The Value of Information in Cross-Listing*

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Abstract

This paper examines the possible sources of valuation benefits of cross-listing. We exploit the unique features of the organizational structure of the London Stock Exchange in order to isolate the effects of information based explanations like bonding and signaling. Up until 2004, foreign firms could be exchanged in the Overseas Segment of the London Stock Exchange under two different programs: official listing and admission to trading. The first is started by the firm's choice to list it's shares in the U.K.; the second is initiated by a market maker/dealer without the firm's involvement. An event study analysis documents significantly positive abnormal returns around the cross-listing event, and no significant price reaction around the trading event. A cross-sectional analysis of the abnormal returns documents significantly higher abnormal returns for cross-listing relative to trading. This difference in abnormal returns between the two events persists after we control for a number of firm specific and country level characteristics. The results are consistent with the positive valuation effects suggested by information-based motives for cross-listing. Finally, a price volatility analysis provides further support that differences in the liquidity effects of LSE cross-listing relative to SEAQ-I trading can not explain the documented difference in abnormal returns.

I Introduction

It is well known that cross-listing of domestic stocks in foreign exchanges has significant valuation effects (see Miller (1999) and Foster and Karolyi (1999) among others). The finance literature identifies a number of sources of cross-listing valuation benefits that can be grouped into two broad categories: the benefits that arise purely from trading in a foreign market, and those associated with a reduction in asymmetric information. The benefits in the first category, called "*the conventional wisdom*" by Karolyi (2006), include broadening of investors base (Merton (1987), Foster and Karolyi (1999)), reducing market segmentation (Domowitz, Glenn, and Madhavan (1997) and Miller (1999)), and the benefits associated with multi-market trading such as increased liquidity (Foster and Karolyi (1999)). The second category of cross-listing benefits are those arising from the reduction of asymmetric information, when the cross-listed firm voluntarily commits to increased disclosure and monitoring through its decision to cross-list on a "higher quality" market[1]. Broadly speaking, two different strands of literature fall in this category. First, the bonding hypothesis—proposed by Doidge et al. (2004), and based on the work of Coffee (1999, 2002), Stulz (1999) and Reese and Weisbach (2002), posits that the increased disclosure and monitoring associated with cross-listing on a U.S. exchange enhances investor protection and, consequently, reduces the agency costs of controlling shareholders. Second, the signaling hypothesis, based on the theoretical contributions of Cantale (1996), Fuerst (1998), and Moel (1999), states that companies may choose to cross-list their shares on an exchange with more compelling disclosure requirements to "communicate" their higher quality to the market. Consistent with both the bonding and part of the signaling hypothesis, Doidge et al. (2008) using a sample of more than 4,000 companies, find that the probability of cross-listing in the U.S. is higher the lower the private benefits of control[2] and the lower the control rights with respect to cash flow rights.

Previous studies that examine cross-listing do not provide conclusive evidence as to the relative importance and magnitude of the different sources of value. This limitation stems from the simultaneous positive valuation impact on the listed shares of all the cross-listing explanations. Early studies focused almost exclusively on the effects of market segmentation and liquidity simply because the

[1] See Lang et al. (2003) and, more recently, Bailey et al. (2006) and Fernandes and Ferreira (2008) for the relation between cross listing and the information environment of the firm. Also, see Chemmanur and Fulghieri (2006) for the resolution of between asymmetric information and competition between exchanges.

[2] See Benos, E., and M. Weisbach (2004) for a review of the realtion between private benefits of control and cross-listing.

asymmetric information theories were not yet fully developed. For example Miller (1999) finds higher abnormal returns around the U.S. cross-listing for firms from emerging markets relative to those of firms from developed countries, a result that is consistent with market segmentation. This finding, however, is also consistent with signaling, bonding and liquidity effects to the extend that the reporting and listing requirements, the investor protection, and the liquidity of the domestic emerging markets are lower than those of the U.S. market. More recent studies tend to dismiss market segmentation as a feasible explanation given the extensive liberalization of world capital markets (see Stulz (1999) and Doidge et al (2004)).

The objective of this paper is to provide an alternative test of both the "conventional wisdom" sources of cross-listing benefits of market segmentation and liquidity and the new information-based theories. To achieve this, we exploit a feature of the organizational structure of the London Stock Exchange, which allows us to isolate the effects of information based explanations. Up until 2004, companies with country of incorporation outside the U.K. could be exchanged in the overseas segment of the London Stock Exchange under two different programs: official listing and admission to trading. The first program, an official listing on the LSE, is started by the firm's choice to list its shares in the U.K. The second program, unique to the SEAQ-I market, is initiated by a market maker/dealer without the firm's involvement. The dichotomy between companies that decide to list on the LSE after a strategic and voluntary corporate decision and companies that just "trade" on SEAQ-I allows us to test the incremental valuation effects of LSE listed foreign firms relative to SEAQ-I traded firms, while effectively controlling for the effects that are associated with the removal of investment barriers and liquidity.

We proceed to empirically investigate the effects of both cross-listing on LSE and trading on SEAQ-I on the abnormal returns and the price volatility in the home market. Our findings are consistent with the positive valuation effects suggested by the information-based motives for cross-listing. The event study analysis documents significantly positive abnormal returns around the cross-listing event, and no significant price reaction around the trading event. A cross-sectional analysis reveals that the difference in abnormal returns between the two events persists after we control for a number of firm specific and country level characteristics. We also document that firms from emerging markets, which are potentially more segmented, do not experience higher abnormal returns than firms from developed countries either at the cross-listing or at the SEAQ-I trading events. We do however document that firms using higher quality accounting standards (either U.S. GAAP or International Accounting Standards) have lower abnormal returns around cross-listing as they already operate in

an enhanced disclosure environment. Furthermore, the significantly higher abnormal returns enjoyed by cross-listed firms persist even after we control for firms that raise capital up to three years after cross-listing. Finally, the price volatility analysis provides additional support that microstructure frictions and differences in the liquidity effects of LSE cross-listing relative to SEAQ-I trading can not explain the documented differences in abnormal returns. We find no evidence of an increase in the liquidity of the domestic shares for the listed firms relative to the SEAQ-I traded firms.

The contribution of our paper is threefold. First, our results contribute to the extensive literature that examines the impact of cross-listing on firm value, and our unique sample allows us to factor out the marginal value of the information based explanations of cross listing benefits. Second, our paper contributes to the limited literature on the effect of cross-listing outside the U.S. and in particular on the London Stock Exchange[3]. Third, the use of SEAQ-I traded firms offers an alternative approach to alleviate the endogeneity problem associated with cross-listing. In fact, any analysis of the valuation effects of cross-listings suffers a severe self selection problem. Possible remedies include an econometric approach of modelling the firm's decision choice (Heckman (1979)), or the use of an appropriate control sample. Some authors have circumvented the endogeneity problem by considering a sample of firms with dual-class shares that list either one or both of the classes (Doidge, 2004; Bris et al, 2007). Ideally, however, one would like to have a sample of firms that could, but do not list abroad, or alternatively a sample of firms which cross-list, but do not want to, or do not choose to. The latter sample is given by the SEAQ-I.

The remainder of the paper is organized as follows. In section 2, we present an introduction to the LSE and more importantly to the SEAQ-I admission process. Section 3 discusses the sample selection process and the data collected. Section 4 provides a comparison of listed and traded firms on a number of characteristics. Section 5 introduces the analysis and presents a simple univariate event study. Section 6 conducts a cross-sectional analysis, describes the methodology used, analyses the results, and presents a number of variations of the main model. Section 7 contains the price volatility decomposition analysis. Finally, section 8 concludes the paper.

[3]Notable exceptions include Salva (2003), Doidge et al. (2008) and Lel and Miller (2008). Salva (2003), the paper that is closest to the present paper, finds positive stock price reaction on the announcement day of cross-listing on the LSE, and relates it to an improvement in corporate governance. However, Doidge et al. (2008) and Lel and Miller (2008) do not document any bonding benefits for firms cross-listed on the London Stock Exchange.

II Listing vs. Trading on the London Stock Exchange

The listing mechanisms in the U.S. markets have been described in detail in the literature (see Karolyi (2006) for references). Recently, the London Stock exchanges attracted more attention especially after the passage of Sarbanes-Oxley 2002 act, and the ensuing debate on the competitiveness of the U.S. exchanges comparative to London (see Doidge et al. (2008), Piotroski and Srinivasan (2007), and Sarkissian and Shill (2008)). In the London Stock Exchange, during our sample period, there were two ways for foreign securities to be admitted to the International Markets section: an official U.K. listing in the London Stock Exchange's Main Market (henceforth "listing") and an admission to trading on SEAQ-I (henceforth "trading"). In this section, we provide an overview of the different markets. The former is a simple process via the U.K. Listing Authority, that is very similar to the process in the U.S. . Firms that obtain admission through this mechanism are defined as the "listed" firms in this paper. The latter mechanism is more peculiar and it requires some additional background information. Firms that are exchanged using the SEAQ-I are referred to as "traded" throughout this paper.

A The London Stock Exchange's Main Market

The market most people would identify as 'the U.K. stock market' is the London Stock Exchange's Main Market. This is the world's most active international equity market with companies from all areas of the business world. In 2007, more than 2,000 companies, including overseas companies, have had securities quoted on this market. There are three principal ways for an international firm to list on the London Stock Exchange's Main Market: equity, depositary receipts and debt. Internationally-based companies can apply for a primary listing in London, or if already listed on their own domestic market, can apply for a dual primary or secondary listing. Some international issuers prefer to list Depository Receipts (DRs). These are negotiable certificates which represent ownership of a given number of a company's shares which can be listed and traded independently from the underlying shares. There are a number of forms of DRs including American Depositary Receipts (ADRs), Global Depositary Receipts (GDRs), and Euro Depositary Receipts (EDRs). Finally, companies can list debt instruments on the LSE' main market. These range from simple eurobonds and credit-linked notes to complex asset-backed issues, high yield bonds and convertible/exchangeable bonds.

A two-stage admission process applies to companies who want to have their securities admitted to the London Stock Exchange's Main market. The securities need to be admitted to the Official

List by the U.K. listing Authority (UKLA), a division of the Financial Services Authority (FSA), and then also admitted to trading by the London Stock Exchange. To be admitted to the LSE's Main Market, companies seeking admission have to abide by a set of strict rules governing their listing (admission requirements). However, it has to be noted that the Exchange does not get involved in setting the regulation. This is the responsibility of the FSA, which is the main regulator in the U.K.. The UKLA retains discretion so that in special circumstances the initial requirements can be waived or "tailored" to reflect individual company requirements. After the admission, the UKLA also sets a series of rules that listed companies need to follow. The UKLA actively monitors the compliance of the admission requirements and continuing obligations (the Standards) so that the market can continuously maintain its high quality and can operate properly. The Standards are set to protect the Exchange's good name, the companies involved in the process, and the investors. Monitoring and enforcement actions are taken by the Exchange on a timely basis, and the Exchange maintains the right to suspend trading and, in extreme circumstances, to cancel the right of a company's securities to be traded if the Standards are not met.

B SEAQ-I International: A primer

In 1985, the London Stock Exchange (LSE) started the SEAQ-I (Stock Exchange Automated Quotation International), a competing screen-based, quote driven system for non-U.K. equities, that operates in a similar manner to the SEAQ for U.K. and to the NASDAQ for U.S. securities. Both shares and depositary receipts (DR) can be traded on SEAQ-I. Trading takes place around the clock, but quotations may be input between 7:30 to 17:15 U.K. time. This period is referred as Mandatory Quote Period (MQP). Market makers are required to provide two quotes, firm or indicative depending on the time of the day, to which they are willing to buy or sell. From 7:30 to 8:00, quotes may be provided but prices are seen as indicative. From 8:00 to 16:30, the market maker has to provide quotes that are firm. Afterwards and until 17:15, prices are regarded as indicative again. Notice that the MQP may be changed to accommodate special needs. For example, the MQP for French securities is from 9:00 to 16:00 U.K. time to adjust for the opening and the closing hours of the Paris Bourse.[4] Additionally, any non-synchronization of daylight savings time between U.K. and the rest of Europe can affect the MQP. SEAQ-I stopped operating on 27 September 2004. The admission to trading process is started by one of the trading members of the LSE, approaching the Exchange with a request to trade a secu-

[4] See Bertrand and Gresse (1998).

rity. The Exchange will then admit the security provided that the security has an official listing on a member exchange of the World Federation of Stock Exchange (or correspondent / affiliate exchange). Notice that there is "*no relationship between the Exchange and the Issuers,*[5] *and the Exchange does not normally contact the Issuers to let them know that they have begun trading on the platform*"[6].

III The Sample

Our objective is to investigate the stock price reaction around the listing/trading day for those non-U.K. firms that list on the LSE or trade on the SEAQ-I, to ascertain whether there is any value associated with the strategic cross-listing decision. To reach our goal, we collected data from Datastream International for all international firms (that is, firms with country of origin outside the U.K.) that were either listed on the LSE or traded on SEAQ-I as of April 30, 2004[7]. The listing event dates range from 6/25/1903 to 3/19/2004, but we restrict our attention to the period post January 1, 1980 and we found price data around the event date for 81 out of 167 firms in the sample. We also collected data for all firms that are traded on the SEAQ-I. Our initial sample consists of 312 firms/securities. Some firms are present in our sample with more than one instrument.[8] For these firms/securities, we keep the instrument that started trading first. We are left with a sample of 253 SEAQ-I firms, with start of trading dates after January 1, 1985 (when the SEAQ-I started operating). We have price data for 192 of these companies. A detailed breakdown of the sample by country of incorporation and type of London listing (Listing vs. Trading) is given in Table 1.

[Insert Table 1]

[5] The Issuers are the companies whose stock is admitted to trade.

[6] This quote (in italic) is taken from an email exchanged by the authors with a representative of the LSE.

[7] We thank Chris Lees, Product Manager of the International Trading Services at the London Stock Exchange for providing the list of the companies, including the starting dates for both listing and trading.

[8] This happens because the market maker decided to trade, for some firms, more than one financial instrument (i.e. share class A and B, or the common and the preferred stock of the same company). We did not find the same phenomenon for firms listing on the LSE.

Table 1 shows that the majority of the SEAQ-I sample comes from Japan (85 firms). This is not surprising as the LSE reports that in 2000 for instance 56 percent of the total volume traded in SEAQ-I corresponded to Japanese companies. There are also 24 firms from Hong Kong, 26 from Taiwan, and 15 from India. The sample of LSE-listed firms is concentrated among U.S. firms (27 observations), and firms from Ireland (21 firms).

This study uses a set of firm specific variables and country specific variables as controls. The firm specific variables that we employ are size as measured by the natural logarithm of market capitalization, and liquidity, proxied by the natural logarithm of volume in the pre-listing period (measured in the window -250 days before the listing to -51 before the listing/trading event).

We also use six country-specific variables: Public Enforcement Index and Disclosure Requirement Index are from Djankov et al. (2008), from now on DLLS (2008), Legal (that is the product of Revised Anti-Director Rights times the Rule of Law Index) is from La Porta et al. (2006), from now on LLS (2006), and Efficiency of the Judicial System is from La Porta et al. (1998), from now on LLSV (1998). GDP per Capita is from the World Development Indicators Database. Lastly, we used Capital Access Index as defined in Yago et al. (2000). The value for this index ranges from 0 to 7 (the higher the score, the easier is to get access to capital).

IV Trading vs Listing Firms' Characteristics

In order to analyze the differences between listed and traded firms, we collect a series of accounting variables for the firms in our sample[9]. Table 2 reports measures of size, profitability, leverage, and corporate liquidity for the two groups of firms. It also provides tests of differences using a non-parametric Kruskal-Wallis test. Accounting data is obtained from Worldscope.

[Insert Table 2]

Overall we find that SEAQ-I firms are larger in size than LSE-listed firms (total revenues, total assets, and market capitalization are all significantly larger at the one-percent significance level). The average SEAQ-I firm has $7.7 bn in market capitalization, while the average LSE firm has $5.1 bn. While 32 percent of sales of listed firms are foreign, the percentage is only 19 for traded firms (significant difference at the one-percent level). SEAQ-I - traded firms are also less profitable and

[9] See Pagano, Roell, and Zechner (2002) for an analysis of the characteristics of companies that cross-list abroad.

more leveraged than LSE-listed firms and EBIT margin is larger for LSE than for SEAQ-I firms (non significant difference though). In summary it seems that the market maker selects large, profitable companies to trade in SEAQ-I, which have decided not to cross-list in LSE.[10]

We expand on these results by estimating a probit regression of the listing/trading decision on firm characteristics. We construct an indicator variable that equals one when the firm trades in SEAQ-I, and zero when it lists in LSE. We use as explanatory variables the accounting variables described above[11], and report marginal effects of the estimation in Table 3.

[Insert Table 3]

We find that cross-listed and traded firms appear to differ significantly only on size related characteristics and marginally on profitability. In the full model in column 7, we only document significant coefficient estimates on the Total Sales (-0.0134) and Total Assets (0.00892) variables indicating that traded firms tend to have lower sales, but more total assets relative to cross-listed firms. In other models market capitalization comes in positive and significant. Profitability variables are only significant in models 1 and 6. The coefficient estimate on ROA in model 1 is negative and significant at the 5% level and the coefficient estimate on Cash Flow to Sales is negative, but significant only at the 10% level. Both of these findings suggest that traded firms tend to be less profitable than cross-listed firms, which is not however substantiated by the insignificant coefficient estimates on EBIT Margin. Finally, corporate liquidity and leverage do not seem to matter as none of the corresponding variables are significant. The low explanatory power of the probit model (a maximum R-square of 13 percent in the full model) suggests that there does not seem to be a selection effect in the sample of SEAQ-I firms relative to the sample of cross-listed firms.

V Initial Evidence: Event Study

This section provides some initial evidence on the valuation benefits of cross-listing and trading using event study methodologies. More specifically, we calculate the stock price reaction around the day of

[10] A good example is Toyota, a Japanese firm that during the sample period was not listed on London, but traded on the SEAQ-I platform.

[11] Because of lack of observations, we exclude from the probit regressions the interest coverage ratio, the ratio of foreign assets to total assets, and the ratio of foreign sales to total sales. We also excluded the EBIT (since we included EBIT margin).

listing (for those firms that list on the LSE) and around the first day of trading (for those firms that trade on SEAQ-I). Throughout this paper, we use the market model to calculate abnormal returns as follows. For every firm (listed or just traded), the following time series regression is estimated using data in the window (-250,-51) days relative to the event date:

$$R_{it} = \alpha_i + \beta_i R^i_{Mt} + \varepsilon_{it} \tag{1}$$

where R^i_{Mt} is the corresponding market index, which is country specific. We then calculate abnormal returns (AR) from the residuals[12]:

$$AR_{it} = R_{it} - \widehat{\alpha} - \widehat{\beta} R^i_{Mt} \tag{2}$$

Finally, cumulative abnormal returns (CARs) for different sub-periods are obtained by adding up the corresponding ARs. In the whole window considered in Figure 1, that is [-20, +20], the CAR accruing to firms listed on LSE is 3.81% (t-stat = 1.69), while for firms traded on SEAQ-I the CAR is -0.038% (t-stat = -0.31). The difference between the two coefficients, which represents the incremental returns of the listing decision, is positive (4.19%) and statistically significant at the 10% level (t-stat = 1.71). In the window [-10, +10] days around the event day, the CAR for firms traded on SEAQ-I is 0.012% (t-stat = 0.14), while, for the same period, the CAR for firms listed on LSE is 3.80% (t-stat = 2.21). The difference between the two coefficients is positive (3.68%) and is significant at the 5% level (t-stat = 2.13). In the next section of the paper, we use the more conventional window of [-1, +1] to conduct a cross-sectional analysis of abnormal returns. For this window, the CARs for listed and traded firms are 1.91% (t-stat = 1.6) and -1.44% (t-stat = - 4.92), respectively. Their difference is 3.35% and it is statistically significant at the 1% level (t-stat 3.86). Figure 1 plots the cumulative abnormal returns for a period of 20 days around the trading and listing events.

[Insert Figure 1]

By being merely traded on the SEAQ-I platform, firms can potentially take advantage of what Karolyi (2006) calls "the conventional wisdom" benefits of cross-listing. These include the easing of cross-border investment barriers, the liquidity benefits provided by a better market, and a larger

[12] We also conducted our analysis using market adjusted returns and the results are qualitatively similar.

investor base. The initial evidence seem to suggest that the explanatory power of the conventional explanations is minimal, if any. In fact, in the different windows, the trading event is associated either with small and insignificant cumulative abnormal return or with a negative and significant cumulative abnormal return (for the window [-1, +1]). On the contrary, however, there is always a positive and statistically significant cumulative abnormal return around the listing event that is sustained in the 20 day period after the event. This finding provides initial evidence that the significant incremental benefits of cross-listing relative to trading may be associated with the improved information environment accompanying the voluntary firm decision to cross-list on the LSE. In the next sections, we further explore the differential price reaction around the listing and trading event days.

VI Econometric Model and Methodology

The results presented above ignore the cross-sectional differences among firms as well as a set of different country specific institutional and legal characteristics. To incorporate these into the analysis, we run the following cross-sectional model:

$$CARs_{(-1,+1),i} = \alpha_i + \beta_i \times LIST + \gamma \times CONTROLS + \epsilon_i \tag{3}$$

where $CARs_{(-1,+1),i}$ are the cumulative abnormal returns for firm i in the interval (-1, +1) days around the event date; LIST is a dummy variable that takes the value of 1 if the firm is listed and zero if the firm is traded; and CONTROLS are our set of control variables. We control for firm level liquidity prior to the listing/trading event, as well as for the ease of access to capital in the firm's home market and size. Furthermore, we control for country level investor protection using variables from LLSV (1998), LLS (2006), and DLLS (2007). We estimate the model using robust ordinary least squares (OLS) and Maximum-Likelihood-Like robust estimator (M-estimator) regression with year-fixed effects. Robust estimators provide a valid alternative to OLS when some assumptions are not met by the data. The Newey-West (1987) procedure produces heteroskedasticity and autocorrelation consistent standard errors and it is employed in the robust OLS procedure. The M-estimator produces robust estimators by iteratively reweighting least squares using Huber's weights and Tukey biweights. Since Huber weights have some issues with outliers and Tukey biweights may encounter some convergence problems, the methodology uses Huber weights in the first iterations, and then uses Tukey weights until convergence is obtained. Methodologically, the more extreme an observation is, the lower its weight in the regression. Eventually, very extreme cases, that is, those

with Cook's D greater than one, are given the weight of zero and are dropped from the analysis. With this procedure, both the standard errors and the coefficients are different from OLS estimates[13].

A Results

The main results of the model are presented in Tables 4 (without the country level corporate governance variables) and 5 (with country level corporate governance variables). First, consider Table 4. The constant in our model captures the cumulative abnormal returns for the firms trading on SEAQ-I. The coefficient estimate for the constant changes sign in the different specifications. However, it becomes positive, but insignificant once we control for liquidity, firm size, GDP per Capita, and capital access using both the OLS and the M-estimator procedures.

[Insert Table 4]

The coefficient estimate on the LIST dummy variable measures the incremental cumulative abnormal return for firms that obtain listing on the LSE, relative to firms that trade on the SEAQ-I platform. Recall that to obtain listing on the LSE, firms have to apply to the LSE and be admitted. To achieve this, firms have to reconcile their accounting standards with respect to the rules dictated by the LSE, provide an English translation, and pay the Exchange fees.

In all versions of the model in Table 4, the estimated coefficients are positive and statistically significant[14]. More importantly, in the full versions of the model, when all control variables are included (column 6 and 7 of Table 4), the LIST variable coefficient estimate is positive and statistically significant at the 1% level. These results provide strong empirical support for the incremental benefits of the information based explanations of cross-listing as we effectively control for the market segmentation and liquidity based explanations.

These results are in the same spirit of that part of the literature that sees cross listing as a governance method. Cantale (1996), Fuerst (1998), and Moel (1999) are theoretical papers that postulate some form of asymmetry of information between insiders and outsiders of the corporation. Using different mechanisms, the aforementioned papers provide parametric restrictions where good

[13] We also performed the analysis using median regression and bootstrapping techniques. The results were qualitatively the same and we do not report them.

[14] We also estimate the model with country-fixed effects (not reported) and the results are very similar.

firms use cross listing as a way to convey more information to outsiders by committing to a higher level of disclosure standards. Doidge et al. (2004) suggest that the cross-listing decision can be seen as a corporate governance tool to avoid expropriation by controlling shareholders. Additionally, our main results (i.e. cross-listing adds value) are in line with the existing body of empirical literature that examines the impact of cross-listing on the price of non-U.S. firms when they cross-list in the U.S. .[15] Miller (1999) and Foerster and Karolyi (1999) provide the most comprehensive evidence on the subject[16]. Miller (1999) finds positive abnormal returns on the day of announcement of the listing decision and shows that the price reaction is consistent with the market segmentation and the liquidity hypotheses. Foerster and Karolyi (1999) add that the price reaction can be linked to an increase in investor base. The results in Miller (1999) and Foerster and Karolyi (1999) are also consistent with an informational story: cross-listing forces the firm to convey more information and this either results in a positive price reaction because of a reduction in the asymmetry of information between insiders and the market (signaling) or because of the credible commitment to decrease expropriation (bonding).[17] The contribution of this paper is that the particular dichotomy between firms that seek and obtain listing committing to abide by the LSE listing requirements and firms that merely trade on the SEAQ-I platform (without their involvement) allows us to capture the valuation effect of the information component.

An examination of the coefficient estimates for the control variables is also instructive. Regarding liquidity, we confirm some but not all the results documented in the literature. Liquidity is often cited as one of the important reasons behind cross-listing, and, more generally, behind listing. Kadlec and McConnel (1994) study a sample of OTC firms that obtain listing on NYSE and NASDAQ and find that listing was accompanied by an increase in liquidity (as measured by a decrease of the bid-ask spread). In a cross listing environment, Foerster and Karolyi (1998) study a sample of Canadian firms cross-listing in the U.S. , and find that intraday volume increases by 29% and the spread decreases

[15] The non-U.S. market experience has not been the subject of much research. Notable exceptions include Lee (1991) and Lau et al. (1994), as well as the already mentioned Salva (2003) and Doidge et al (2008).

[16] See, however, Karolyi (2006) for a review of the evidence on cross-listing.

[17] Note that liquidity is related to the amount of information asymmetry. Glosten and Milgrom (1985) characterize an economy where the market maker set a bid/ask spread depending on the level of asymmetric information. That is, part of the liquidity increase (documented in previous studies) that accompanies cross-listing can be given by a decrease in information asymmetry.

44 basis points after the cross-listing event. Domowitz et al. (1998) show for a sample of Mexican firms that cross-listing increases liquidity as long as the advantage of being traded in a more "liquid" market outweigh the disadvantages of order flow migration. Finally, Smith and Sofianos (1996) for a sample of non-U.S. firm that cross-list on the NYSE show that the total daily trade value for these firms increased by 34% after the event. In Table 4 (column 2), when liquidity is included in the model without the other control variables, its coefficient estimate is negative and significant at the 10% level. This indicates that, in line with previous studies, the more liquid a stock is prior to its listing/trading event, the lower is the advantage of being traded/listed in the U.K. However, liquidity loses explanatory power when included with the other control variables. In the full versions of the model, in fact, the estimated coefficients remain negative (as predicted by the liquidity hypothesis), but are not statistically significant. Size enters with the right sign, but its effect does not seem to be significant. The same for GDP per capita. Finally, Stapleton and Subrahmanian (1977) claim that cross-listing can be used as a way to by pass market segmentation[18]. And indeed, Miller (1999) finds positive abnormal returns on the day of announcement of the listing decision for a sample of non-U.S. firms listing on a U.S.-organized exchange and shows that the results are consistent with the idea that cross-listing can be used as a way to circumvent market segmentation. The potential integration benefits are expected to be similar as both cross-listing and trading mechanisms make foreign shares available to U.K. investors. Taking this into consideration, we use capital access as an additional control variable. This variable captures the ease of financing, as a proxy for market segmentation. In Table 4 column 5, the estimated coefficient associated with this variable is negative and significant at the 10% level. This is consistent with previous findings that market segmentation plays a role in explaining returns, and that the higher the impediments to capital raising, the higher the advantage of listing/trading abroad. However, in the fuller version of the model (column 6 and 7), the coefficients are still negative, but lose significance, implying that, at least with respect to the U.K. market, we do not find a strong significant role for market segmentation.

[Insert Table 5]

The model in equation (3) is also estimated with country level proxies of investor protection using variables from LLSV(1998), LLS(2006), and DLLS (2008). Table 5 reports the results showing that the significant incremental abnormal returns of cross-listing over trading are robust to these new

[18] See also the work by Errunza and Lonq (1985), Eun and Janakiramanan (1986), Alexander et al. (1987).

control variables. The estimated coefficients associated with the LIST variable are always positive and significant at least at the 5% level. The liquidity coefficients are always negative and the negative coefficient (-0.00319) is significant at the 5% level (t-stat = -2.08) in the full version of the model with the M-estimator, providing some evidence that liquidity is important in explaining abnormal returns. Finally, the country wide corporate governance variables are never significant.

Overall the results show that cross-listing on the LSE has a statistically positive valuation effect, over and above the effect of trading in London through the SEAQ-I market. Even when we control for market segmentation, as proxied at the country level by the capital access index, and liquidity measured as the natural logarithm of volume[19], the coefficients remain positive and significant, implying that information related differences between listing and trading play a significant role in explaining the abnormal returns.

B Additional Results

In this section, we examine whether firms coming from emerging markets[20], or firms that raise capital after their cross-listing enjoy higher valuation benefits. We also investigate whether firms that use higher quality accounting standards (either U.S. GAAP, or International Accounting Standards (IAS)) prior to their cross-listing or trading in London have lower valuation benefits. Different theories of cross-listing suggest that the valuation impact of cross-listing could vary based on the degree of market segmentation and/or the information environment of the firm prior to cross-listing. Firms from more integrated countries and firms with higher quality accounting standards will potentially benefit less from cross-listing. In order to capture these effects in our model and to be able to capture the marginal effect on the traded stocks, we create four additional dummy variables. First, we create a dummy variable named TRADE that takes the value of 1 if a firm is traded on SEAQ-I and zero otherwise; second, EM that takes the value of 1 if a firm is from an emerging market and zero otherwise; third, Accounting Standards that takes the value of 1 if a firm uses IAS or U.S. GAAP prior to its cross-listing and zero otherwise; and finally, Equity takes the value of 1 if a firm raises capital up to three years after cross-listing on LSE and zero otherwise. All the models we run include as controls all the

[19] In addition to using the natural logarithm of volume, we also use the percentage of zero returns (see Bekaert, Harvey, and Lundblad (2007)) and the Amihud (2002) liquidity measure in order to proxy for liquidity. The results are qualitatively similar to the ones presented here and they are not reported.

[20] We use the World Bank classification as it is indicated in the *Emerging Markets Factbook*.

variables that we used in the full models of Table 5 (columns 5 and 6). Each model is run using robust OLS and the M-estimator.

[Insert Table 6]

Table 6 presents the results. In models 1 and 4, none of the interaction variables with the EM dummy variable is statistically significant indicating that there is no valuation difference between firms coming from emerging markets and those coming from developed markets for either cross-listing or trading. In models 2 and 5, the coefficient estimates of the interaction of Accounting standards with the TRADE dummy variable are positive, but not significant, indicating that the prior firm information environment does not affect the valuation of SEAQ-I traded firms. On the other hand, the coefficient estimates of the interaction of the LIST variable with the Accounting Standards dummy variable are negative and statistically significant at the 10% level in both models 2 and 5. This result indicates that firms that come from a lower quality information environment benefit more from cross-listing, consistent with the information based explanations of cross-listing. Finally, in models 3 and 6, the coefficient estimates of the interaction of the LIST variable with the Equity dummy variable are positive, but statistically significant only in the OLS model. More importantly, in all models the coefficient estimates of the LIST dummy variable remain positive and significant. These results show that even after we account for a potential differential valuation effect for firms coming from emerging markets, higher quality information environments, and firms that raise capital after their cross-listing, the valuation benefits of cross-listed firms relative to traded firms remain significantly higher.

VII Price Volatility

In this section we investigate in more depth whether the documented differences in abnormal returns between the LSE listed firms and the SEAQ-I firms are driven by differential liquidity effects due to microstructure differences between the two trading platforms. We conduct a price volatility analysis using a modified version of the econometric model of Domowitz et al. (1998). The econometric model is given below:

$$(\Delta P_t)^2 = \gamma_t + \delta_t \times (\Delta P_{t-1})^2 + \lambda \times V_t + \eta_t$$

where:

$$\gamma_t = \gamma_0 + \gamma_1 \times LIST + \gamma_2 \times AFTER_t \times LIST + \gamma_3 \times AFTER_t \times TRADE$$

$$\delta_t = \delta_0 + \delta_1 LIST + \delta_2 AFTER_t \times LIST + \delta_3 AFTER_t \times TRADE$$

$$\lambda_t = \lambda_0 + \lambda_1 LIST + \lambda_2 AFTER_t \times LIST + \lambda_3 AFTER_t \times TRADE$$

and P_t is daily price (in U.K. pounds), $(\Delta P_t)^2 = (P_t - P_{t-1})^2$, $(\Delta P_{t-1})^2 = (P_{t-1} - P_{t-2})^2$, and V_t is volume measured as the number of shares traded per day (in millions) in the domestic market. AFTER is a dummy variable that takes the value of 1 if the observation is after the trading/listing event, and zero otherwise, and the other dummy variables are explained in Tables 4 and 6. The time-varying parameters of the model are estimated using panel data methodologies. The model decomposes price volatility into two components. The first component captures the variance of *overnight* public information arising from imperfect public information. This term, which represents base level volatility, is captured by the parameter γ_t. The second component represents the volatility induced by microstructure frictions including information asymmetry. This component is proportional to expected daily volume, where the proportionality coefficient λ is inversely related to market liquidity. We are particularly interested in the effects of listing/trading on λ.

[Insert Table 7]

Table 7 presents the results. The model is estimated separately with year and firm fixed effects. It is also estimated for the whole sample and for firms from developed and emerging markets separately. The parameters γ_0 and λ_0 are typically positive and significant[21], confirming the validity of the model (see Domowitz et al. (1998)). With respect to liquidity, the parameters of interest are λ_2 and λ_3. They measure the effect of cross-listing (for LSE and SEAQ-I, respectively) on the sensitivity of price volatility to trading volume. The estimated parameters can be affected by market microstructure frictions, including order flow migration and order processing costs. Interestingly, we find that domestic liquidity does not appear to be affected by the listing or trading events in both the overall and developed market samples. For emerging market firms we find negative and significant effects on λ after both trading and listing in the two models without firm fixed effects, but no significant effects when firm fixed effects are included in the model. The significant improvement in liquidity implied by the

[21] The coefficient estimates are always positive and significant in the overall sample, but become insignificant in some models in the developed or the emerging markets sub-samples. They are never significantly negative.

negative coefficients appears to be stronger for traded firms relative to listed firms. These results support the argument that microstructure frictions and thus possible differences in the liquidity effects of cross-listing relative to SEAQ-I trading can not explain the documented differences in abnormal returns. We find no evidence of an increase in domestic market liquidity for the listed firms relative to the SEAQ-I traded firms. In fact, on the contrary, for firms from emerging markets the documented significant increase in liquidity appears to be stronger for traded firms relative to listed firms.

VIII Conclusions

The paper exploits the unique features of a dataset of LSE listed and SEAQ-I traded foreign firms and compares the effect of the listing / trading events on the returns and price volatility of the firms in their home market. Our findings are consistent with the information-based motives for cross-listing. We find that the LSE listing is associated with a positive and significant abnormal return. This is in line with most of the literature. However, although we identify a positive valuation effect around the SEAQ-I trading event, it is not statistically significant. This finding implies that the shareholders of the cross-listed firms value positively the listing decision, and that only the proactive decision by the firm to cross list has value. The results however are not consistent with the traditional explanation of cross-listing benefits through the reduction of investment barriers and through potential liquidity benefits of multimarket trading as no significant abnormal returns are documented around the SEAQ-I trading event.

A cross-sectional analysis of the abnormal returns shows that the documented significant incremental valuation benefit of cross-listing on LSE relative to trading on SEAQ-I is robust to the inclusion of proxies for liquidity, ease of access to capital, and investor protection. We also document that firms from emerging markets, which are potentially more segmented, do not enjoy higher abnormal returns than firms from developed countries either at the cross-listing or at the SEAQ-I trading events. We do however document that firms using higher quality accounting standards (either U.S. GAAP or International Accounting Standards) enjoy lower abnormal returns around cross-listing as they already operate in an enhanced disclosure environment. Furthermore, the significantly higher abnormal returns enjoyed by cross-listed firms persist even after we control for firms that raise capital up to three years after cross-listing. These results are consistent with the positive valuation effects suggested by the information-based motives for cross-listing. Furthermore, the price volatility analysis provides conclusive support that the differences in the liquidity effects of LSE cross-listing relative to SEAQ-I

trading can not explain the documented differences in abnormal returns. In fact, we find no evidence of an increase in domestic market liquidity for the listed firms relative to the SEAQ-I traded firms.

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Figure 1 – Listing on the LSE vs. Trading on SEAQ-I

This figure plots the CARs of those firms that decide to list on the LSE (solid line) and those firms that started trading on the SEAQ-I in the period [-20, +20] days with respect to the listing/trading day. The abnormal returns were calculated using the market model, where the beta of each security has been estimated in the window (-250, -51) days before the listing/trading event.

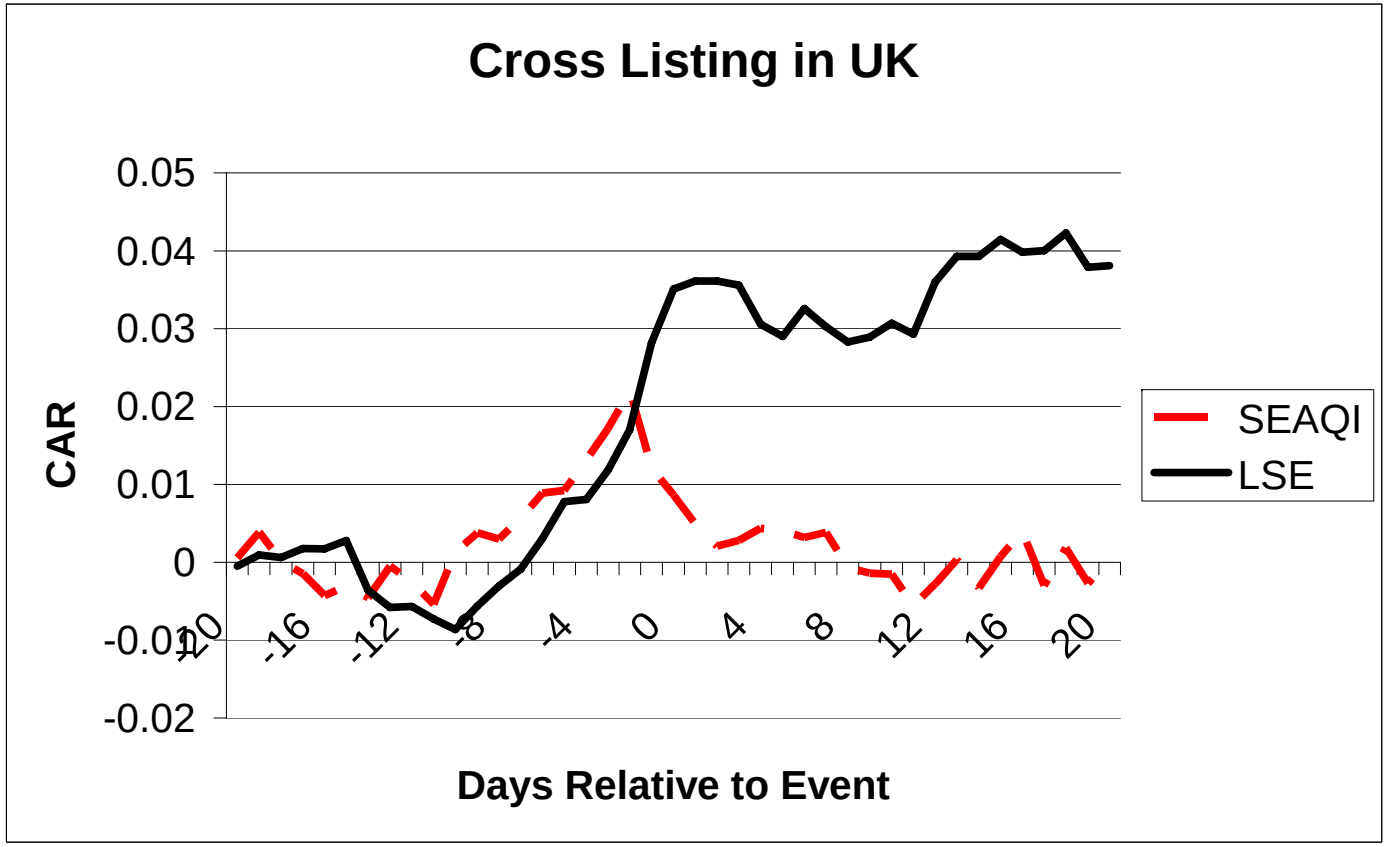

Table 1 – Sample Description

Number of firms on LSE, SEAQ-I, total number of firms, and description of each country by the dichotomy Emerging Market/ Non Emerging Market.

Country	LSE	SEAQ-I	Total Number	Emerging Market
Australia	0	1	1	No
Bermuda	1	8	9	No
Canada	3	1	4	No
Cayman Islands	0	1	1	No
Chile	1	0	1	Yes
China	0	3	3	Yes
Egypt	1	1	2	Yes
Germany	7	0	7	No
Hong Kong	0	24	24	No
Hungary	0	5	5	Yes
India	2	15	17	Yes
Indonesia	1	0	1	Yes
Israel	2	1	3	Yes
Japan	1	84	85	No
Mexico	0	4	4	Yes
Netherlands	2	1	3	No
Norway	1	0	1	No
Papua New Guinea	0	1	1	Yes*
Poland	0	3	3	Yes
Republic of Ireland	21	0	21	No
Russia	2	0	2	Yes
South Africa	1	2	3	Yes
South Korea	2	6	8	Yes**
Sweden	2	0	2	No
Switzerland	4	0	4	No
Taiwan	0	26	26	Yes
Turkey	0	4	4	Yes
USA	27	1	28	No
Total	**81**	**192**	**273**	

Notes:

* Papua New Guinea is not included in the list of Emerging Markets as well as in the list of Developed Markets. We included it as "Emerging"

** South Korea is not included in the list of Emerging Markets as well as in the list of Developed Markets. Korea is classified as "Emerging", and we included South Korea as such.

Table 2 –Description of Firms in the Sample

The Table reports measures of accounting performance and market returns for the LSE (Listed) and SEAQ-I (Traded) firms in the sample. All variables are measured the year prior to the listing /trading date. The "Number of Firms" column reports the number of firms with available information on the corresponding variable. "Annual Return" is inclusive of dividends, and all level variables are in $ thousands. Data is from Worldscope. All variables are all winsorized at the 5% probability level to avoid outliers. Tests of differences are based on a non-parametric Kruskal-Wallis equality-of-populations rank test. Asterisks denote significance level: one asterisk denotes significance at the 10% level, two asterisks denote significance at the 5% level, and three asterisks denote significance at the 1% level.

	Listed			Traded			Difference Listed - Traded			All		
	Number of Firms	Mean	Median	Number of Firms	Mean	Median	Mean	Median	p-value	Number of Firms	Mean	Median
Total Revenues	45	$5,987,240	$648,934	168	$6,433,122	$2,424,958	-$445,882	-$1,776,024 ***	(0.0047)	213	$6,338,922	$2,171,486
Total Assets	45	$23,800,000	$1,154,414	168	$24,500,000	$6,148,972	-$700,000	-$4,994,558 ***	(0.0005)	213	$24,300,000	$5,144,567
Market Capitalization	33	$5,121,086	$597,515	165	$7,709,998	$3,765,411	-$2,588,912	-$3,167,896 ***	(0.0033)	198	$7,278,513	$3,282,281
EBIT	41	$602,336	$62,156	165	$401,584	$203,003	$200,752	-$140,847	(0.1891)	206	$441,540	$187,222
Fixed Assets to Common Equity	44	88.5%	56.0%	168	109.5%	75.5%	-21.0%	-19.5% *	(0.0506)	212	105.1%	73.0%
Foreign Sales to Total Sales	29	32.2%	31.5%	110	19.0%	12.7%	13.2%	18.8% ***	(0.0040)	139	21.7%	14.6%
Foreign Assets to Total Assets	15	15.3%	15.7%	84	10.9%	0.0%	4.5%	15.7%	(0.2610)	99	11.6%	0.0%
Annual Stock Return	38	31.4%	16.4%	165	40.1%	46.0%	-8.7%	-29.7% ***	(0.0092)	203	38.5%	41.6%
Debt to Asset Ratio	45	11.2%	8.7%	168	17.9%	16.6%	-6.7%	-7.9% ***	(0.0027)	213	16.4%	15.0%
Return on Assets	40	6.4%	6.6%	163	4.9%	3.0%	1.5%	3.6% **	(0.0405)	203	5.2%	3.6%
EBIT Margin	40	14.2%	12.0%	165	13.5%	10.8%	0.7%	1.2%	(0.3743)	205	13.6%	11.3%
Cash Flow to Sales	43	15.2%	12.5%	166	14.3%	9.8%	0.8%	2.7%	(0.4516)	209	14.5%	10.6%
Capital Turnover	45	76.0%	68.1%	168	59.7%	54.9%	16.2%	13.1%	(0.1583)	213	63.2%	59.8%
Cash to Asset Ratio	37	13.7%	8.7%	150	13.8%	11.5%	-0.1%	-2.7%	(0.5259)	187	13.8%	11.4%
Interest Coverage Ratio	4	4.0	3.3	26	2.0	0.3	2.1	3.0 *	(0.0994)	30	2.2	0.5

Table 3 – Probit Regression: Trading vs. Listing

In the regressions, the dependent variable is an indicator that takes value 1 when the firm is traded (SEAQ-I), and zero when the firm is listed (LSE). The table reports the marginal effect of a change in the independent variable on the probability of a SEAQ-I trading. Accounting Variables are from Worldscope, and they are all winsorized at the 5% probability level to avoid outliers. Robust z statistics in brackets. Asterisks denote significance level as in Table 2.

	1	2	3	4	5	6	7
Sales (dollar bn)	- 0.0063	- 0.0026	- 0.0051	- 0.0034	- 0.0029	-0.0168***	-0.0134**
	[1.32]	[0.52]	[1.14]	[0.69]	[0.53]	[2.90]	[2.21]
Total Assets (dollar bn)	- 0.0006	- 0.0005	- 0.0000	0.0004	- 0.0003	0.0123***	0.00892**
	[0.91]	[0.67]	[0.04]	[0.48]	[0.45]	[2.41]	[1.74]
Market Capitalization (dollar bn)	0.0105**	0.00963*	0.00876**	0.0058	0.00793*	0.0034	0.0054
	[2.34]	[1.76]	[1.93]	[1.36]	[1.72]	[0.89]	[1.39]
Fixed Assets To Common Equity	0.0203	0.0212	- 0.0032	0.0208	0.0241	- 0.0011	- 0.0361
	[0.59]	[0.64]	[0.07]	[0.63]	[0.67]	[0.03]	[1.46]
Cash Flow To Sales	- 0.0431	- 0.2640	- 0.2740	- 0.1980	- 0.3160	-0.325*	- 0.2440
	[0.18]	[1.29]	[1.34]	[0.91]	[1.33]	[1.78]	[1.19]
ROA	-0.0156**						- 0.0109
	[2.44]						[1.64]
Annual Stock Return		0.0684					0.0307
		[1.59]					[1.04]
Debt to Asset Ratio			0.3580				0.2820
			[1.27]				[1.37]
EBIT Margin				- 0.0169			0.1940
				[0.09]			[0.81]
Capital Turnover					- 0.0588		0.0220
					[0.77]		[0.27]
Cash to Asset Ratio						0.2020	0.1280
						[0.84]	[0.62]
Observations	188	187	194	188	194	172	161
R-squared	0.062	0.0474	0.0394	0.0241	0.0315	0.0579	0.132

Table 4 –Main Model estimated with year-fixed effects.

We estimate the model in Equation (3) to include the cross-sectional differences among firms as well as a set of different country specific institutional and legal characteristics. CARs $_{(-1,+1),i}$ are the dependent variable of our model and are defined as the cumulative abnormal returns for firm i in the interval (-1, +1) days around the event date; LIST is a dummy variable that takes the value of 1 if the firm is listed and zero if the firm is traded; ln(Volume) is the natural logarithm of volume in the prelisting/trading period; Size is defined as the natural logarithm of market capitalization (in millions); GDP per Capita is from the World Factbook; Capital Access is the index defined in Yago et al. (2000). This model has been estimated with year-fixed effects using OLS (Model 1 to 6) and with M-estimator as explained in the text of the paper (Model 7). Robust Newey-West (1987) t-statistics are noted below each coefficient for OLS estimators, and t-statistics are noted below each M-estimator coefficient. Asterisks denote significance level as in Table 2.

	OLS						**M-estimator**
	1	2	3	4	5	6	7
Constant	-0.0144***	-0.00766	-0.0143***	-0.00672	0.034	0.0306	0.0235
	[-4.91]	[-1.65]	[-4.67]	[-1.06]	[1.19]	[1.01]	[0.86]
LIST	0.0358***	0.0222***	0.0358***	0.0352**	0.0406***	0.0263***	0.0228***
	[2.66]	[2.75]	[2.66]	[2.58]	[3.01]	[2.74]	[3.10]
Ln(Volume)		-0.00266*				-0.00201	-0.0018
		[-1.83]				[-1.25]	[-1.41]
Size			-0.0481			-0.116	0.332
			[-0.065]			[-0.15]	[0.32]
GDP per Capita				-0.0299		-0.0066	-0.00348
				[-1.43]		[-0.28]	[-0.16]
Capital Access					-0.0105*	-0.00823	-0.00554
					[-1.70]	[-1.16]	[-0.83]
Observations	273	247	273	263	262	236	236
R-squared	0.25	0.17	0.25	0.25	0.25	0.19	0.15

Table 5 – Main Model estimated with Country Level Variables and with year-fixed effects.

We estimate the model in Equation (3) to include the cross-sectional differences among firms as well as a set of different country specific institutional and legal characteristics. The Public Enforcement Index, the Disclose Requirement Index are taken from LLS (2006). The variable Legal (equal to Revised Anti-Director Rights Index x the Rule of Law Index) is from DLLS (2008). The Efficiency of the Judicial System Index is from LLSV (1998). All other variables are as in Table 4. This model has been estimated using OLS (Model 1 to 5) and with M-estimator (Model 6). Robust Newey-West (1987) t-statistics are noted below each coefficient for OLS estimators, and t-statistics are noted below each M-estimator coefficient. Asterisks denote significance level as in Table 2.

	OLS					M-estimator
	1	2	3	4	5	6
Constant	0.0371	0.0603*	0.0364	0.0707**	0.0628	0.0453
	[1.20]	[1.67]	[0.83]	[2.07]	[1.16]	[0.89]
LIST	0.0257***	0.0267**	0.0287**	0.0277**	0.0260**	0.0256***
	[3.03]	[2.38]	[2.51]	[2.50]	[2.40]	[2.84]
Size	-0.117	-0.485	-0.425	-0.673	-0.695	-0.23
	[-0.15]	[-0.59]	[-0.54]	[-0.76]	[-0.77]	[-0.20]
Capital Access	-0.00784	-0.00436	-0.00539	-0.00796	-0.00407	-0.00301
	[-1.15]	[-0.43]	[-0.50]	[-0.74]	[-0.40]	[-0.30]
Ln(Volume)	-0.00195	-0.00274	-0.00262	-0.00293	-0.00281	-0.00319**
	[-1.11]	[-1.46]	[-1.41]	[-1.39]	[-1.27]	[-2.08]
GDP per Capita	-0.00534	-0.0209	0.0186	0.0228	0.0118	0.037
	[-0.21]	[-0.75]	[0.45]	[0.50]	[0.17]	[0.51]
Public Enforcement Index	0.00231				0.00592	-0.0116
	[0.15]				[0.31]	[-0.82]
Disclosure Requirement Index		-0.0363			-0.0222	0.0109
		[-1.16]			[-0.51]	[0.26]
Legal			-0.0019		-0.0000272	-0.00113
			[-0.78]		[-0.0079]	[-0.39]
Efficiency of the Judicial System				-0.00355	-0.00256	-0.00373
				[-0.78]	[-0.36]	[-0.77]
Observations	236	224	224	224	224	224
R-squared	0.19	0.21	0.22	0.22	0.22	0.18

Table 6 – The Effect of Emerging Market, Accounting Standards, and Raising Equity (estimated with year-fixed effects).

We estimate our model to control for firms coming from Emerging Markets, firms that comply with US GAAP and IAS (Accounting Standards), and firms that issue equity after cross listing on the LSE. TRADE is a dummy variable that takes the value of 1 if the firm is traded on SEAQ-I and zero otherwise; EM is a dummy variable that takes the value of 1 if the firm is from an emerging market and zero otherwise; Accounting Standards is a dummy variable that takes the value of 1 if the firm was already complying with US GAAP or IAS before listing/trading on LSE/SEAQ-I and zero otherwise; Equity is a dummy variable that takes the value of 1 if the firm raised equity up to three years after listing on the LSE and zero otherwise. All other variables are as in Table 4 and 5. This model has been estimated with year-fixed effect using OLS (Model 1 to 3) and with M-estimator (Model 4 to 6). Robust Newey-West (1987) t-statistics are noted below each coefficient for OLS estimators, and t-statistics are noted below each M-estimator coefficient. Asterisks denote significance level as in Table 2.

	OLS			**M-Estimator**		
	1	2	3	4	5	6
Constant	0.0101	0.00262	0.0392	0.0416	-0.00497	0.0426
	[0.11]	[0.032]	[0.74]	[0.70]	[-0.070]	[0.82]
TRADE x EM	0.0486			0.0198		
	[1.35]			[0.78]		
TRADE x Accounting Standards		0.00472			0.00512	
		[0.40]			[0.41]	
LIST	0.0311***	0.0292*	0.0175*	0.0322***	0.0270**	0.0233**
	[3.33]	[1.87]	[1.81]	[3.06]	[2.42]	[2.48]
LIST x EM	0.0363			-0.00852		
	[0.73]			[-0.31]		
LIST x Accounting Standards		-0.00966*			-0.00913*	
		[-1.86]			[-1.69]	
LIST x Equity			0.0670**			0.0198
			[2.04]			[1.06]
GDP per Capita	0.0267	0.0586	0.0469	0.0367	0.067	0.0506
	[0.38]	[0.67]	[0.65]	[0.49]	[0.77]	[0.68]
Ln(Volume)	-0.00337*	-0.00306	-0.00334*	-0.00340**	-0.00305*	-0.00312**
	[-1.69]	[-1.19]	[-1.73]	[-2.15]	[-1.81]	[-2.01]
Capital Access	-0.00585	0.0028	-0.000737	-0.00513	0.00029	-0.00285
	[-0.58]	[0.26]	[-0.075]	[-0.50]	[0.026]	[-0.28]
Size	-0.0512	-0.418	-0.643	-0.0881	0.201	-0.268
	[-0.052]	[-0.43]	[-0.73]	[-0.074]	[0.17]	[-0.24]
Public Enforcement Index	-0.000689	0.0174	0.00155	-0.0148	-0.00168	-0.00737
	[-0.036]	[0.78]	[0.095]	[-1.01]	[-0.11]	[-0.51]
Disclosure Requirement Index	-0.055	0.00674	0.00464	-0.0101	0.035	0.0189
	[-1.01]	[0.13]	[0.11]	[-0.22]	[0.68]	[0.43]
Legal	0.00427	-0.00185	-0.00148	0.000792	-0.00233	-0.00108
	[1.04]	[-0.42]	[-0.50]	[0.21]	[-0.66]	[-0.37]
Efficiency of the Judicial System	0.00263	-0.00211	-0.0036	-0.00209	-0.00244	-0.00471
	[0.31]	[-0.26]	[-0.62]	[-0.37]	[-0.45]	[-0.96]
Observations	224	219	224	224	219	224
R-squared	0.25	0.24	0.26	0.22	0.36	0.18

Table 7 – Decomposition of Stock Price Volatility

The Table reports estimates of the following regression:

$$(\Delta P_t)^2 = \gamma_t + \delta_t(\Delta P_{t-1})^2 + \lambda_t V_t + \eta_t$$

where P_t are daily stock prices, $(\Delta P_t)^2 = (P_t - P_{t-1})^2$, $(\Delta P_{t-1})^2 = (P_{t-1} - P_{t-2})^2$ and V_t is the daily volume. We interact the coefficients γ, δ, and λ, with dummy variables that take value 1 when the stock is Listed (subscript 1); when the stock is Listed, after the Listing date (subscript 2); when the stock is Traded, after the trading date (subscript 3). The model is estimated with 250 observations before, and 250 observations after the listing (trading date). Robust Newey-West (1987) t-statistics are noted below each coefficient. Asterisks denote significance level as in Table 2.

	All Firms			Developed Markets			Emerging Markets		
	OLS	Year-Fixed Effects	Firm-Fixed Effects	OLS	Year-Fixed Effects	Firm-Fixed Effects	OLS	Year-Fixed Effects	Firm-Fixed Effects
Gamma 0	1,902.393***	1,772.394***	1,667.452*	74.635***	-70.359	-35.56	7,634.247***	7,567.032***	4,857.246***
	[10.14]	[8.09]	[1.65]	[15.09]	[1.53]	[0.03]	[10.14]	[8.88]	[5.46]
Gamma 1	-1,577.416***	-178.521	0.000	395.58	1,167.426*	0.000	-7,627.492***	-864.455	0.000
	[5.52]	[0.38]	[0.00]	[1.24]	[1.94]	[0.00]	[10.13]	[1.29]	[0.00]
Gamma 2	-115.212	-119.594	-216.417	-178.461	-259.565	-334.064	12.529*	509.294***	-606.557*
	[0.53]	[0.52]	[0.63]	[0.56]	[0.69]	[0.67]	[1.87]	[4.37]	[1.76]
Gamma 3	794.388**	536.912	-595.954	-11.239	-27.466	-77.053	2,909.423**	1460.186	-2,317.713*
	[2.24]	[1.28]	[1.53]	[0.22]	[0.37]	[0.99]	[2.15]	[0.92]	[1.67]
Delta 0	0.343***	0.343***	0.223***	0.257***	0.245***	0.068	0.339***	0.338***	0.221***
	[5.56]	[5.56]	[4.20]	[10.12]	[9.70]	[0.96]	[5.52]	[5.49]	[4.17]
Delta 1	0.156	0.156	0.273	0.242	0.253	0.428	0.038	1.837***	-1.207**
	[0.44]	[0.44]	[0.76]	[0.69]	[0.72]	[1.19]	[0.39]	[3.76]	[2.19]
Delta 2	-0.158	-0.302	-0.381	-0.169	-0.279	-0.346	0.159	-1.686***	1.553**
	[0.45]	[0.87]	[1.14]	[0.48]	[0.81]	[1.03]	[0.56]	[2.98]	[2.45]
Delta 3	0.124	0.124	0.129	0.242	0.254	0.428	0.12	0.121	0.122
	[1.38]	[1.38]	[1.54]	[0.68]	[0.71]	[1.34]	[1.33]	[1.34]	[1.45]
Lambda 0	0.056***	0.056***	0.089***	0.014***	0.013***	-0.014	-0.005	-0.004	0.099***
	[7.40]	[7.38]	[6.49]	[9.14]	[8.41]	[0.58]	[0.81]	[0.65]	[6.34]
Lambda 1	-0.063***	-0.056***	-0.091***	-0.075	-0.036	-0.005	0.005	0.006	-0.099***
	[6.39]	[6.23]	[6.44]	[1.60]	[1.10]	[0.15]	[0.80]	[0.96]	[6.33]
Lambda 2	-0.003	0.006	0.008	0.02	0.034	0.039	-0.000**	-0.003*	-0.002
	[0.46]	[0.76]	[0.70]	[0.42]	[0.62]	[0.79]	[2.14]	[1.88]	[1.53]
Lambda 3	-0.012	-0.013	-0.006	0.021	0.024	0.021	-0.056**	-0.054**	0.006
	[0.55]	[0.57]	[0.29]	[0.86]	[0.93]	[0.95]	[2.14]	[2.06]	[0.27]
Observations	125,058	125,058	125,058	90,887	90,887	90,887	34,171	34,171	34,171
R-squared	0.2	0.2	0.11	0.25	0.25	0.25	0.19	0.19	0.1