuses on the effects for *emerging markets*' dual-listed firms' and this paper is the first one to include dual-listings in London, on the Stock Exchange Automated Quotation International (SEAQ-I) Developing Markets' sector.

The contribution of this paper is three-fold. First, it re-examines the effects of international dual-listings on local stock returns with a sample of emerging markets' firms that is more extensive than any other used before, and assesses the robustness of earlier findings to the use of non-parametric tests. Second, it compares the impact of US and London SEAQ-I listings. Third, it *explicitly* investigates to which extent international asset pricing theory can explain the valuation effects of dual-listings.

This study is important because it generalizes previous results to emerging markets; it allows to extract inferences about capital segmentation and it evaluates the merits of listing in different places with the necessary implications for corporate managers wishing to decrease the firm's cost of capital.

The final sample consists of 70 international dual-listings from 10 emerging stock markets over the period of January 1991 to November 1995.

My results confirm previous findings: firms experience significant positive abnormal returns before the listing date and a significant decline in returns over the first five weeks following listing. The decline seems to be persistent for a longer horizon but that evidence is not conclusive. For emerging markets, the effects are more pronounced and the pattern seems to be similar across exchanges. For a control sample of mature markets' firms, however, only the NYSE listings' effects are significant.

Altogether, these results suggest that, changes in expected returns around listing are related to market segmentation. Stocks from more segmented markets seem to register a decrease in its cost of capital regardless of the place where they are dual-listed.

The results are robust to different specifications for modelling returns and the inference conclusions are robust to a battery of parametric and non-parametric tests. In addition I observe a significant increase in the world systematic risk parameters. The cross-sectional analysis results are weak. Yet, it is possible to identify some economically and statistically significant coefficients for proxies of the international asset pricing determinants.

The paper is arranged as follows. Section 2 presents the American Depositary Receipts (ADR) and SEAQ-I markets. Section 3 reviews the relevant literature. Section 4 presents the testable hypotheses motivated by an international asset pricing model. Section 5 reviews the methodology. Section 6 describes the data sources and the sample. Section 7 summarizes the results of my empirical tests and discusses the findings. Section 8 concludes.

2. Emerging markets' foreign listings

Equity placements in the international capital market have registered a huge increase over the last decade. Developing markets' share represents close to 40% of those issues, if we exclude the retreat observed after the Mexican crisis of December 1994. Most international equity placements have been offered by Latin American and Asian firms with special emphasis for Mexico, Argentina, China and recently India.

In the recent years, international cross-listing started taking place in special shares of the foreign firm, depositary receipts (DRs).⁴ Depositary receipts are claims issued by a depositary institution to an underlying foreign security. When issuers raise money in two or more markets, they issue Global Depositary Receipts (GDRs). GDRs placed in Europe are usually listed on Luxembourg or quoted on SEAQ-I. Depositary receipts can be publicly offered or privately placed. Public traded securities in the USA are called American Depositary Receipts (ADRs). There are three levels of ADRs which differ on whether they trade on the over-the-counter market (level-one) or are exchange listed and involve (level-three) or not (level-two) raising capital with new shares. These different facilities have different US reporting requirements and Generally Accepted Accounting Principles (GAAP) compliance. In the USA, Rule 144A allows further the placement of privately placed foreign securities to Qualified Institutional Buyers (QIBs).

Depositary receipts offer several advantages for international investors and facilitate diversification into foreign securities as ADRs are regarded as domestic assets for foreign assets ceilings. Investors can trade, clear, settle and collect dividends in accordance with requirements of the market in which they usually trade; and, if DRs are exchange listed, investors also benefit from accessibility of price, trading information and research.

At the end of 1996, only 375 of the 1733 depositary receipts traded in the USA were exchange listed. The dollar value of ADR shares traded on US stock exchanges soared during 1996, reaching \$US 345 billion, 6 times more than in 1990.⁵ The large 20 ADRs represented a share of 65% of that value. At the end of June 1996, there were around 100 emerging markets' firms from 15 countries listed on the 3 main exchanges representing around 50% of total ADR turnover.⁶

By the end of June 1996, the SEAQ-I Developing Markets Sector in London had 104 quoted foreign firms from 16 countries. Together with listings and excluding South Africa, there were 120 firms trading \$US 24 billion, respectively.⁷ Most of the participants in this market are institutional investors.

In 1994 alone, more than 70 emerging markets' firms listed their shares abroad. Altogether, US and UK emerging markets' listings traded around \$US 180 billion in 1996, more than 10% of emerging markets' local total turnover.⁸

⁴ A more detailed description of these facilities was not included here due to space limitations but it is available upon request from the author.

⁵ NYSE ADRs represented 70% of this total, around \$US 240 billion. Total annual turnover in domestic securities was around \$US 3,000 billion. ADRs represented thus are still a small share of the NYSE market turnover (around 7%).

⁶ We use here the IFC (International Finance Corporation) definition of emerging markets. Any stock market in a developing economy is considered an emerging stock market. The World Bank classification of low and middle-income economies, corresponds to a GNP per capita level of, respectively, less than \$US 725 and less than \$US 8,956.

⁷ In 1995, foreign firms traded \$US 400 billion in the London Stock Exchange, close to the \$US 470 billion observed for domestic equities.

⁸ In 1996, local turnover of All Emerging Markets was slightly above \$US 1,580 billion (Source: IFC).

Listing procedures

In the USA, the time required to complete this process depends on the type of depositary receipt a firm chooses and whether the firm applies or not for listing. In the case of level-two and level-three ADRs, that are the ones that involve a public listing, the process takes, on average, 14–15 weeks. Foreign issuers must register the depositary shares with the Securities and Exchange Commission (SEC) and must also obtain the SEC approval regarding the fulfilment of US reporting requirements. Additionally, the issuers must file an application with the exchange where they wish their depositary receipts to trade.

The process to list a depositary receipt on SEAQ-I is reduced to about 8–12 weeks. The exchange is responsible both for the approval of the prospectus and for admitting the firm to trade on the exchange.

3. Literature

A recent monograph by Karolyi (1997) surveys the academic literature on the valuation and liquidity effects of the listing decision. He examines in detail the empirical evidence over 40 contributions to the literature on international listings. Here below I summarize some selected papers.

3.1. Theoretical background

There are several potential explanations to the observed phenomenon of negative post-listing abnormal stock returns. The first three arguments below have been put forward to explain the behaviour of post-listing returns in a domestic setting.⁹

Merton (1987) refers to changes in investor recognition as a source of value. Investors only invest in the assets they are aware of. Investors require higher returns to compensate not only for market risk but also for the shadow cost of incomplete information. Listing on a major exchange, by expanding the firm's investor base could result in a decrease of its expected return. The diversification gains are proportional to the firm's specific risk and to the weight of its capitalization in the world market capitalization.

Amihud and Mendelson (1986) claim that liquidity is what is behind the fall in required returns through changes in the bid-ask spread. When a stock trades on an exchange that provides superior liquidity services, its expected return will fall.

Recent literature refers to the fact that managers time their application for listing, could explain the decline in expected returns observed after listing. As there is evidence that this decline is more pronounced for small firms, for which listing requirements may be binding, it may be the case that managers choose to list when firms have recently performed well. This line of argument does not address why firms are motivated to dual-list.

Fuerst (1997) and Cantale (1996) propose a different argument saying that the strictness of the regulatory regime may attract highly profitable firms that use the listing decision to signal future positive prospects. The two signalling models assume

⁹Most of these studies concentrate on firms that 'upgraded', i.e. that moved trading from the over-the-counter (OTC) market or from the National Association of Security Dealers Automated Quotation (NASDAQ) to the NYSE or to the American Stock Exchange (AMEX).

that the listing decision is exogenous and that the resolution of uncertainty, and thus the benefits associated to listing, are only related to the disclosure requirements that differ across exchanges.

While these explanations may also be valid for international listings, an international asset pricing framework provides a distinctive argument for the effects of *international* dual-listings. Besides, even if the Merton's awareness explanation assists the home bias observed in equity portfolios, given that the shadow cost of incomplete information may prevent international investors from holding foreign assets, it is unable to explain the different pricing in completely segmented markets where international investors do not affect the price formation.

Alexander *et al.* (1987) provide a closed-form solution to the equilibrium asset pricing problem that arises when capital markets are completely segmented before an international listing takes place. They demonstrate that, *ceteris paribus*, we should observe a decline in the required return of a dual-listed stock as long as the covariance of the dual-listed security with its local market portfolio is larger than the covariance with the market portfolio of the place where it dual-lists.

Most of the empirical tests have concentrated on quantifying the impact of dual-listing on mean expected returns and variances. The usual approach to assess the effects of dual-listings has been the event study methodology. If a dual-listing creates value, one would expect that the announcement of a listing generates positive abnormal returns. The movement in price should be associated with the changing expectations about future returns. After the listing, then, firms should observe negative abnormal returns reflecting the decrease in expected returns (compared to what was required before listing). Below I briefly review some selected empirical studies. Table 1 summarizes the most important results.

3.2. Testing the impact of dual-listing on mean returns

Domestic listings. Sanger and McConnell (1986) look at the behaviour of US OTC firms that were listed on the NYSE over the period of 1966–1977 and find significant positive abnormal returns before the application date and negative returns around and after the listing date. Kadlec and McConnell (1994) look at the same effects in the eighties and find similar results for the pre-listing and listing weeks but fail to find any negative abnormal returns after the listing date. Their cross-sectional regressions provide support for both investor recognition — proxied by changes in the number of shareholders — and liquidity — proxied by the change in the bid-ask spread — as sources of value from exchange listing.

Dharan and Ikenberry (1995) analyse 2889 US firms that have moved the trading in their stock to the AMEX or NYSE, over the period of 1962–1990. Post-listing stock returns are negative and this effect is persistent over time and across industries and exchanges. These abnormal returns are not so dramatic when the benchmark model accounts for size and book to market risk factors, and when they control for IPOs and equity issues. Yet the post-listing effect prevails. However, when the sample is partitioned between small and large firms, the effect is only present for small firms. The authors believe their evidence supports the managerial timing hypothesis.

Table 1
Selected findings

	Abnormal returns		Explanations				
	Before (+ve)	After (-ve)	Segmentation	Awareness	Liquidity	Timing	Signalling
<i>Domestic listings (upgradings)</i>							
Sanger and McConnell (1986, 1987)	Yes	Yes			✓		✓ weak
Kadlec and McConnell (1994)	Yes	No		✓	✓ weak		
Dharan and Ikenberry (1995)		Yes		✓ indirect		✓	
<i>US listings abroad</i>							
Lau, Diltz and Apilado (1994)	Yes	Yes					
<i>Foreign listings in the USA</i>							
Alexander, <i>et al.</i> (1988)	Yes	Yes	✓ weak				
Foerster and Karolyi (1996)	Yes	Yes	x	✓	✓ indirect		
Miller (1996)	Yes	Yes	✓ weak				
Cantale (1996)	Yes						✓

International listings. Alexander *et al.* (1988) analyse the effect of international listing on the stock prices with a sample of 34 non-US firms that were listed either in NYSE, AMEX or NASDAQ between 1969 and 1982. Their results show a decline in the expected return for the 36 months after the dual-listing date except for Canadian firms. They conclude that this evidence supports that US and Canadian capital markets are integrated.

Lau *et al.* (1994) analyse the valuation consequences of 364 US firms' listings on 10 different foreign stock exchanges between 1962 and 1990. Results show positive abnormal returns around the date of acceptance on the foreign exchange, negative abnormal returns on the first trading day and negative abnormal returns in the post-listing period on Tokyo and Basel stock exchanges.

Foerster and Karolyi (1996) study the stock price performance associated with the dual-listing of foreign stocks in US markets. Using dummy regression methodology, that allows for changes in risk exposures before and after the listing, and allowing for time-varying risk parameters, they analyse a sample of 106 firms that listed their ADRs in the USA from 1976 to 1992. They find positive and negative significant abnormal returns respectively before and after the listing. Their evidence supports that abnormal returns are related to shareholders' base change and stock exchange location, providing support for the investor's awareness and the liquidity hypotheses. The way these abnormal returns differ by region is not, however, supportive of the segmentation hypothesis. Miller (1996) looks also at the effects of non-US firms listings in the USA. His work considers not only exchange listings (AMEX, NASDAQ, NYSE) but private placements (RADRs) and public quotes (OTC). His sample covers 183 firms from 35 countries over the period 1985–1995. Results show negative returns after the listing date that are more pronounced for firms that originate from emerging markets.

Cantale (1996) also observes positive abnormal returns for a sample of 72 European firms that listed on the NYSE, around the announcement day. This effect is more pronounced for continental than UK firms. He also finds positive abnormal returns for European listings on the London stock exchange and the Paris stock exchange but these are less pronounced than the ones observed for NYSE listings. Finally, he does not observe any effect for a sample of 55 US companies that listed either on the London or the Paris stock exchange. His results are supportive that a dual-listing is more valuable in a more prestigious exchange and for firms that originate from markets where disclosure requirements are relatively less strict.

In summary, the bulk of the existing evidence shows that there are positive abnormal returns around the announcement of listing and negative abnormal returns following international listings both for US listings abroad and foreign listings on US exchanges. For foreign listings in particular, the evidence is inconclusive regarding the role of international market segmentation hypothesis but provides support for investor recognition and liquidity hypotheses.

4. Testable hypotheses

Alexander *et al.* (1987) international asset pricing model motivates the testable hypotheses of the empirical analysis that follows.

The framework is the following. There are two countries: the international (UK, for example) and the local (emerging market) country. Only one local security is dual-

listed on the international market. Besides this, the two stock markets are assumed to be completely segmented before the dual listing: international investors are forbidden (whatever the barriers) to invest in any other local securities and local investors are precluded from investing in international securities.

They derive an equilibrium asset-pricing relationship for the dual-listed security that states that its expected return depends on the covariances of its return with the returns on both the local and the international market portfolios. This reflects the fact that all investors, both local and international, hold the dual-listed security. The change in the expected return depends on (i) the relative value of the aggregate risk aversion coefficients; (ii) the market capitalization values; and (iii) the covariance of the dual-listed security with the local and international market portfolios. If the relative risk aversions are the same across markets, the return after listing will be lower as long as the dual-listing security is less positively correlated with the international market than with the local market. The implication of this is that dual-listed securities that match the idiosyncrasies of the local market, and that are not replicable with international free assets, should register stronger declines in expected returns. If the price of international risk is lower than the price of local risk, the firm's cost of capital should decline even further.

The market for 'pure' local securities becomes indirectly integrated via the dual-listing. The impact on each individual security depends on its correlation with the dual-listed security. The more correlated those securities are with the first dual-listed security, the lower the impact. Because dual-listing dismantles partially segmentation, further cross-listings, *ceteris paribus*, will register lower changes in required returns.

This model yields the following testable hypotheses:

Segmentation I: ceteris paribus, the decline in expected returns from an international dual-listing of a security originating from a segmented market varies directly with the degree of segmentation in that market.

Segmentation II: ceteris paribus, the decline in expected returns from an international dual-listing of a security originating from a segmented market varies directly with the ratio of local and international risk premiums.

Segmentation III: ceteris paribus, the decline in expected returns from an international dual-listing of a security originating from a segmented market varies directly (inversely) with the covariance of the dual-listed security and the local (international) market portfolio.

Segmentation IV: ceteris paribus, for firms originating from the same market, the first dual-listing should observe the largest impact on its expected return.

These hypotheses are the focus of my analysis and relate to the international market segmentation-based explanation. In addition, I investigate whether the listing impact is affected by the exchange where the firm dual-lists. The univariate analysis breaks down the results by market and exchange type allowing to indirectly draw some implications regarding the other theoretical explanations discussed in the previous section. While the segmentation theory anticipates that listing effects should be significantly different across markets, the other explanations suggest that these effects should be stronger for listings on exchanges with better risk sharing,

superior liquidity services and stricter initial listing requirements and regulatory regimes.^{10,11}

5. Methodology

5.1. Abnormal returns

The methodology employed to measure the magnitude of security returns adjustments to a dual-listing is the standard abnormal returns technique based upon the several benchmarks described below.¹² I am interested in examining the impact of the dual-listing decision on returns on the announcement of listing but also in the post-listing period. Most of the time it is not possible to pinpoint exactly when the listing decision was made public so, we define the event as the week of listing.¹³ Since the process from application to actual listing takes between 8 and 14 weeks, I computed weekly abnormal returns for each firm starting from week -14 before the listing date through week $+5$. The event period goes until week $+5$ to account for any delayed effects that may occur due to thin trading. Post-listing returns are calculated from week $+6$ to week $+36$ in event time.

Ex post abnormal returns are obtained as the difference between observed returns of the firm i at event week t , $R_{i,t}$, defined as

$$R_{i,t} = \log \frac{P_t + D_t}{P_{t-1}} \quad (1)$$

and the expected return generated by a chosen benchmark $E(R_{i,t})$:

$$AR_{i,t} = R_{i,t} - E(R_{i,t}). \quad (2)$$

Averaging these residuals across firms in common event time, we obtain the average residuals

$$\overline{AR}_t = (1/N) \sum_{i=1}^N AR_{i,t} \quad (3)$$

¹⁰ The univariate analysis compares the behaviour of emerging markets with mature markets. Among the two groups, the degree of integration changes dramatically but it is defensible that, as a group, emerging markets are expected to be more segmented than mature markets. The cross-sectional regressions try to capture the partial segmentation and the degree of segmentation (see, for example, Errunza and Losq, 1985) with the help of some proxy variables for that measure.

¹¹ There are important differences other than the degree of segmentation between the two groups of markets (emerging and mature). Specifically, and again as a group, emerging local markets are less liquid and have less severe disclosure requirements than mature markets. It can thus be fallacious to say that any differences between the two groups can be attributed solely to segmentation.

¹² For a detailed discussion of the methodology see, for example, Brown and Warner (1980, 1985) or Thompson (1985, 1995).

¹³ Due to data constraints, we could not use daily data.

where N is the number of firms in the sample and t refers to weeks in event time. By cumulating the average residuals over a particular time interval (L weeks around the dual-listing date), we obtain the cumulative average residuals (\overline{CAR}):

$$\overline{CAR} = \sum_L \overline{AR}_t. \quad (4)$$

Bias in measuring abnormal returns. By using continuously compounded returns, compounding returns over time is achieved by simply summing the log returns.¹⁴ If we assume that discrete returns are distributed as iid log normal variables, the cumulative log return is normal distributed. On the other hand, when we are looking at portfolio returns, we reduce the re-balancing bid-ask spread bias.^{15,16}

Benchmark models. One central question in measuring abnormal returns is the choice of the right benchmark. Dimson and Marsh (1986) and for example, recently, Dharan and Ikenberry (1995) have shown that failure to adjust for size and book to market risk factors results in a downward bias of abnormal performance. Due to lack of information about the firms in my sample, I do not account for those risk factors here. Bekaert and Harvey (1995) argue that the presence of country funds and/or cross-listed securities might serve to effectively integrate markets with the world capital market despite the existence of other formal and informal barriers to foreign investment. The presence of unequal integration of individual shares makes it difficult to find a good model for the pricing of these securities. If markets are not completely integrated, the shares in the restricted market are priced for their exposures to local and world risk factors. In this paper, I assume that the degree of segmentation is fixed through the period of estimation of risk exposures. I use unconditional and conditional versions of the Capital Asset Pricing Model, with two and three factors, and unconditional and conditional versions of the least squares market model with two and three factors. Abnormal returns here discussed are computed based on the following model:

Unconditional CAPM Two Factors (see, for example, Solnik, 1974)

$$R_{i,t} = R_{f,t} + \beta_{i1}(R_{l,t} - R_{f,t}) + \beta_{i2}(R_{m,t} - R_{f,t}) + e_{i,t} \quad (5)$$

¹⁴Portfolio log returns have two main drawbacks. The problems arise because portfolio abnormal returns are computed as a geometric average across securities. Geometric averages negatively proxy arithmetic and true averages. Bias can also come from comparing a buy and hold return for the portfolio of event firms with a benchmark that is a re-balancing portfolio (i.e., comparing a mean of logs with the log of a mean).

¹⁵See, for example, Conrad and Kaul (1993).

¹⁶Two other procedures can induce bias in the results: the use of value-weighted benchmarks and not accounting for non-synchronous trading. The available aggregate market data on emerging markets is value-weighted. The equilibrium model we focus in this paper, provides justification for the use of a value-weighted index even if that may result in too little rejections. Relative to the second problem, previous literature has suggested the downward in the risk parameters is compensated by the upward bias in the intercept (Market Model). Moreover, this bias is expected to be small compared to the residual variation. I repeat the analysis using the correction proposed by Dimson (1979) using a specification that includes one lagged, one matching and one leaded market returns and use the aggregated coefficients from this multiple regression to compute abnormal returns.

where R_i is the total realized return of the firm i . $R_{l,t}$ and $R_{m,t}$ are, respectively, the returns on the local market and mature market (world, USA or UK) portfolios.¹⁷ $R_{f,t}$ is the 1-month Treasury Bills' rate. The β_i s are the unconditional risk exposures of the returns of firm i . I include one additional risk factor to capture the sensitivity of returns to currency risks (see, for example, Dumas and Solnik, 1995). Finally, I test a conditional version to incorporate time-varying risk exposures (see, for example, Ferson and Schadt, 1996).¹⁸

5.2. Assessing statistical significance

I use both parametric and non-parametric tests to assess the statistical significance of average abnormal returns. The parametric test statistics examined are Brown and Warner (1980, 1985) with and without crude dependence adjustment, Patell (1976) standardized residual test and Boehmer *et al.* (1991) standardized cross-sectional test. The non-parametric statistics are the generalized sign test (Sanger and McConnell, 1986; Cowen and Sergeant, 1996), the Wilcoxon signed rank test and Corrado's (1989) rank test. Finally, I use a bootstrapping procedure (Noreen, 1989). The non-parametric tests evaluate the robustness of results to violations of the normality assumption for returns.

To test for variance changes around and after listing, I use two parametric tests: an F test for the equality of two population variances and Beavers's U test. I also look at two non-parametric rank tests: the squared rank test (Conover, 1994) and a test proposed by Rohrbach and Chandra (1989).¹⁹

5.3. Structural changes in the return generating process

If listing effectively eliminates constraints on foreign ownership and changes the marginal investor for dual-listed stocks, then the local stock's beta should fall and the international stock's beta should rise. For the particular case of the model with two factors, the structural changes can be modelled as follows:²⁰

$$R_{i,t} = \alpha^b + \alpha^d E_{i,t} + \alpha^a D_{i,t} + \beta_{i1}^b R_{i,t} + \beta_{i1}^a D_{i,t} R_{i,t} + \beta_{i2}^b R_{m,t} + \beta_{i2}^a D_{i,t} R_{m,t} + e_{i,t} \quad (6)$$

where the variables are defined as above and the superscripts b , d and a label the parameters before, around and after the listing date. $E_{i,t}$ is a dummy variable that

¹⁷ The choice of the world index or the US or UK indices depends on what we assume in terms of segmentation among mature markets.

¹⁸ In my conditional K -factor model, for example, the regression equation has $(L+1)K+1$ regressors. The regressors are a constant, the K -factors and the products of the L information variables with the K factors. I use a collection of public information variables that previous studies have shown important in predicting risks over time. The information variables are: (1) the lagged local and world market returns; (2) the lagged local dividend yield; (3) other macroeconomic variables: local interest rates; the consumer price index; the industrial production index and changes in exports.

¹⁹ Details about each of these tests are available upon request from the author.

²⁰ I could use a Chow test of differential regressions instead. The structural test used here, however, gives me more information on which subset of variables is driving the overall significance of the test.

equals one for the weeks around the dual-listing date and $D_{i,t}$ is a dummy variable that equals one for the post-listing weeks.

If there are changes in the risk parameters after the listing date, then the estimates of β_{i1}^a and β_{i2}^a should be significantly different from zero. Otherwise the listing effects should be concentrated in the coefficients α^d and α^a . The estimates of these parameters give, respectively, the mean CAR, for each firm, in the event period prior to listing and in the post-listing period. For each firm, I use a Wald test to assess if the difference between the pre- and post-listing parameters is significantly different from zero. To assess the significance of the differences in the estimates across firms, I used a pairwise difference Student t -test and a naïf sign test.

5.4. Cross-sectional analysis

To investigate how the determinants suggested by the international asset pricing theory are related to the observed abnormal returns, I estimate univariate and multivariate cross-sectional regressions.

Hypothesis *Segmentation I* states that the higher the degree of segmentation, the higher the increase in price (and the negative impact on required returns). To proxy the degree of segmentation, I have chosen the following variables:

- the premium on country funds targeting the emerging market from where the firm originates (*CF*). Previous literature has suggested that country fund premiums vary directly with the degree of segmentation.²¹
- the IFC investability indices (*II*)²²
- the Institutional Investor's country credit ratings (*RATING*). These ratings result from a semi-annual survey of leading international banks and have been published by 'Institutional Investor' since 1979.

Hypothesis *Segmentation II* states that the effect of a dual-listing should be more pronounced, the higher the ratio of local and international risk premiums. To capture the effect of differential market risk premiums, I use the historical difference between the local and world market's returns for the year before the event (*DRP*). This proxy is far from adequate given the small period it is used to compute the risk premiums. I also include the size of the originating market relative the world market value (*LMSIZE*) to account for wealth effects that could influence the price of risk.

Hypothesis *Segmentation III* says that the higher the correlation between the dual-listed stock and the local (world) market, the higher (lower) the impact on price. To proxy for the idiosyncratic features of the dual-listed stock, I use the correlation

²¹ See, for example, Bekaert and Urias (1996) for a discussion to why one would expect to observe premiums for country funds targeting segmented markets.

²² These indices reflect the share of stocks that can be held by foreigners and are only concerned with legal barriers. The index varies from 0 to 100. The lowest and highest values correspond to a completely restricted market and a free market, respectively. IFC considers restrictions as access by non-residents and government, sector and firm aggregate ownership limits. Further, IFC considers liquidity and size criteria: minimum investable market capitalization of \$US 25 million and value-traded of at least \$US 10 million over the prior year. For more details, see the IFC Indices—Methodology, Definitions and Practices.

coefficients between the stock's local return and the local and world market returns computed over the period prior to the beginning of the event window (*CORL* and *CORW*).

Hypothesis *Segmentation IV* asserts that firms, originating from a particular market, that dual-list first, should observe a higher impact on prices. Urias (1995) suggests that the dual-listing effects should decline as the number of dual-listed securities increases. We include the number (*RANK*) and market value of emerging markets' securities previously dual-listed (*TMV*).²³

Finally, I include the market value of the dual-listed security (*SIZE*)²⁴. This last variable may capture different things. First, large firms are the ones that are more targeted by international investors that invest directly in foreign markets. Second these firms usually receive a broader coverage than smaller firms and have higher liquidity before the listing. Third, these are the firms that will have less problems in complying with the requirements of the international exchanges. Finally, this variable could be associated with NYSE listings given the exchange requirements in terms of size.

The multiple regression is as follows:

$$CAR_i = c_0 + c_1CORL + c_2CORW + c_3DRP + c_4LMSIZE + c_5CF + c_6II + c_7RATING + c_8RANK + c_9TMV + c_{10}SIZE + e_i \quad (7)$$

where CAR_i is the cumulative abnormal return for each firm over the period before listing and measures the price reaction to the announcement of the dual-listing.²⁵

6. Sample selection and data sources

6.1. Sources

The initial sample consists of all the emerging markets' firms listed either on a US public exchange (NYSE, AMEX or NASDAQ) or trading on London SEAQ-I as of June 1996, in a total of 133 firms.²⁶ The sample and listing dates were obtained directly from the exchanges. I cross-checked the listing dates and the identification of the underlying stocks using Bloomberg (Equity New Issues Calendar).

My analysis will only be concerned with measuring the impact of a *listing*. The sample does not include either Rule 144A ADRs (RADRs) or level-one ADRs. Moreover, I do not have information on whether a particular listing is a direct entry in the US market or an upgrade from a level-one ADR or a private RADR. Additionally, many of the issues that quote in SEAQ-I, are also privately or publicly traded in the over-the-counter market in the USA. The impact of SEAQ-I listings on local stocks' returns must be, therefore, carefully interpreted, in the sense that, it can

²³ I restrict the ranking and the total market values to the securities (all classes) in the initial sample.

²⁴ This variable may create endogeneity problems if the listing decision is indeed endogenous.

²⁵ I have also run the cross-sectional regressions for the mean cumulative abnormal returns over the period after listing. These results are less precise so I focus here on the price effect only.

²⁶ Some firms have more than one security dual-listed. This is true in the case of Brazil, India, Mexico, the Philippines, South Korea, Turkey and Zimbabwe. The total number of securities in the initial sample was 150.

also result from the initiation of a level-one ADR or from the launch of a private offer.²⁷

The primary data source was Datastream. I excluded all the issues for which weekly local returns, exchange rates (middle rates) and stock index returns were not available for 52 weeks before and 36 weeks after the listing date.^{28,29} My sample may be biased in the sense that I included only firms covered by Datastream and I excluded those firms for which data were not available for at least 1 year before the listing. I kept only one class of shares for each firm. Given that my analysis focuses on the effect of dual-listings on the local expected returns, I have chosen to include the series A shares that usually can only be held by local investors. Finally, I did not exclude equity offerings because they represent a large part of my sample.

I include a control sample of European mature markets' firms that dual-listed in the US and SEAQ-I over the same period.

I use IFC (in US dollars and local currency) and FT/S&P—Actuaries' World (local currency) value-weighted indices, respectively, for emerging and mature (including the world) markets.³⁰ Return data for these series are only available on a weekly basis. Dividend yields refer to local indices' information. To compute excess returns I use the 1-month T-bill rates.³¹

Interest rates (commercial lending prime rate), the consumer prices index (CPI), the industrial production index (IPI) and changes in exports (in US dollars) for each of the home markets are IMF series (International Financial Statistics database). These series are available on a monthly basis and were obtained from Datastream.³²

Country fund premiums were obtained in Bloomberg and cross-checked in Datastream for UK funds. For each emerging market, I use the simple average of all available information on funds targeting that particular market, listed in the USA or in the UK and that had at least 36 monthly observations. The Investable Indices were obtained by computing the ratio of the market values of the IFC Global index

²⁷ When we look at SEAQ-I listings, these occur, in time, after the international offer (and this offer may have been made public well in advance, at least when the road show started); and, for side-by-side programmes or level-one ADRs, probably after these receipts having been admitted to trade on the OTC in the USA.

²⁸ I compare the results of this reference sample with the results of other sub-samples that had data available for at least one, and one and an half years before and after the event window.

²⁹ For 27 emerging markets' firms in the initial sample, the data are only available after the dual-listing date. One of the reasons for this lies in the fact that some of these firms dual-listed as soon as they got privatized (by an IPO) and thus got their primary listing at that same time.

³⁰ The FT/S&P covers around 80% of 28 different markets and 2400 stocks. Missing from the index, for instance, are markets like Argentina, Israel, Pakistan and Greece. The Morgan Stanley Capital International World Index covers only 60% of a broad range of markets: 47 and 2600 stocks. The MSCI index only has total return data on a monthly basis.

³¹ To compute risk free rates in local currency, I use the T-bill rates and assumed *ex ante* parity (based on *ex post* exchange rates) and rational expectations.

³² Conversion to weekly data assumed a step function for interest rates and spline approximations to generate the other three series. For a particular week, I use the figures at the beginning of that month and assume those would be readily available, public information by then. This is a strong assumption that can be overcome if we believe that the forecasts produced for these variables were reasonably accurate.

over the IFC Investable index for each country. Market value data were downloaded from Datastream. The country credit ratings were collected from several issues of the Institutional Investor. This information is available on a monthly basis. I used the figures of the month preceding the start of the event window.

6.2. *Announcement dates*

As described briefly above, the listing process of a foreign security is not an instantaneous process.^{33,34}

I collected the announcement dates from the Dow Jones Service and from the FT Financial Extel databases. The search was done using the firm name, for 1 year before the listing date. The earliest press release is taken as the announcement date. In addition, and for US listings, I include the filing date, obtained from Bloomberg, when it was previous to the announcement date or when no announcement appeared in the press.

From my search, the most common sources were Dow Jones News Services and the Wall Street Journal. Of a total of 51 announcements, 35 of these were announcements regarding emerging markets' firms. I could only trace 7 announcements regarding new quotes on SEAQ-I. For my sample of announcements, the average (median) time between the first announcement and the listing was approximately 8 (5) weeks.

6.3. *Sample description*

The final sample consists of 135 listings, 70 from emerging stock markets and 65 from European mature markets. Listing dates go from January 1991 to November 1995.³⁵

The sample covers 10 emerging markets. India has the largest number of firms (20) followed by Chile and Mexico (18 and 14 respectively). Only 7 emerging markets' firms dual-listed in both US and UK exchanges. The rest of the firms is well divided between NYSE+NASDAQ (29 + 2) and SEAQ-I (32). Chilean firms have chosen US exchanges 17 out of 18 times while Indian or Taiwanese firms only listed in London. The boom year for emerging markets' foreign listings was 1994. Until the end of 1991 (inclusive), only 2 firms, in the final sample, had dual-listed. The control sample for mature markets includes 5 European countries and is evenly distributed across exchanges.

³³ For more details see Sanger and McConnell (1986).

³⁴ In the case of listings in the NYSE there are three dates of interest: the formal application (or filing) date, the approval date that occurs within 4 weeks after the application and the indication of the admission date (usually announced on week before the actual listing). All these dates are made public via an Official Public Announcement on the NYSE Weekly Bulletin, that is published every Friday. This bulletin is freely available but exists only on hard copy (SEC library). For stocks listing on SEAQ-I, the only official publication of this kind is the Weekly Official Intelligence and contains the new issues admitted to list on the previous week.

³⁵ Descriptive statistics concerning the partition of the sample by country, listing exchange and listing year, were not included here due to space limitations but are available upon request from the author.

7. Results

7.1. Returns

Table 2 shows that the distribution of raw returns for the emerging markets' dual-listed stocks is significantly leptokurtic and positively skewed. For the mature markets' firms, there is no such evidence.

These are very large variations in the time series. For example, average weekly returns on the combined time series of one year before and one year after the listing can be as low as -1% (Edwards, Chile, NYSE) and is common to observe positive values of around 0.8% . Standard deviations are also very high at 25% per week (again Edwards). Standard deviations are in general around 5% a week and never below 3% . The more extreme values occur for different exchanges and for different emerging markets. Except for the case of very small sub-samples (for example, when we analyse the firms that listed on both UK and US exchanges), their influence does not drive the results. In any case, the use of standardized residuals and some non-parametric tests overcomes partially that potential bias.

Table 3 shows that, on average, for the emerging markets' sub-sample, the weekly return in local currency during the event window is 0.32% against 0.74% in the pre-listing period and -0.04% in the post-listing period. Paired difference tests show these differences are very significant. Differently, firms originating from mature markets observe, on average, a slight increase in returns around the listing date: 0.5% from 0.02% in the pre-listing period.

7.2. Abnormal returns

In this section, I present the results of the analysis of abnormal returns generated by an unconditional two-factor CAPM. As stated earlier, the core analysis is based on an

Table 2

Distributional properties of dual-listed firms' weekly returns over the period of 1991–1995

Statistics are averages based on weekly local currency denominated returns 1 year before and 1 year after the listing date. Only firms with at least 1 year of weekly observations before the listing and 36 weeks after the listing date were included. The sample data were obtained from Datastream.

	All listings	Emerging markets	Mature markets
Number of firms	135	70	65
Mean	0.0023	0.0037	0.0009
Std. deviation	0.0543	0.0619	0.0466
Skewness	0.1759	0.3650	-0.0644
Kurtosis	3.5691	4.5060	2.6178

Memo: Fractiles of random samples of size 100 drawn from a normal distribution

<i>Skewness</i>		<i>Kurtosis</i>	
0.95	0.99	0.95	0.99
+/-0.389	+/-0.567	3.77	4.39

Table 3
Change in average returns

This table reports the results of paired difference tests between the pre-listing and post-listing means based on weekly local currency denominated returns. The sample data were obtained from Datastream. Statistics are averages across firms that dual-listed from 1991 to 1995. Only firms with at least one year of weekly observations before the listing and 36 weeks after the listing date were included. t refers to the t -test and the p -values reflect Wilcoxon Signed Rank two-tailed tests.

	All listings (N=135)	Emerging markets (N=70)	Mature markets (N=60)
Pre-listing (-118 to -15)	0.0038	0.0074	0.0002
Event window (-14 to +5)	0.0040	0.0032	0.0049
Post-listing (+6 to +109)	0.0000	-0.0004	0.0004
Mean difference (post vs. pre)	-0.0038	-0.0078	-0.0078
t -statistic	(-4.75)	(-6.69)	(0.22)
$p(W)$	(0.0001)	(0.0001)	(0.6815)

event window from week -14 to week +5 and considering an estimation period that goes from week -52 to week -15 (weeks relative to the listing date). The results discussed in this section refer to local returns.

Previous literature has warned about the dangers of using pre-listing parameters from a market model because positive abnormal performance could be present in the pre-listing period and, by using those parameters, the abnormal returns during the event and post-listing periods would be biased downwards. CAPM will avoid this bias if it is the correct asset pricing model to use in the pre-listing period. However, if the equilibrium model holds only *after* the dual-listing then the true intercept in the pre-listing period will be positive and we will be violating the OLS regression (the expected residuals will be different from zero). When using data from the pre-listing period, we may create a bias then for two reasons: on one hand positive abnormal performance may exist because of timing behaviour; on the other hand, the true intercept may be positive due to a super risk premium due to market segmentation. To overcome that, I re-estimate the parameters using data from the *post-listing* period. With this specification, I expect to observe positive abnormal performance in the period before listing because of segmentation and timing, and positive performance during the event period due to anticipation of lower future expected returns.³⁶

Estimation parameters were obtained by regressing local returns on local and world market indices.³⁷ I have tried different estimation periods and performed the correction for trading infrequency (Dimson, 1979) and I obtained very similar

³⁶ To disentangle the segmentation and timing effect, one would need to investigate further whether these firms have effectively observed positive operating performance before the application to listing. Due to availability of data, my analysis was limited to stock market data.

³⁷ To proxy the local risk factor I used both returns of the local market index and a 'pure' orthogonalized local risk factor. This latter factor is obtained by regressing the local market return on the world market return and using the resulting residuals.

parameters. I find that, on average, only the local factor is significant. For each firm separately, the world factor turns out to be significant in many cases. Plots of the returns of emerging markets' firms against local and world indices are very clear: firms' returns usually go together with the local index and this is more notorious before the dual-listing. After listing, however, I do not observe a closer co-movement with the world index or the index of the international exchange where the firm has listed. I kept a two-factor model, anyway, and that choice was dictated by theoretical reasons.

Average abnormal returns. Table 4 shows the cross-sectional average abnormal returns generated by the two-factor unconditional CAPM for the 20 weeks surrounding the listing date. We observe positive abnormal performance before the listing date. After listing, abnormal returns are always negative and significant in the first week after the listing. Using standardized abnormal returns, the tests are stronger both for positive and negative abnormal performance. Using cross-sectional standard

Table 4
Average abnormal returns around the week of dual-listing

This table reports average abnormal returns (AR) and cumulative average abnormal returns (CAR) around the listing date for 70 emerging markets' firms that dual-listed their stocks on a US or UK exchange during the period of 1991–1995. Abnormal returns are prediction errors using CAPM parameters estimated regressing local returns on local and world market indices over the weeks -52 to -15 in event time. t -statistics refer to tests on average returns using the Crude Dependence Adjustment (Brown and Warner, 1980). The z -values reflect significance tests using average standardized residuals. p -G and p -C reflect, respectively, the Generalized Sign and the Corrado Rank one-tailed tests.

Week	AR	t	z	% non negative	p -G	p -C	CAR	z
-14	0.0129	(1.27)	(2.38)	0.6061	(0.0292)	(0.0160)	0.0129	(0.0086)
-13	0.0084	(0.82)	(1.53)	0.6212	(0.0162)	(0.0673)	0.0213	(0.0028)
-12	0.0060	(0.59)	(1.27)	0.5455	(0.1819)	(0.2043)	0.0272	(0.0014)
-11	0.0007	(0.07)	(-0.44)	0.4849	(0.4695)	(0.2150)	0.0279	(0.0090)
-10	0.0001	(0.01)	(0.05)	0.4849	(0.4695)	(0.4408)	0.0279	(0.0162)
-9	0.0021	(0.20)	(0.37)	0.5000	(0.4327)	(0.4911)	0.0300	(0.0176)
-8	0.0156	(1.53)	(2.34)	0.5606	(0.1241)	(0.0573)	0.0456	(0.0023)
-7	0.0043	(0.42)	(1.25)	0.5606	(0.1241)	(0.0765)	0.0499	(0.0010)
-6	0.0017	(0.17)	(0.98)	0.4697	(0.3734)	(0.4350)	0.0516	(0.0006)
-5	-0.0045	(-0.44)	(-0.62)	0.3939	(0.0601)	(0.0866)	0.0471	(0.0020)
-4	0.0106	(1.04)	(2.24)	0.6061	(0.0292)	(0.0226)	0.0577	(0.0003)
-3	-0.0028	(-0.28)	(0.01)	0.5303	(0.2540)	(0.4941)	0.0549	(0.0005)
-2	0.0167	(1.64)	(2.55)	0.6364	(0.0085)	(0.0154)	0.0716	(0.0001)
-1	-0.0068	(-0.67)	(-0.56)	0.4394	(0.2075)	(0.1111)	0.0647	(0.0002)
0	0.0023	(0.22)	(1.14)	0.5000	(0.4327)	(0.3384)	0.0670	(0.0001)
1	-0.0172	(-1.69)	(-2.26)	0.3333	(0.0056)	(0.0025)	0.0498	(0.0011)
2	-0.0121	(-1.19)	(-1.56)	0.4546	(0.2847)	(0.0347)	0.0377	(0.0048)
3	-0.0162	(-1.59)	(-3.09)	0.3182	(0.0027)	(0.0006)	0.0215	(0.0370)
4	-0.0080	(-0.79)	(-1.32)	0.3939	(0.0601)	(0.0463)	0.0135	(0.0756)
5	-0.0030	(-0.29)	(-0.75)	0.4546	(0.2847)	(0.1879)	0.0105	(0.1089)

deviations can work in both directions.³⁸ Overall, the conclusions are valid whatever the parametric test used. Non-parametric tests confirm the results of the parametric tests.

Table 5 shows the average abnormal returns after week +6. The long run post-listing abnormal performance is not so clear. The CAPM model generates a negative pattern in abnormal returns but both parametric and non parametric tests are inconclusive.

Cumulative average abnormal returns. The last two columns in Tables 4 and 5 refer to cumulative abnormal returns. Table 6 summarizes abnormal performance. The CAPM specification generates 6.7% positive cumulative abnormal returns that are significant until the week of the listing date even if we use standardized abnormal returns or infer with non-parametric tests. When we look at the first 5 weeks after listing, we observe a cumulative decline of -5.7% and this decline is significant whatever the tests (parametric and non-parametric) we use.³⁹

In the post-listing period, starting at week six, we observe a negative cumulative return of -4.8% that is statistically significant at a 10% level. One-half year after listing there is a negative CAR of 11%.

Notice that if these markets are becoming gradually more integrated one should observe necessarily a trend of decline in expected returns. Along with liberalization measures, many of these markets have been modernising their trading mechanisms, settlement and clearing systems and that should also result in a decline in expected returns.⁴⁰

Robustness of the results.

Measuring abnormal returns. Previous studies have shown that log returns can produce a negative bias in abnormal returns. To ensure that the findings described here were not driven by that, I compare the results with those obtained using Buy and Hold *discrete* returns. Post-listing short-run performance is negative as before and very significant but I find stronger positive abnormal performance before the listing and are not able to reject the null of no abnormal performance in the long-run.

Estimation period. When I include a longer estimation period, the positive abnormal performance in the pre-listing period becomes more evident. There seems thus to be evidence that firms list after a period of better performance.

When I compute abnormal returns with parameters estimated in the *post-listing* period, I get, as expected, positive abnormal returns in the pre-event period (weeks

³⁸ I looked for changes in variance of abnormal returns during the period of study. I performed Beaver's U test and a non-parametric test proposed by Rohrbach and Chandra (1989). Relative to the event period it is not possible to reject the null hypothesis of a constant variance. In the post-listing period, many weeks have variances that differ from the ones obtained in the estimation period. Given this result, I compared the Brown and Warner parametric tests with the results obtained by using cross-sectional variances.

³⁹ One-factor model generates cumulative average abnormal returns of respectively, 6%, -6% and -5% for the pre-listing period, immediately after and post-listing period.

⁴⁰ It is possible that these trends do not affect similarly the market and the stocks in my sample.

Table 5
Post-listing average abnormal returns

This table reports post-listing average abnormal returns (AR) and cumulative average abnormal returns (CAR) for 70 emerging markets' firms that dual-listed their stocks on a US or UK exchange during the period of 1991–1995. Abnormal returns are prediction errors using *CAPM* parameters estimated regressing local returns on local and world market indices over the weeks –52 to –15 in event time. *t*-statistics refer to tests on average returns using the Crude Dependence Adjustment (Brown and Warner, 1980). The *z*-values reflect significance tests using average standardized residuals. *p*-G and *p*-C reflect, respectively, the Generalized Sign and the Corrado Rank one-tailed tests.

Week	AR	<i>t</i>	<i>z</i>	% non negative	<i>p</i> -G	<i>p</i> -C	CAR	<i>z</i>
6	0.0021	(0.21)	(0.24)	0.4697	(0.3734)	(0.3424)	0.0021	(0.4065)
7	–0.0089	(–0.87)	(–1.22)	0.4242	(0.1442)	(0.0917)	–0.0067	(0.2438)
8	–0.0071	(–0.70)	(–1.25)	0.4394	(0.2075)	(0.0782)	–0.0138	(0.0985)
9	0.0048	(0.47)	(0.51)	0.5303	(0.2540)	(0.2662)	–0.0091	(0.1939)
10	–0.0038	(–0.37)	(–0.55)	0.5303	(0.2540)	(0.3539)	–0.0129	(0.1548)
11	–0.0041	(–0.40)	(–0.30)	0.3788	(0.0359)	(0.1266)	–0.0170	(0.1465)
12	0.0067	(0.66)	(1.33)	0.5606	(0.1241)	(0.1305)	–0.0102	(0.3194)
13	–0.0025	(–0.25)	(–0.72)	0.4546	(0.2847)	(0.1665)	–0.0128	(0.2435)
14	0.0001	(0.01)	(0.41)	0.4697	(0.3734)	(0.4677)	–0.0127	(0.3017)
15	–0.0033	(–0.32)	(–0.00)	0.5758	(0.0806)	(0.4950)	–0.0160	(0.3106)
16	–0.0068	(–0.67)	(–0.85)	0.4546	(0.2847)	(0.1810)	–0.0228	(0.2337)
17	0.0015	(0.15)	(0.37)	0.4546	(0.2847)	(0.3870)	–0.0212	(0.2780)
18	0.0057	(0.56)	(0.78)	0.5152	(0.3388)	(0.2175)	–0.0155	(0.3631)
19	–0.0148	(–1.45)	(–2.25)	0.4091	(0.0955)	(0.0050)	–0.0303	(0.1740)
20	0.0084	(0.82)	(1.57)	0.6061	(0.0292)	(0.0435)	–0.0219	(0.3081)
21	0.0003	(0.03)	(0.58)	0.5758	(0.0806)	(0.1843)	–0.0215	(0.3667)
22	0.0082	(0.81)	(1.21)	0.5303	(0.2540)	(0.1442)	–0.0133	(0.4858)
23	0.0018	(0.18)	(0.15)	0.4849	(0.4695)	(0.4208)	–0.0115	(0.4996)
24	–0.0053	(–0.52)	(–1.23)	0.4091	(0.0955)	(0.0772)	–0.0167	(0.3892)
25	–0.0069	(–0.67)	(–0.75)	0.4394	(0.2075)	(0.1292)	–0.0236	(0.3290)
26	–0.0140	(–1.38)	(–2.29)	0.3939	(0.0601)	(0.0103)	–0.0376	(0.1756)
27	0.0126	(1.24)	(2.36)	0.5152	(0.3388)	(0.0662)	–0.0250	(0.3417)
28	–0.0133	(–1.31)	(–2.44)	0.4091	(0.0955)	(0.0578)	–0.0383	(0.1822)
29	–0.0018	(–0.18)	(–0.49)	0.5000	(0.4327)	(0.4900)	–0.0401	(0.1615)
30	0.0098	(0.96)	(1.50)	0.5606	(0.1241)	(0.1544)	–0.0304	(0.2518)
31	0.0060	(0.59)	(0.84)	0.6061	(0.0292)	(0.1305)	–0.0243	(0.3117)
32	–0.0011	(–0.10)	(–0.65)	0.6061	(0.0292)	(0.2441)	–0.0254	(0.2722)
33	–0.0030	(–0.30)	(0.29)	0.5909	(0.0498)	(0.1165)	–0.0284	(0.2946)
34	–0.0031	(–0.31)	(–1.56)	0.4091	(0.0955)	(0.1177)	–0.0315	(0.2062)
35	–0.0191	(–1.87)	(–3.18)	0.3182	(0.0027)	(0.0003)	–0.0506	(0.0827)
36	0.0031	(0.30)	(0.40)	0.5152	(0.3388)	(0.3941)	–0.0475	(0.0979)

Table 6

Cumulative average abnormal returns around and after the week of dual-listing significance tests for sub-periods

This table reports cumulative average abnormal returns (CAR) around and after the listing date for 70 emerging markets' firms that dual-listed their stocks on a US or UK exchange during the period of 1991–1995. Abnormal returns are prediction errors using CAPM parameters estimated regressing local returns on local and world market indices over the weeks -52 to -15 in event time. Statistical significance is calculated using average standardized residuals. The p -values reflect two-tailed tests for the event period and one-tailed test for the post-listing period. Significance for one tailed-test at the 90%, 95% and 99% level is indicated by *, ** and ***.

Period	CAR	p
<i>Event</i>		
-14 to -2	0.0716	(0.0002)
-1 to 0	-0.0046	(0.6789)
+1 to +5	-0.0565	(0.0000)
<i>Post-listing</i>		
+6 to +36	-0.0475	(0.0979)

Weeks	5 weeks CAR	CAR
6–10	-0.0129	-0.0129
11–15	-0.0031	-0.0160
16–20	-0.0059	-0.0219
21–25	-0.0017	-0.0236
26–30	-0.0068	-0.0304
31–35	-0.0202**	-0.0506*

-52 to -15) that are significant at a 1% level. For the period of interest, around the listing date, the CAPM specification generates similar results: the positive cumulative abnormal performance just before the listing date is slightly lower (3.6% against 7.2%) but still statistically significant; in the first 5 weeks after the listing, cumulative abnormal returns are -5.7% as before. After the event, and if the equilibrium model used here is well specified, the expected residuals should be zero. The negative performance observed after the listing is thus puzzling and difficult to interpret within the segmentation, awareness or liquidity arguments. Apparently, this pattern could only be justified by the timing argument.

US dollars denominated returns. The tests were repeated using dollar returns and the balance of the results was similar to these reported above.

Model specification.

● Unconditional market model two-factors

I observe a downward bias in abnormal returns that is reflected in lower positive abnormal performance before listing (but still statistically significant) and much more

negative abnormal returns thereafter. These results seem to confirm the bias in abnormal returns that arises when one does not control for the positive performance in the pre-listing period.

- Unconditional CAPM/market model three factors

This specification includes a currency risk factor. I have used an *F*-test to evaluate the marginal significance of this risk factor. The hypothesis of a zero coefficient on the currency factor was only rejected in 6 out of the 70 cases.

In spite of all the noise that this model seems to be adding, it is still possible to observe significant positive cumulative abnormal performance until the listing date (+4.2%) and confirm the decline in the weeks that follow the listing (-3.1%). Both movements are statistically significant whatever the statistics used to infer. The cumulative abnormal returns in the post-listing period amount to -4% and are statistically significant at a 5% level.

- Conditional market model two-factors

A. Information variables: lagged market returns and lagged dividend yields

I use Wald tests to test for the joint significance of the information variables. It is never possible to reject the hypothesis that the marginal contribution of the cross-product variables is zero.

This model generates very high *t*-statistics when we use the inference with variances obtained in the estimation period, with or without cross-sectional dependence adjustment. However, when I account for potential changes in variance, by using the cross-sectional estimates of the variance of the average residuals, or use standardized residuals, the statistics assume more reasonable values. The pattern is similar to the observed for the unconditional specification.

B. Other information variables

Again it is not possible to reject the hypothesis that the estimates of the parameters of the cross-product variables are zero. The pattern is similar to the observed for the unconditional specification.

Announcement dates. I repeated the analysis using the announcement date when available, i.e. for the sub-sample of 35 emerging markets' firms. CAPM generates significant (at a 10% level) positive cumulative abnormal returns of about 5.4% by the week of the announcement. Cumulative abnormal returns after the announcement date are close to zero.

Calendar time effects. I have analysed the results for the sub-sample of emerging markets into sub-periods: before and after the crash of Mexican shares in December 1994 (respectively, 56 and 14 firms). I have chosen these two sub-periods because most of the emerging markets to pick up two performance regimes (positive before December 1994 and negative after that date). The patterns for abnormal returns are slightly different. The first period has respectively significant and positive abnormal returns before the listing date and negative abnormal returns after the listing date but not statistically significant. In the second period, the positive effect on prices before the listing date is not significant. In the five weeks following listing, we also observe significant negative abnormal returns, that are larger in absolute terms.

One simple reason for this behaviour could be that the second sub-sample includes subsequent and not first listings and, as discussed above, the impact of dual-listing is lower.

By market type. Figures 1 and 2 plot the abnormal performance for each of the sub-samples of emerging and mature markets. Table 7 shows these results. Mature

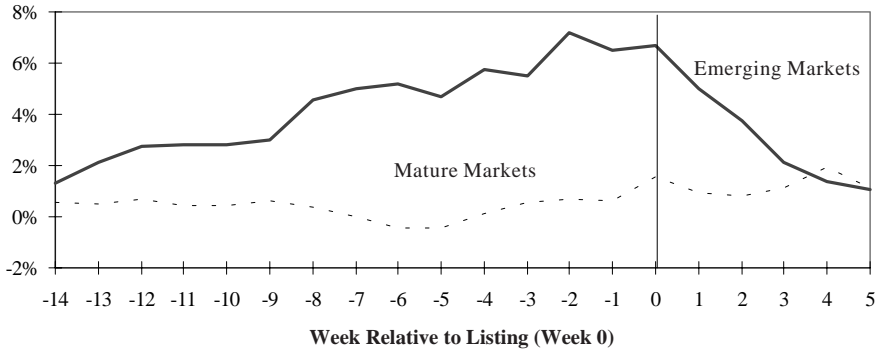


Fig. 1. Cumulative abnormal returns of dual-listed firms around listing date: 1991–1995 Emerging vs. Mature Markets.

This figure plots cumulative average abnormal returns around the week of listing for, respectively, 70 and 65 emerging and mature markets’ firms that dual-listed on the NYSE, NASDAQ and SEAQ-I during the period 1991–1995. Abnormal returns are measured starting on the –14th week before listing, using an unconditional CAPM model that regresses local returns on a world and a local risk factors. The sample data were obtained from Datastream.

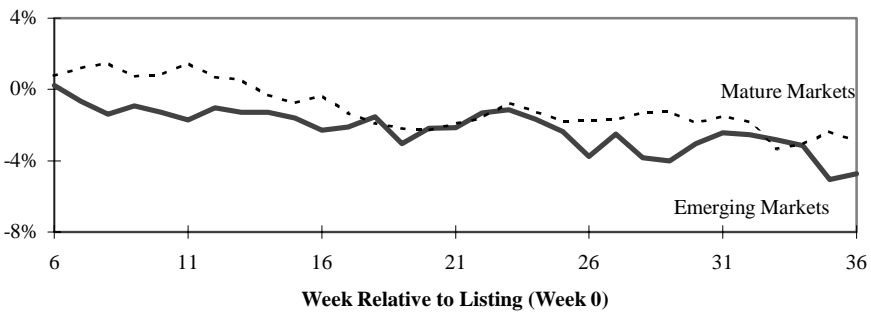


Fig. 2. Post-listing cumulative abnormal returns for dual-listed firms 1991–1995 Emerging vs. Mature Markets.

This figure plots cumulative average abnormal returns up to 36 weeks after listing for, respectively, 70 and 65 emerging and mature markets’ firms that dual-listed on the NYSE, NASDAQ and SEAQ-I during the period 1991 to 1995. Abnormal returns are measured starting on the 6th week following listing using an unconditional CAPM model that regresses local returns on a world and a local risk factors. The sample data were obtained from Datastream.

Table 7

Cumulative average abnormal returns around and after the week of dual-listing by market type significance tests for sub-periods

This table reports cumulative average abnormal returns (CAR) around and after the listing date for, respectively, 70 emerging markets' and 65 mature markets' firms that dual-listed their stocks on a US or UK exchange during the period of 1991–1995. Abnormal returns are prediction errors using CAPM parameters estimated regressing local returns on local and world market indices over the weeks –52 to –15 in event time. The *p*-values reflect two-tailed tests for the event period and one-tailed test for the post-listing period. *t*-dif CAR refers to a *t*-test on the set of differences across markets.

<i>Panel A. All exchanges</i>					
Period	Emerging markets (N = 70)		Mature markets (N = 65)		
	CAR	<i>p</i>	CAR	<i>p</i>	<i>t</i> -dif CAR
<i>Event</i>					
–14 to –2	0.0716	(0.0002)	0.0070	(0.5466)	(2.17)
–1 to 0	–0.0046	(0.6789)	0.0084	(0.0970)	(–0.90)
+1 to +5	–0.0565	(0.0000)	–0.0040	(0.2134)	(–2.24)
<i>Post-listing</i>					
+6 to +36	–0.0475	(0.0979)	–0.0290	(0.1424)	(–0.13)
<i>Panel B. NYSE</i>					
Period	Emerging markets (N = 29)		Mature markets (N = 13)		
	CAR	<i>p</i>	CAR	<i>p</i>	<i>t</i> -dif CAR
<i>Event</i>					
–14 to –2	0.0359	(0.2835)	0.0248	(0.3163)	(–0.19)
–1 to 0	–0.0229	(0.6533)	0.0135	(0.3980)	(–0.95)
+1 to +5	–0.0343	(0.1802)	–0.0409	(0.0160)	(1.21)
<i>Post-listing</i>					
+6 to +36	0.0211	(0.4008)	–0.0450	(0.3167)	(0.50)
<i>Panel C. SEAQ-I</i>					
Period	Emerging markets (N = 32)		Mature markets (N = 46)		
	CAR	<i>p</i>	CAR	<i>p</i>	<i>t</i> -dif CAR
<i>Event</i>					
–14 to –2	0.0844	(0.0018)	0.0037	(0.9143)	(2.31)
–1 to 0	0.0013	(0.7113)	0.0048	(0.3290)	(–0.35)
+1 to +5	–0.0625	(0.0002)	0.0037	(0.4605)	(–2.70)
<i>Post-listing</i>					
+6 to +36	–0.0655	(0.0910)	–0.0542	(0.0459)	(0.06)

markets, unlike emerging markets, do not seem to register positive or negative performance, respectively before and after the listing date in event time. There are positive significant abnormal returns but these concentrate on the week just before listing and the listing week. For the post-listing period, the cumulative abnormal performance is negative of -3% against the -5% we observe for the emerging markets group.

When we compare the performance of the two groups with a difference t -test, we see that abnormal performance is statistically different for the two groups in both the pre-listing period and in the 5 weeks following the listing date.

By exchange type. To investigate further this differential behaviour, panels B and C in Table 7 report the differences between the two groups across two stock exchanges: NYSE and SEAQ-I.

For SEAQ-I listings, the results are similar: during the event period, the effects are only significant for the emerging markets sub-sample; in the post-listing period the difference in the abnormal performance between the two groups is not statistically significant.

For NYSE listings, however, the general pattern vanishes: both emerging and mature markets' firms register the overall pattern of positive and negative abnormal returns respectively before and after the listing date (the lack of significance seems to result from the small number of observation in each group). Strangely, in the post-listing period there are no signs of negative abnormal performance for the emerging markets listings.

Thus the difference we observed above, between emerging and mature markets, for the overall sample, seems to be driven by differences in SEAQ-I listings.

I re-examined the results by comparing now the effects across stock exchanges for each of the two groups of markets. Table 8 shows the difference t -tests. We can see that, for emerging markets, the pattern during the event period is similar across exchanges. The difference between the two exchanges is only significant in the first 5 weeks following listing where firms trading on SEAQ-I register a steeper decline than their NYSE counterparts. If we consider altogether this period and weeks -1 and 0 this difference is no longer statistically significant. Thus, it seems that for emerging markets' firms, dual-listing has a significant impact on returns regardless of the listing place. For the mature markets, however, the general pattern we observed during the event period remains only for listings on the NYSE. Yet, listing on any of the two exchanges, shows negative abnormal performance in the post-listing period.

This evidence could be supportive of the segmentation hypothesis. For emerging markets, any of the two trading venues is good enough to undo partially the segmentation effects and decrease the firm's cost of capital. For mature markets' firms, that originate from markets that are more financially integrated, the impact on prices is limited to the NYSE if we leave out the post-listing period. Any of the other theories reviewed above, anticipates that effect. For example, information, and liquidity arguments would predict that trading on SEAQ-I will have no (or a negligible) effect on the firm's value. However, trading on the NYSE by providing access to a very large pool of investors and superior liquidity services, should impact the firm's cost of capital. For emerging markets' firms those effects could also be present given that the different explanations are not mutually exclusive.

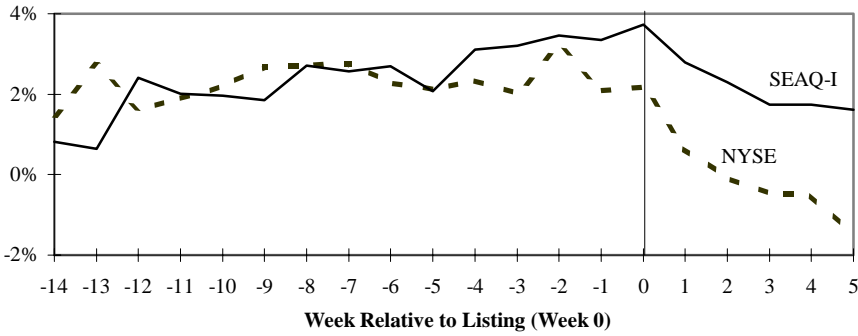


Fig. 3. Cumulative abnormal returns for dual-listed firms around listing date: 1991–1995 Emerging Markets, NYSE vs. SEAQ-I

This figure plots cumulative average abnormal returns around the week of listing for, respectively, 29 and 32 emerging markets firms that dual-listed their stocks on the NYSE and on the SEAQ-I during the period 1991–1995. Abnormal returns are measured starting on the –14th week before listing, using an unconditional model that regresses local returns on a world and a local risk factors. The sample data were obtained from Datastream.

Table 8

Cumulative average abnormal returns around and after the week of dual-listing by exchange type significance tests for sub-periods

This table reports the significance statistics for the difference between the cumulative average abnormal returns (CAR), around and after the listing, in NYSE and in the SEAQ-I during the period of 1991–1995. *t*-dif CAR refers to a *t*-test on the set of differences across exchanges. Refer to Table 7, panel B and C, for the CARs for each sub-sample of emerging and mature markets in NYSE and in SEAQ-I.

Period	<i>t</i> -dif CAR	
	Emerging markets	Mature markets
Event		
–14 to –2	(–1.26)	(0.83)
–1 to 0	(–0.58)	(0.28)
+1 to +5	(1.71)	(–1.84)
Post-listing		
+6 to +36	(0.99)	(0.35)

Selected markets. The first hypothesis (*Segmentation I*) is whether the impact of listing varies directly with the degree of segmentation. Whether a market is more or less integrated with the world market is a difficult question to answer. On one hand, formal or informal barriers are too many to list. On the other hand, these barriers are not necessarily binding.

If the international segmentation theory is valid, the impact of dual listing is a measure of integration. The evidence discussed above broadly confirmed that listings of emerging markets' firms register a greater impact than those listings originating from mature markets. We now examine, in more detail, the results for some selected emerging markets and try to link the results with the information we have on barriers for each of those markets. Table 9 reports the results for Chile, India, Mexico and Taiwan. The analysis is restricted to these markets given that the remaining emerging markets in the sample have only a few listings each.

Chile. There are 18 dual-listed Chilean firms in my sample, of which 16 listed on the NYSE, 1 on NASDAQ and 1 on SEAQ-I. By the end of 1992, there were only 2 international listings from Chile and most of the listings clustered in 1994 (11).

We would expect *a priori* that Chilean dual-listings lead to a significant impact in returns. Chilean market has still important restrictions to foreign investment. Until 1993, there were currency controls. Only after 1994, the Chilean peso was pegged against a basket of currencies and was allowed to fluctuate in a band of $-/+10\%$ (12.5% in 1996). Repatriation of capital was only allowed after 3–6 years (changed to 1 year in 1994). Only from January 1996, Decree Law 600 permits 100% foreign ownership of listed Chilean companies. Besides that, a 30% reserve requirement on foreign borrowers (with no interest) is required and there are limits on outward investment. Finally, foreign investors are liable to pay 35% on capital gains and dividends.

At the beginning of 1991, there were only 4 country funds targeting Chile. By 1996 this number had jumped to 9 (of which 6 were closed-end funds). Over the period of 1991–1995, these funds accounted for between 2 and 3% of Chilean total market capitalization.

My results for the Chilean listings do not show the pattern we would expect given the scenario described in the previous two paragraphs. Results are even more

Table 9

Cumulative average abnormal returns around and after the week of dual-listing significance tests for sub-periods selected markets

This table reports cumulative average abnormal returns (CAR) around and after the listing date for selected emerging markets' firms that dual-listed their stocks on a US or UK exchange during the period of 1991–1995. Abnormal returns are prediction errors using *CAPM* parameters estimated regressing local returns on local and world market indices over the weeks -52 to -15 in event time. The *p*-values reflect two-tailed tests for the event period and one-tailed test for the post-listing period.

Period	Chile (N = 18)		India (N = 20)		Mexico (N = 14)		Taiwan (N = 7)	
	CAR	<i>p</i>	CAR	<i>p</i>	CAR	<i>p</i>	CAR	<i>p</i>
<i>Event</i>								
-14 to -2	-0.0127	(0.7491)	0.0978	(0.0010)	0.1214	(0.0053)	0.0063	(0.9939)
-1 to 0	-0.0145	(0.5975)	-0.0124	(0.3171)	0.0069	(0.6612)	0.0515	(0.0083)
+1 to +5	-0.0499	(0.1245)	-0.0412	(0.0271)	-0.0806	(0.0028)	-0.1010	(0.0015)
<i>Post-listing</i>								
+6 to +36	0.0695	(0.1140)	-0.0307	(0.3354)	-0.1827	(0.0050)	-0.1201	(0.1343)

surprising given that Chile is a market within the same time zone as NYSE. Smith and Sofianos (1997) show that the market share of US market in global trading is more pronounced when dual-listed securities originate from time zones where business hours overlap substantially with the NYSE because information that is revealed locally can be used simultaneously at the NYSE. If the weight of US investors is more important then the higher should be the impact on the firm's cost of capital. We observe that Chilean cumulative abnormal returns are always negative but never significant. The reason for this could be that this sub-sample includes listings at different moments in time. According to the hypothesis *Segmentation IV*, the most important impact should be registered for the first international listings. From that point on, all securities in the local market become indirectly related to the international market. It is notorious that, by the end of 1996, Chilean dual-listed securities represented 40% of Santiago's market capitalization.

India. There are 20 Indian GDRs in my sample, all trading on SEAQ-I. By the end of 1993, only 2 Indian GDRs were trading internationally.

India is a country with very severe barriers. Not only are there still many formal restrictions to foreign investment, but India's settlement and clearing risks are extremely high. For example, from 1992 to 1994, it was difficult for any foreign investor to access the local custody services because the existing ones were unable to take on more clients. Only authorized investors are allowed to invest in India (Qualified Foreign Investors) and even these investors face ownership limits of 24%, on aggregate and 5%, for the holdings of a single QFI (10% since 1996). At the end of 1992 there were 10 QFI. This number has jumped to 429 in June 1997 but only around 100 are active. The Indian rupee is independently floating and repatriation is free but subject to registration. There are taxes on dividends and capital gains and limits on outward investment.

At the beginning of 1990, there were 6 country funds investing in India. By the end of 1996, more than 50 funds targeted India (18 of which were closed-end funds). These funds represented around 2% of Indian total market capitalization and, over the 1991–1995 period, accounted for between 1 and 2%.

The results in Table 9 confirm that the Indian stock market is not fully integrated. Indian dual-listings follow the overall pattern we observe for the emerging markets' sub-sample. By the listing date, we observe significant cumulative abnormal returns amounting to +9% and in the 5 weeks following listing the cumulative abnormal returns are -4% (significant at a 5% level).

Indian GDRs provide a distinctive case from almost the rest of emerging markets' listings in our sample. While for the generality of these listings, the law of one price holds (and the differential in prices usually does not exceed 5%), Indian GDRs trade at a substantial premium. It seems thus that the dual listing dismantles only partially the segmentation. Even if we observe a positive and significant effect in prices around the listing date, this effect could even be more pronounced as the premium usually observed suggests.

Mexico. Our sample comprises 14 Mexican listings but Mexico is the emerging market country that has dual-listed more securities in the last decade. By the end of 1991 Mexico already had more than 10 listed ADRs.

The Mexican stock market is free to foreign investment since December 1993—with some exceptions in reserved activities. Investors can invest directly or through the

Neutral Mechanism (class N shares with no voting rights) for the cases where investment is reserved to Mexican nationals. In 1991, foreign participation in the Mexican stock market was 18% and this figure has been growing since then. By June 1997, foreign investors accounted for around 35% of total market capitalization. Mexico has no taxes on dividend or capital gains and there are no currency controls. Finally, outward investment is also free.

Country funds have never accounted for a substantial part of the market capitalisation (less than 1%). By the end of 1991, there were 5 country funds in Mexico and 12 in 1996.

Mexican dual-listings show a very positive cumulative abnormal returns before the listing date (+12%) and negative cumulative abnormal returns of -8% after that. This result is surprising given that there seem to be no formal barriers to foreign investment and Mexico is a market that, *a priori*, we would expect to be integrated world-wide. One of the reasons for this behaviour could be related with the substantial time-overlap of Mexico and NYSE stock markets. The information and liquidity effects could be thus driving the results. To confirm that one would need to compare the impact across exchanges but the dimension of the sub-samples does not allow that analysis.

Taiwan. There are 7 dual-listings in our sample, all trading on SEAQ-I. The first dual-listing from Taiwan occurred in 1992 but at the end of 1996, there were only still 10 international listings.

Taiwan is the second largest emerging market but it is very regulated and foreign participation is small. As in India, only authorized investors are allowed to invest in the stock market. At the end of 1995, there were 45 such investors. There are restrictions to income and capital repatriation and ownership limits for non-Taiwanese investors (20% on aggregate and 5% individually). At the same time and until July 1995, there was a ceiling on the aggregate amount of foreign capital inflows. There are currency controls and outward restrictions on investment. Finally, foreigners have to pay taxes on dividends (usually 20% but that can go up to 35%) and a securities transaction tax.

Country funds play an important role to invest in Taiwan. By 1991, there were 5 country funds accounting for less than 1% of total market capitalization. This fraction has increased since then but, by the end of 1995, it was only slightly above 2%.

The evidence in Table 9 confirms the investment restrictions just described, suggesting Taiwan is not fully integrated with the world capital markets. By the listing date, there were positive cumulative abnormal returns of around 5.8% and during the first 36 weeks after listing cumulative abnormal returns summed to -22%.

Summary of main findings.

1. Previous studies on the effects of *foreign listings* in the USA have found positive significant abnormal performance before listing and negative significant abnormal performance immediately following listing. For a sample of 70 emerging markets' listings, I also find positive abnormal performance before the listing date and negative short-run abnormal performance following the dual-listing. For the first month after listing, my results show a decline of around -6% while Alexander *et al.* (1988) found -3%, and Miller (1996), -3.5%. Jayaraman *et al.* (1993) show a negative cumulative abnormal return of -1% one month following listing. Foerster and Karolyi (1996)

abnormal returns are not directly comparable to mine because they adjust for changes in risk. My results are robust to the specification model used (CAPM or market model, unconditional or conditional) and are significant whether I use parametric and non-parametric tests.

2. In the post-listing period, there seems to be a negative cumulative abnormal returns but the abnormal performance is marginally significant. Further, that pattern exists only for SEAQ-I listings.

It is difficult to establish a link between the observed change in prices before listing and the estimates I obtain for the decline in required returns. If we use a simplistic valuation model like the Gordon model, in the extreme case of no dividend growth and assuming a required return of 20% before listing, then the observed decline in returns in the post-listing period, of near -8% (annualized), would call for a positive change in prices of around 40%. Recall that the cumulative abnormal returns by the listing date are below 7%. Conversely, if we trust the observed change in price as correct, the demanded decline in expected returns would be no more than 1.4% (annualized). Thus apparently, the change in prices does not accommodate the decline in returns. This could be because the Gordon model assumes that future required returns and dividend growth are constant, or due to partial anticipation by investors of the decline in the firm's cost of capital or still because a large part of the benefits are

Table 10
Dummy variable regressions

This table summarizes the dummy variable regressions of local returns against a world and a local risk factors using GMM. Panel A shows the average estimated parameters for 70 emerging markets' firms that dual-listed on the NYSE, NASDAQ and SEAQ-I during the period 1991–1995. Panel B compares the parameters before and after listing. The pre-listing period goes from week -52 (or before) to week -15 . The post-listing period starts at week $+6$ and ends at least at week $+36$ (or later). t refers to the value of the t -test. p -S reports the Sign Test p -value for a two-tailed test.

<i>Panel A. Average estimates</i>				
Variable	Estimate		t	
Intercept	—		—	
Listing dummy	0.0036		(0.39)	
Post-listing dummy	-0.0026		(-0.61)	
Local risk	0.8166		(7.65)	
Post-listing local risk dummy	0.0711		(0.31)	
World risk	0.0990		(0.49)	
Post-listing world risk dummy	0.1487		(0.38)	
<i>Panel B. Pairwise test of differences in parameters before and after listing</i>				
Parameter	Pre-listing	Post-listing	t	p -S
Intercept				
Local beta	0.8092	0.8805	(2.05)	(0.065)
World beta	0.1044	0.4984	(5.34)	(0.000)

Table 11

GMM regressions of cumulative abnormal returns on proxies for the international asset pricing determinants

This table shows the coefficients for the cross-sectional regressions of abnormal returns on proxies for the International Asset Pricing model determinants. *CAR* is the cumulative abnormal returns for each firm over the period before listing (week -14 to -2) using a *CAPM* specification. *CORL* and *CORW* are the correlation coefficients between the stock's local return and the local and world market returns computed over the period prior to the beginning of the event. *DRP* is the historical difference between the local and the world market's returns previous to the listing date. *LMSIZE* the size of the originating market relative the world market value. *II* are IFC investability indices and *RATING* are the Institutional Investor's country credit ratings. *CF* is the premium on country funds targeting the emerging market from where the firm originates. *RANK* and *TMV* are, respectively, the ranking and the total market value (up to that listing) of the dual-listed securities (all classes) originating from that particular country. *SIZE* is the market value of the stock. *t*-statistics are reported in parentheses below the coefficient.

Dependent variable: <i>CAR</i> over the 15 weeks before listing													
Number of Firms	70												
<i>Intercept</i>	0.0427 (0.45)	0.0803 (3.00)	0.0679 (3.16)	0.0525 (0.93)	0.0118 (0.36)	0.1992 (2.42)	0.0078 (3.48)	0.0570 (1.32)	0.0660 (1.93)	0.0739 (2.78)	0.2710 (2.01)	0.2547 (1.95)	0.3096 (1.76)
<i>CORL</i>	0.0593 (0.33)										-0.0163 (-0.09)	-0.0296 (-0.16)	-0.0249 (-0.13)
<i>CORW</i>		-0.1337 (-0.85)									-0.0984 (-0.62)	-0.166 (-0.69)	-0.0933 (-0.56)
<i>DRP</i>			1.3329 (0.37)									2.3974 (0.56)	2.2577 (0.53)
<i>LMSIZE</i>				2.8000 (0.46)								5.8050 (0.66)	4.938 (0.52)

(continued)

<i>II</i>					0.1608									
<i>RATING</i>					(1.89)									
						-0.0959						-0.1330	-0.1612	-0.1881
						(-1.80)						(-2.25)	(-2.20)	(-2.08)
<i>CF</i>							0.5172					0.7202	0.7895	0.8778
							(2.11)					(2.63)	(2.41)	(2.34)
<i>TMV</i>								0.4126						-0.0924
								(0.44)						(-0.76)
<i>RANK</i>									0.0005					0.0012
									(0.24)					(0.57)
<i>SIZE</i>										-0.0814			0.5532	0.6442
										(0.22)			(1.39)	(1.59)
<i>R-square</i>	0.003	0.020	0.002	0.003	0.074	0.034	0.049	0.003	0.006	0.000		0.128	0.155	0.164
<i>Adjusted R-Square</i>	-0.001	0.005	-0.013	-0.013	0.059	0.020	0.033	-0.013	-0.015	-0.015		0.070	0.051	0.026

reaped by fees and disclosure costs. Alternatively, my benchmark model could be misspecified.

3. Emerging markets' firms register stronger positive and stronger negative abnormal returns (respectively, in the 14 weeks before listing and the first 5 weeks after listing) than mature markets. This result is important in that it supports our first hypothesis (*Segmentation I*) that states that the effects of dual-listing are more pronounced for markets that exhibit more barriers to free investment. Miller (1996) also finds that difference significant for a sample of US dual listings. When we investigate further that differential behaviour, we see that that difference only exists for the sub-sample of SEAQ-I listings.

4. For emerging markets' firms thus there is no support for higher rewards in the more liquid place where there is better risk sharing and stricter disclosure rules. The implication of this result in terms of choosing a place to list is that, as there are benefits in both exchanges, it may be important to consider the other costs involved in the listing process. I computed a rough estimate of the present value of fees across exchanges. For a firm with a capitalization of around US\$ 20 million, NYSE fees could represent around 1.2% of the firm's value. For NASDAQ or SEAQ-I, this cost should not exceed 0.3% of the firm's capitalization.

In the case of the European firms in my sample, dual-listing seems to create value and impact the firm's cost of capital only when it lists on the NYSE. Cantale (1996) finds similar results. This evidence could be supportive of one (or several) of the other arguments (awareness, liquidity, timing or signalling).

5. The patterns we observe are not always consistent with the priors suggested by investment restrictions and foreign participation in the local markets. The valuation impacts are as expected in India and Taiwan, where formal barriers are high and foreign presence is small. However, for Chile and Mexico results are puzzling.

7.3. Risk changes

It is plausible that the listing caused a shift in the return generating process. To address further the problem of change in the risk parameters, I run a dummy regression, for each stock, allowing for changes in the intercept during and after the listing date and in the risk parameters after the event. I tested individually and jointly the significance of these dummy variables. Table 10 summarizes the results.

Panel A is inconclusive regarding the change in the model parameters. The intercept dummy variables are economically significant but, on average, are not statistically significant. Results in panel B are more convincing. *A priori* we would expect the local parameter to decrease and the world market to increase after listing reflecting increasing segmentation from dual listing. We observe an increase for both the local and world betas and this last is very significant. Jayaraman *et al.* (1993) and Miller (1996) are unable to find significant changes in risk parameters. Foerster and Karolyi (1996) report a decline in the local betas using a pooled model. Their Chow-test is very significant but it seems to be a joint test that includes also intercept changes.

After accounting for risk changes, the event dummy (mean CAR during the event period) still shows a positive value (+0.4%) and the post-listing dummy is negative (-0.5%) but, on average, these parameters are not significant. Foerster and Karolyi (1996) find a similar decrease of around -0.5% using a pooled regression.

I also controlled for possible changes in trading frequency motivated by the listing. I performed the pairwise tests of differences in risk parameters after accounting for thin trading following Dimson (1979) procedure. Doing so, it is not possible to reject the null of no change in the parameters.

7.4. Cross-sectional analysis

The results in the previous two sections suggest that the super risk premium required for stocks originating from markets where there are barriers to investment is partially undone by the dual-listing.

In this section, I provide more evidence on the determinants of the listing impact by conducting a cross-sectional regression of cumulative abnormal returns over the period before listing, on proxies for the factors motivated by the theoretical framework described in section 4.

Table 11 shows the results. The univariate regressions show that the more powerful variables are the IFC investability index (*II*), the country credit rating (*RATING*) and the premium on country funds (*CF*). The last two variables are economically and statistically significant. These results give support to hypotheses *Segmentation I*. Firms that originate from markets where barriers are more severe observe a larger impact on prices. The evidence is inconclusive for the other hypotheses: we cannot establish that first listings and firms that provide more diversification benefits register a stronger valuation impact.

For the multivariate regression, I only present here some selected specifications given that some of the explanatory variables are highly correlated. The regressions explain only a small part of the cross-sectional variation in abnormal returns. Further, the intercept term is, in almost all specifications, statistically different from zero.

8. Conclusions

The prospectus for foreign listing in London states the following: 'London provides access to the largest pool of institutional equity capital in the world'; 'a wide and sophisticated shareholder base'; 'increased investor interest and confidence'; 'A listing in London can mean a company's visibility and status is dramatically enhanced'.

My results for emerging markets' listings support this statement: listing on an international exchange results in a decline of a firm's expected returns reflecting a better risk sharing. For emerging markets, any of the two main international exchanges seems to be good enough to reap these benefits. Emerging markets' firms register stronger abnormal performance than mature markets. For mature markets' firms, the impact on prices is limited to NYSE listings.

The evidence presented here could be supportive of the segmentation hypothesis. Firms that originate from markets where barriers are more severe observe a larger impact on prices. Further, while NYSE provides access to a wider range of investors, better liquidity and transparency, listing on SEAQ-I seems to undo partially the segmentation effects and decrease the firm's cost of capital. For mature markets' firms, that originate from markets that are more integrated, the dual-listing benefits of an enlarged shareholder base and/or superior liquidity can only be realised by listing on the NYSE.

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