International Cross-listing and Corporate Disclosure Policy

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Abstract

We investigate whether cross-listing in the U.S contributes to impound more earnings information into stock prices. Our results indicate that exchange cross-listings are associated with more future earnings news reflected in current stock prices. The improvement in stock price informativeness is concentrated in developed markets. On the other hand, the cross-listing decision seems to have no impact on the information environment of emerging markets firms. Further, we find strong positive association between stock price informativeness and U.S exchange cross-listings after the enactment of the Sarbanes-Oxley (SOX) act in 2002, which is consistent with the bonding hypothesis. Finally, consistent with their minimal incremental disclosure requirements, non-exchange ADRs (Level I/Rule 144a) experience an insignificant change in their price informativeness.

Keywords: U.S cross-listing, stock price informativeness, corporate governance
JEL Classification: G15, G34, G38

1. Introduction

In this paper, we investigate the relation between cross-listing in the U.S and stock price informativeness, particularly the extent to which stock prices incorporate future earnings information in an accurate and timely manner. The impact of U.S. cross-listings on the information environment of non U.S. firms is a much debated topic. Although the question is still open, the consensus is that foreign firms that list on U.S. exchanges (NYSE and NASDAQ) become subject to stricter disclosure rules and to greater scrutiny and monitoring from the press and a variety of U.S. market intermediaries (financial analysts, underwriters, etc.). Therefore, on a theoretical basis, a U.S. cross-listing should improve transparency and reduce information asymmetries. It follows that cross-listed stocks should be priced more correctly than non cross-listed stocks, and thus contribute to better capital allocation and investment decisions.

To date, however, little evidence relates U.S. cross-listing with stock transactions occurring at "fair" prices. Lang et al. (2003) find that cross-listed firms experience more analyst following and more accurate forecasts. Similarly, Baker et al. (2002) show that U.S. cross-listings are associated with more analyst and media coverage. These findings suggest that U.S cross-border listings mitigate the information barriers by stimulating media coverage ("hits" in the *Wall Street Journal* and *Financial Times*) and increasing exposure to analysts monitoring.

On the other hand, the expected positive relation between U.S. cross-listings and price informativeness has to be nuanced. For instance, Bailey et al. (2006) provide empirical evidence that absolute abnormal returns and abnormal trading volume around earnings announcements by non-U.S. companies are economically and statistically larger once they list their shares on U.S markets. These results suggest that U.S. cross-listing is associated with increased uncertainty and less transparency. Bailey et al. (2006) argue that part of the problem is that researchers are still unable to determine clearly the motivations for pursuing international cross-listings in the first place. In fact, non U.S. firms may be more attracted by higher liquidity, diversification gains, tax advantages and prestige rather than improving their information disclosure. Further, Fernando and Ferreira (2008) show that the added scrutiny and disclosure associated with the U.S. cross-listing can have very different results for firm's stock price informativeness around the world. They find a significant positive link between U.S. cross-listing and price informativeness for developed markets firms but a negative association for emerging markets firms. In the case of emerging markets firms, Fernando and Ferreira (2008) argue that actions intended to enable stricter disclosure obligations can actually have counter-effect. According to them, the increased disclosure associated with U.S. exchange rules can crowd out private information collection. To address this issue, regulators should complement disclosure standards with other policy initiatives that encourage investment in the production of private information and minimize crowding out effects (Fernando and Ferreira, 2008).

In the same line of reasoning, several studies (Ball et al., 2000; Fan and Wong, 2002) have provided evidence that, in addition to accounting and disclosure standards,

features of the institutional environment also play an important role in the improvement of corporate transparency. The primary contribution of these studies is to show that despite efforts to impose stricter reporting rules and standards (e.g. International accounting standards), corporate transparency has been declining in many countries. In fact, while the more stringent disclosure and accounting rules may have increased the quantity of information, we can have reservations about the quality of this information.

In summary, although part of the literature suggests that U.S. cross-listed firms should have a richer information environment, there are also reasons to believe that the relation between U.S. cross-listing and stock price informativeness might be neutral or negative, leaving the issue an empirical question.

We attempt to make several contributions to the literature. First, we propose an intuitive approach to assess whether cross-listing in the U.S brings stock prices closer to their fully informed (i.e. fundamental) levels given the upgraded disclosure requirements involved. The latter should help investors better predict future cash-flows. More specifically, we estimate how much information current stocks prices contain about future earnings (more informative stocks prices should contain more information about future earnings). If cross-listing in the U.S improves non-U.S. firms' disclosure policies, it will leave less information about future earnings that can be privately discovered. Consequently, their stock prices will reflect more information about future earnings suggesting that the quality of the information environment has improved.

Second, such alleged benefits are not easily ascertained (Fernandes and Ferreira, 2008; Lang et al., 2003), seemingly because direct measures of the information effects due to cross-listing are lacking. Most published studies involve indirect approaches focusing on coverage by analysts and media. Lang et al. (2003), for instance, equate information effects with the extent of analysts' coverage (their number) and the accuracy of their forecasts, whereas Baker et al. (2002) also rely on analysts' coverage in addition to print media attention as reflected in the *Wall Street Journal* and the *Financial Times*. To overcome the difficulties in accounting for the information effects undergone by cross-listed firms, we use a direct measure of price discovery that relies on fundamental data, namely earnings[2].

Third, we investigate the impact of the enactment of the Sarbanes-Oxley (SOX) Act on the relation between cross-listing in the U.S and corporate disclosure policy. Finally, we tackle various complexities linked to the cultural proximity of the market and assets familiarity because many studies emphasize the importance of familiarity concerns and cultural homogeneity in cross-listing choices (Pagano et al. 2001, and Sarkissian and Schill, 2004). One prevailing conclusion from this literature is that familiarity issues can push investors to neglect fundamental principles of portfolio diversification and favor proximate assets. If familiarity is important to investing agents, we argue that it will also

[2] Note that Fernandes and Ferreira (2008) also propose a direct approach. In their study, they derive stock price informativeness from the market model (firm-specific return variability).

affect financing agents (firms) decisions and create heterogeneity in the sample. For instance, U.S. investors will be more inclined to invest in Japanese firms with better-known products such as Sony and Toyota. On the other hand, they will shun investing in Japan Telecom because they are less familiar with their products (little tradable outputs). Therefore, in comparison with Japan Telecom, Sony and Toyota may pay less attention to information asymmetry issues once they cross-list their shares in the U.S market.

With regard to cultural proximity, Grinblatt and Keloharju (2001) and Sarkissian and Schill (2004) argue that internationally-minded investors will favor the stocks from countries sharing common traits, be they linguistic, historic, etc. For example, it is intuitively plausible that more information should flow between countries with the same language and cultural background (e.g. Australia, Canada, UK and the US) or historical ties (e.g., colonial ties). It follows that firms from countries less tied to the U.S should be more inclined to better improve their information environment in order to mitigate the "cultural bias." Furthermore, disclosure rules and corporate management laws that work well in the U.S may not be universal and fit with other national cultures. According to Hofstede, the core of culture is formed by values which shape people behavior as well as their perception of what is preferable and not. Therefore, if some U.S disclosure rules or corporate management laws are inconsistent with these values, foreign managers are likely to feel uncomfortable and uncommitted (Newman and Nollen, 1996). As a result, they may be less able or willing to respect these rules. In other words, what works for the Americans might work for some (e.g. Canadians or British) but not for all. For instance, in countries low on the Hofstede individualism dimension (IDV), national culture encourages and legitimizes deference to others decisions and interests rather than protecting its personal interests. In these nations, corporate management practices will be less compatible with giving power to investors and encouraging them to stand up and fight for their rights (Litch et al. 2005). This situation could create cross-sectional differences in the benefits of U.S cross-listing. To tackle this issue, we include in our regressions Hofstede cultural variables (see more details on Hofstede cultural dimensions and scores in Tables 9 and 10).

In our analysis, we use an accounting measure of stock price informativeness. A growing body of research suggests that accounting standards in a given country depend crucially on factors like regulatory enforcement, legal environment and managerial incentives (Lang et al., 2006). Consequently, differences in accounting practices across countries could have an impact on the reliability of our results. Although attempts are made by Worldscope to homogenize accounting data of firms subject to different accounting standards in a way that makes them comparable, such efforts have obvious limitations (Doidge et al. 2004; Fresard and Salva, 2008). However, to the extent that such accounting rules differences are country- or industry-specific, the inclusion of country and industry dummies in our regressions is apt to account for them (see Hail and Leuz (2006, 2009) for a discussion).

Beyond the accounting data issue, empirical evidence suggests that many various plausible factors, such as earnings timeliness and firm size, affect our measure of price informativeness. Therefore, we see fit to include control variables to account for

observed variations in the earnings–return relation deemed unrelated to the cross-listing decision. Finally, the impact of U.S cross-listing on price informativeness could also vary across different institutional environments. Consequently, we partition our sample into subsamples arranged by legal origin (common law versus civil law countries). The results of such analysis should provide some confidence that the main conclusions are (are not) driven by a subset of countries or institutional environments.

We document four primary empirical results. First, U.S exchange cross-listings (ADRII/III and direct listings) improve stock price informativeness. Second, the improvement in stock price informativeness is concentrated in developed markets. On the other hand, the cross-listing decision seems to have a neutral impact on the information environment of emerging markets firms. Third, the benefits of U.S cross-listing are large after the enactment of SOX which is consistent with the bonding hypothesis. Finally, consistent with their minimal incremental disclosure requirements, non-exchange ADRs (Level I/Rule 144a) experience an insignificant change in their price informativeness.

The paper proceeds as follows: In section 2, we describe the mechanisms of U.S cross-listings and summarize the cross-listing literature. In section 3, we present our empirical model and outline our methodology and testable hypotheses. We discuss our data and sample in section 4. Section 5 presents empirical results characterizing the relation between U.S cross-listing and stock price informativeness. Conclusions follow in section 6.

2. Previous research work

This paper investigates the hypothesis that information considerations, such as the commitment to increase levels of disclosure and reduce information asymmetries, are a key factor for cross-listing in the United States. However, the empirical cross-listing literature supports other factors that affect U.S cross-listings, such as higher liquidity and lower financing costs. It is worth mentioning that these factors are not mutually exclusive and complement the information considerations emphasized in our paper. Before we summarize the literature that examines the relation between U.S cross-listings and the information environment of non-U.S firms, we, first, describe the mechanics of such a decision.

2.1 Mechanics of U.S cross-listings

Foreign firms can cross-list on U.S markets via direct listings, New York Registered shares, or American Depositary Receipts (ADRs). The vast majority of foreign firms choose to cross-list using ADRs. Some firms (mostly Canadian and Israeli) use direct listings (ordinary listings) rather than ADRs. ADRs are negotiable certificates that represent a foreign firm's publicly traded equity or debt. Foreign firms that cross-list via ADRs can choose between four possibilities: level I, level II, Level III and Rule 144a. Level I ADRs trade over-the-counter (OTC) and offer limited liquidity. This type of ADR requires only minimal U.S Securities and Exchange Commission (SEC) disclosure and no

U.S generally accepted accounting principles (U.S GAAP) reconciliation. Level I programs don't raise capital. On the other hand, level II and III ADRs are exchange listed securities (NYSE/NASDAQ). Firms who choose to cross-list via level II and III must follow U.S GAAP and complete all required filings with the SEC. Moreover, level III programs, contrary to level II, allow foreign companies to raise capital. Finally, Rule 144a listings trade on the PORTAL (Private Offerings, Resales and Trading through Automated Linkages) with limited liquidities, do not require compliance with GAAP and allow firms to raise funds as private placements to qualified institutional buyers (QIBs).

The legal implications of ADRs II/III and direct cross-listings are essentially the same. Therefore, we treat direct listings by foreign firms as ADRs II/III. Further, because we are interested in whether cross-listing improves stock price informativeness, we focus our analysis on firms that list via levels II/III and ordinary listings. As mentioned earlier, these firms are required to conform to U.S GAAP and substantially increase their disclosure which is not the case for non-exchange listed ADRs (level I and Rule 144a). In the robustness section, we complement our main tests using non-exchange listed ADRs.

2.2 U.S cross-listing and the commitment to reveal information

The expected relation between U.S cross listings and stock price informativeness is commonly linked to the fact that high levels of disclosure stand to attract more investors. Voluntary disclosure makes investors more confident that stock transactions occur at "fair" prices (Bailey et al. 2006). To date, however, little direct evidence associates U.S cross-listing with stock transactions occurring at "fair" prices. For instance, Fernando and Ferreira (2008) use firm-specific return variation as a measure of stock price informativeness and test its possible association with the cross-listing decision. They find a significant positive relation between U.S cross-listing and price informativeness for developed markets firms but a negative relation in the case of emerging markets firms. Bailey et al. (2006) measure the magnitude of price and volume reactions to public information announcements (earnings announcements) before and after the U.S listing. They argue that more private information equates with higher return volatility and suggest that if return volatility diminishes after the U.S listing, this could indicate less disagreement among investors in their interpretation of the information content of the public announcement. Bailey et al. (2006) find that absolute return and volume reactions to earnings announcements increase significantly after a cross-listing on U.S. markets. These findings run contrary to the hypothesis that U.S cross-listings improve stock price informativeness. Other studies focus on indirect approaches using, for example, the characteristics of analysts' forecasts and media coverage as proxies for the firm's information environment. In particular, Lang et al. (2003) find that cross-listed firms experience more analyst following and more accurate forecasts. Similarly, Baker et al. (2002) show that cross-listed firms experience more analyst and media coverage.

In our paper, we propose a direct measure of stock price informativeness. Particularly, we intend to test if U.S cross-listing is associated with stock prices reflecting more information about future earnings. Since a primary role of firm disclosure is to inform investors about future cash-flows, if current stock prices reflect more future

earnings news after a U.S cross-listing, we can infer that there is, indeed, a positive direct association between cross-listing in the U.S and the commitment to reveal more information to investors.

Our research is also linked to the bonding hypothesis. Coffee (1999) and Stultz (1999) argue that firms can raise capital if they commit to return this capital to investors and to limit the expropriation of cash-flows by controlling shareholders and managers. Therefore, firms wishing to raise external financing respond by bonding themselves to greater transparency (Coffee, 1999 and Stultz, 1999). One way to accomplish this bonding and to signal its commitment is to cross-list on a U.S exchange whose legal system allows a better protection of the firm's investors. In fact, such cross-listing obligates foreign firms to conform to U.S GAAP and complete all required filing with the SEC. It thus provides a mechanism by which non U.S firms can voluntarily subject themselves to better corporate governance practices under U.S securities laws (Coffee, 1999 and Stultz, 1999). Many papers in the literature examine the extent to which such voluntarily bonding explains the cross-listing behaviour. Doidge (2004) tests the hypothesis that private benefits of control decrease when non U.S. firms cross-list their shares in the U.S. via ADRs. As argued by Doidge (2004), when a firm has two classes of shares that are differentiated only by their voting rights, the percentage difference between the prices of high-voting shares and low voting shares is the voting premium, and this measure can be used as a proxy for the private benefits of control. Doidge (2004) finds that non U.S. firms that cross-list on U.S. exchanges have lower voting premiums in comparison to non U.S. firms that do not cross-list. In addition, the difference in voting premiums is larger for firms originated from countries with poorer investor rights. This evidence is interpreted as a direct empirical support for the bonding hypothesis. Similarly, Doidge et al. (2009) examined the expected relations between private benefits of control, ownership and the cross-listing decision. According to them, when private benefits are high, controlling shareholders are less likely to choose to list on U.S. exchanges because they will be subject to strong U.S. investor protection laws. Doidge et al. (2009) find that the control rights held by controlling shareholders, as well as the difference between their control rights and their cash flow rights, are significantly and negatively related to the existence of a U.S. listing. Also, their duration analysis shows that the probability of listing in a given year from 1995 to 2005 is significantly lower for firms whose managers have high levels of control.

On the other hand, a number of other contributions challenge the bonding hypothesis. For instance, Licht (2001, 2003) argues that little is done by the SEC to enforce corporate governance rules for foreign issuers. He blames the «hand off» policy of the SEC and puts forward the avoiding hypothesis. According to Licht (2003), firms cross-list on U.S. markets primarily to access cheaper finance and enhance their visibility rather than to improve their corporate governance. In the same line of reasoning, Siegel (2005) provides evidence of low SEC enforcement against Mexican firms with ADRs.

3. Hypotheses and methodology

Our main goal is to measure the association between current stock prices and future earnings for cross-listed and non cross-listed firms. Many studies show that firms with more informative disclosures "bring the future forward" so that their current market prices reflect more future earnings news (Lundholm and Myers, 2002). Theoretically, cross-listed firms' enhanced disclosure activities should reveal credible and relevant information in the current period that changes expectations about future earnings. To test this hypothesis, we base our methodology on the work of Warfield and Wild (1992), Collins et al. (1994), Gelb and Zarowin (2002), and Lundholm and Myers (2002). In these papers, current returns are regressed against both current and future earnings:

$$R_t = \beta_0 + \beta_1 uce_t + \sum_{i=1}^{\infty} \beta_{2i} \Delta E_t(fe_{t+i}) + \varepsilon_t \qquad (1)$$

where
R_t stands for current stock return in period t,
uce_t stands for synchronous unexpected current earnings,
$\Delta E_t(fe_{t+i})$ stands for change in expectations about future earnings, and
ε_t for the error term.

To better understand the intuition behind this model, we consider a firm over three periods and a discount rate of zero. We denote period t earnings by e_t, dividends by d_t and book value by BV_t. Following Lundholm and Myers (2002) and using the residual income valuation model (see Ohlson, 1995), prices at time 0 and time 1 can be expressed by:

$P_0 = BV_0 + E_0(e_1) + E_0(e_2) + E_0(e_3)$
$P_1 = BV_1 + E_1(e_2) + E_1(e_3)$

Assuming a clean surplus accounting system (see Lundholm and Myers, 2002), we can substitute BV_1 by $BV_0 + e_1 - d_1$. Hence, we get:

$P_1 = BV_0 + e_1 - d_1 + E_1(e_2) + E_1(e_3)$
$P_1 = P_0 - E_0(e_1) - E_0(e_2) - E_0(e_3) + e_1 - d_1 + E_1(e_2) + E_1(e_3)$
$P_1 - P_0 + d_1 = e_1 - E_0(e_1) + E_1(e_2) - E_0(e_2) + E_1(e_3) - E_0(e_3)$
$P_1 - P_0 + d_1 = Ue_1 + \Delta E_1(e_2) + \Delta E_1(e_3) \qquad (2)$

Scaling equation (2) by P_0, the left-hand side equates with the annual return. The right-hand side becomes the scaled sum of the unexpected earnings for year 1 and the synchronous change in expectations during year (1) about earnings in year 2 and 3. As suggested by Lundholm and Myers (2002, p. 813): «the regressions coefficients in the more general model in (1) allow for many complications not present in the simple example shown in (2), such as time value, risk, and the precision of the proxies used to measure unexpected current earnings and changes in excepted future earnings» .

The aggregated coefficients on the future earnings (Sum of β_{2i}s) represent the association between current returns and future earnings. The independent variables in regression (1) are not directly observable. In the literature, authors (Lev and Zarowin,

1999; Francis and Schipper, 1999; Lundholm and Myers, 2002) use the level of earnings at periods (t) and (t-1) as a proxy for uce_t. According to Lundholm and Myers (2002), when we include the past year's earnings (e_{t-1}), we allow the regression to find the best representation of the prior expectation for current earnings. Lundholm and Myers (2002) argue that earnings are treated by the market as a random walk process when the coefficient on e_{t-1} is of similar magnitude but opposite sign as the coefficient on e_t (current earnings). On the other hand, if the coefficient on e_{t-1} is approximately zero then earnings are treated as a white noise process.

The proxies for $\Delta E_t(fe_{t+i})$ are the realized future earnings (e_{t+i}) and future returns (a proxy for the unexpected component of future earnings). Some papers (Beaver et al. 1980; Warfield and Wild, 1992) only use realized future earnings as a proxy for $\Delta E_t(fe_{t+i})$. However, relying on the realized future earnings introduces an error in variables because realized future earnings have expected and unexpected components. To correct for the error and control for the unexpected component, we need an instrument that is correlated with the measurement error but is uncorrelated with the dependent variable. Following Collins et al. (1994), we account for the unexpected component of future earnings by using future returns (R_{t+i}) since an unexpected shock to future earnings should have an impact on future returns. On the other hand, dropping future returns (R_{t+i}) from equation (1) does not affect our results in section 5.

Earnings variables in equation (1) are earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by the market value of common equity at the beginning of the firm's fiscal year. Interest, taxes, depreciation, and amortization are among the components of income most vulnerable to differences in accounting measurements. Furthermore, EBITDA is not sensitive to differences in capital structure (Durnev et al. 2003). Therefore, relying on EBITDA is more appropriate for our purposes than net income. It allows us to mitigate some concerns about differences in accounting practices across countries.

To test whether cross-listing in the U.S is associated with stock prices that are more informative about future earnings, we follow Lundholm and Myers (2002) methodology and estimate the following regression (panel regression):

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + \sum_{i=1}^{3} (b_{3i} e_{t+i} + b_{4i} R_{t+i}) + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t$$
$$+ \sum_{i=1}^{3} (\theta_{3i} CL_t * e_{t+i} + \theta_{4i} CL_t * R_{t+i}) + \varepsilon_t \qquad (3)$$

CL_t is a dummy variable that takes the value 1 if the firm has an ADR that requires reconciliation to U.S. GAAP (ADR II/III) and 0 otherwise. We use only three years of future earnings (e_{t+1}, e_{t+2} and e_{t+3}) and returns (R_{t+1}, R_{t+2} and R_{t+3}) because prior research has shown that amounts further out in time add little explanatory power (Collins et al. 1994). Our main interest in equation (3) centers on the estimates of the coefficients θ_{3i} (future earnings response coefficients for years t+1, t+2 and t+3). We hypothesize that the quality of the information environment improves after a listing on U.S exchanges because of more stringent disclosure rules. In other words, stock prices of U.S exchange cross-

listed firms should contain more information about future earnings in comparison to non cross-listed firms. Therefore, our first hypothesis predicts that the coefficients on CL_t*e_{t+i} will be positive and significant.

> *Hypothesis 1: Cross-listing in the U.S allows more information about future earnings to be impounded directly into current returns.*

This hypothesis implies that there is an interaction effect between future earnings and the cross-listing decision. The interaction term CL_t*e_{t+i} proxies for the impact of cross-listing on the importance of future earnings news (more or less future earnings news that are reflected in current returns).

As discussed in Lundholm and Myers (2002), there are 17 independent variables in regression (3). In the interest of parsimony, we define:

e_{3t} as the sum of e_{t+1}, e_{t+2} and e_{t+3}

R_{3t} as the buy-and-hold return for the three-year period following year (t)

and estimate :

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t} + \varepsilon_t \quad (4)$$

By combining three years of data into one aggregate variable, we effectively force each year to have the same coefficient estimate, but we eliminate eight variables from the regression (3) as noted by Lundholm and Myers (2002). We should also ascertain that the reduced model in (4) yields very similar conclusions to the more detailed model in (3). Given that b_3 represents the coefficient on future earnings for non cross-listed firms, the coefficient on future earnings for cross-listed firms (ADRII/III) becomes $b_3+\theta_3$ and the percentage increase (decrease) is θ_3/ b_3. If θ_3 is positive and significant, cross-listing in the U.S is associated with more revealed information about future earnings. On the other hand, if θ_3 is negative and significant, cross-listing in the U.S is not associated with more revealed information about future earnings.

In our analysis, we perform panel regressions using random or fixed effects models. In our panel data set, the residuals may be cross-correlated (i.e across firms) and autocorrelated (across time). Should cross-correlations and autocorrelations exist, OLS standard errors can be biased and the true variability of our coefficients will be misestimated. We need then to adjust the *t-statistics* in our regressions using clustered standards errors by firm and time (Petersen, 2009). Further, to choose between fixed effects model and random effects model estimation, we use the Hausman specification test. The latter compares the fixed versus random effects under the null hypothesis that the individual effects are uncorrelated with the regressors in the model. If the null hypothesis is rejected, a random effects model produces biased estimators in comparison to a fixed effects model. Our Hausman test results reject the null hypothesis in favour of the fixed effects model. To control for industry, time and country fixed effects, we include industry, year and country dummies in our regressions (3) and (4). For

robustness, we re-estimate our regressions using fixed firm and year effects models instead of country and industry fixed effects models.

A remaining concern is endogeneity. Cross-listing is not a random decision and whenever an independent variable in a regression is the result of such a choice, it raises the possibility of an endogenous relation between the dependent variable and the chosen independent variable (CL_t). To a certain extent, the panel data approach and our firm-fixed effects models address this issue (see, Doidge, 2004, and Hail and Leuz for a discussion). In addition, some of the main determinants of the cross-listing decision from prior literature, namely size and growth, are already in our robustness tests regressions, so the residual error is already orthogonal to these sources of variation in CL_t.

To reinforce our conclusions about the relation between the cross-listing decision and stock price informativeness, it is useful to further investigate the potential differences between Rule 114a/level I programs and level II/III programs. Theoretically, non-exchange listed ADRs should experience an insignificant change in their price informativeness because of their minimal incremental disclosure requirements. This reasoning leads to the following hypothesis:

> *Hypothesis 2: The degree to which future earnings news are reflected in current returns is less pronounced for firms that list in the U.S using a Rule 144a or level I program.*

To verify hypothesis 2, we re-estimate equations (3) and (4) without considering level II and III ADRs and ordinary listings. In this case, CL_t becomes a dummy variable that takes the value 1 if the firm has a level I or Rule 144a listings and 0 otherwise.

Following the cross-listing literature results, we should expect a more pronounced change in the quality of the information environment for emerging markets firms in comparison to developed markets firms. On a theoretical basis, U.S exchange listings should have a larger impact on firms originating from countries where disclosure rules are weak. Knowing that emerging markets firms are subject to less stringent information disclosure requirements, we can propose the following hypothesis:

> *Hypothesis 3: The degree to which future earnings news are reflected in current returns is more pronounced for firms from emerging countries.*

To investigate if there is a differential impact for firms in developed and emerging markets, we estimate equations (3) and (4) separately for developed and emerging markets.

Finally, the introduction of the Sarbanes-Oxley (SOX) Act in 2002 is likely to have an impact on the intensity of the association between current stock returns and future earnings. The argument is that SOX imposes more severe disclosure rules to companies and their managers. In fact, as discussed in Doidge et al. (2009), this new

legal environment creates significant legal exposures for firms as well as for executives. Therefore, on the basis of these arguments, we can propose the following hypothesis:

> *Hypothesis 4: The degree to which future earnings news are reflected in current returns is more pronounced after the enactment of the Sarbanes-Oxley (SOX) Act in 2002.*

To test hypothesis 4, we use the results of regressions covering our data from 1990 through 2002 and from 2003 through 2006 and compare the coefficients on the future earnings before and after the passage of SOX.

Specification checks

An important empirical literature suggests that our measure of stock price informativeness is affected by a variety of factors (e.g. earnings timeliness and firm size). Therefore, we should include a set of variables in equations (3) and (4) to control for observed variations in the earnings–return relation that are likely due to causes other than cross-listing. After controlling for these factors, our empirical measure should reflect informativeness.

Earnings timeliness refers to the speed with which earnings information is reflected in prices. For example, in industries with shorter operating cycles, current earnings will be considered as a better measure for value creation; and thus, the association between current returns and future earnings should be less pronounced in these industries in comparison to industries with longer operating cycles. To examine the length of the operating cycles, we follow Lundholm and Myers (2002) who consider two industry classes: industries with shorter accounting lags and industries with longer accounting lags. Lundholm and Myers (2002) label mining, construction and manufacturing as longer operating cycles industries and the remaining industries as shorter operating cycles. We then pool firms according to this classification before estimating regressions (3) and (4). Timeliness is also linked to growth. Firms with high expected growth should exhibit a strong relation between current returns and future earnings in comparison to mature firms, all else equal. Therefore, we should include a measure of firm growth opportunities to control for this factor. We define growth as the percentage growth in the firm's assets from year *t-5* to year *t*. Other determinants of the earnings response coefficient may intrinsically affect the relation between current returns and future earnings. For example, size might also be an important omitted variable. Freeman (1987) and Collins and Kothari (1989) find that returns of larger firms impound earnings on a more timely basis than returns of smaller firms. To measure the size, we use the log of firm's market value of equity.

A remaining concern is familiarity and cultural proximity. With regard to familiarity, Kang and Stultz (1997), and Dalhlquist and Roberston (2001) argue that foreign investors tend to hold larger positions in firms that produce tradable outputs. For example, U.S investors tend to invest more in Japanese firms with large tradable outputs such as Sony and Honda. On the other hand, the same investors will be less inclined to

invest in Japan Telecom because they are not familiar with their products (little tradable outputs). If familiarity is important to investing agents, we argue that it will also impact financing agents (corporations) decisions and probably creates heterogeneity in the sample. To tackle this issue, we classify all firms based on their respective industry and re-estimate equation 3 and 4 according to type of produced goods (tradable versus little tradable outputs). We follow Sarkissian and Schill (2004) and split our sample into tradable industries (consumer goods, electronics, oil and gas…) and non tradable industries (construction, leisure, retail, telecommunications…). With regard to cultural proximity, we also study how differences in national culture may lead corporations to respond differently to the information asymmetry issue. Our cultural control variables are those constructed by Hofstede (1984, 1991, 1998 and 2001) who identified five independent dimensions of national culture.

In our analysis, earnings variables are earnings before interests, taxes, depreciation, and amortization (EBITDA). As argued earlier, relying on EBITDA is more appropriate for our purposes because it allows us to mitigate some concerns about differences in accounting practices across countries. However, by ignoring interests, we do not consider the riskiness of debt and its potential impact on the return-earnings relation. Leverage could be considered as a proxy for credit risk (default risk). Therefore, we propose to include leverage in our analysis in order to control for potential differences in the earnings-return relation between high leverage and low leverage firms, because highly levered firms are associated with high stock return volatility.

Finally, we control for liquidity because there is evidence of important changes in firm's trading environment around U.S cross-listing (Mitto, 1992, 2001; Forester and Karolyi, 1998; Smith and Sofianos, 1997); and these changes could impact the informational environment of non U.S firms. The intuition behind this additional test is that more active trading, rather than cross-listing, could explain any possible improvement in price informativeness because market prices of actively traded stocks should react quickly to earnings information in comparison to less actively traded stocks.

4. Data

Our sample construction starts by considering all firms (both active and dead ones) included in the country list provided by Datastream from 1990 to 2006. From this list, cross-listed firms are identified. Sampling stops in 2006 instead of 2009 because some of our variables require three years of data beyond any sampling year. The data on ADRs listing comes from the Bank of New York (BNY), Citibank (CB), Deutsche Bank (DB), JP Morgan (JPM), the OTCBB, The Pink Sheets, and CRSP. The information from these various datasets is manually cross-checked and verified. The websites of the major depositaries of ADRs provide the names, type of listings (Rule 144a private placements, level I OTC, Level II and III), listing dates, sponsorship status, country of origin, and the International Securities Identification Number (ISIN) of the underlying share. Further, we obtain information on direct listings (Canadian and Israeli firms) from the NYSE and NASDAQ websites. The data provided by Citibank and CRSP allows us to keep track of

firms that had been delisted from U.S exchanges. Adding these delistings mitigates concerns about the survivorship bias. Unfortunately, the information on delisted firms that traded OTC or on PORTAL from 1990 through 2006 is unavailable. Combining all the data gives a sample of 2 586 cross-listings and 11 354 non cross-listed firms. Note our exclusion of financial and banking firms because the financial nature of their assets hinders accounting data comparisons with other firms.

Table (1) presents summary statistics for our sample. As expected, U.S exchange cross-listed firms are larger than non-cross-listed firms. The median size for exchange-listed firms is 14.855 while non cross-listed firms have a median size equal to 11.508. Further, cross-listed firms have higher returns, as well as higher leverage in comparison with non-cross-listed firms.

Table 1

Descriptive statistics (reduced model: equation 4)

This table presents descriptive statistics for the reduced model (equation 4). **Return (t)** (Current return) for year (t) is the fiscal-year-end adjusted share price, plus the adjusted dividends, all divided by the adjusted price at the end of the previous fiscal year (t-1). **Return (3t)** (Future return) is the buy-and-hold return for the three-year period following the current year (for years t+1, t+2 and t+3). **Earnings (t)** (Current earnings) for year (t) is income before interest, taxes, depreciation and amortization (EBITDA) for year (t) divided by the market value of equity at the beginning of the firm's fiscal year. **Earnings (3t)** (Future earnings) is the sum of earnings for the three years following the current year (for years t+1, t+2 and t+3). Market value of equity is the share price times the previous year number of shares outstanding. **Size** is the logarithm of the market capitalization. **Leverage** is defined as the ratio of long-term debt to total assets. Exchange-listed firms are firms that are listed on U.S. exchanges (ADRs II/III and direct cross-listings). The sample period is from 1990 to 2006.

Variable	All firms				Non-cross-listed firms				Exchange-listed firms			
	Mean	median	Std dev	N	Mean	median	Std dev	N	Mean	median	Std dev	N
Panel A : Stock returns and earnings statistics												
Return (t)	1.358	1.071	1.475	79457	1.355	1.068	1.485	77103	1.451	1.162	1.097	2354
Earnings (t)	0.225	0.154	0.719	72684	0.226	0.153	0.728	70482	0.196	0.156	0.270	2202
Earnings (3t)	0.625	0.459	1.356	78346	0.627	0.459	1.372	76015	0.550	0.464	0.651	2331
Returns (3t)	2.047	1.180	3.447	88651	2.041	1.173	3.463	86125	2.251	1.398	2.878	2526
Size	11.646	11.572	2.012	89394	11.550	11.508	1.946	86773	14.721	14.855	1.919	2621
Leverage	0.158	0.062	4.265	101251	0.1576	0.060	4.326	98411	0.182	0.163	0.152	2840

When we measure the Pearson correlations between our variables (reduced model), multicollinearity is not an issue since current earnings, future earnings (Earnings (3t)) and future return (Return (3t)) measures are not highly correlated (Table 2). The same conclusion holds for the detailed model (equation 3). We also use the variance inflation factor and find no evidence of multicollinarity.

Our main hypothesis implies a positive interaction effect between the cross-listing decision and future earnings. The negative correlation between CL(t) and Earnings (3t) in table 2 does not confirm this hypothesis. However, our tests are best performed using multivariate regression analysis because the conclusions from our univariate variables do not account for a variety of factors known to affect the earnings-return relation.

Table 2

Pearson Correlations for the reduced model (p-values)

This table presents the correlations between variables of the condensed model.

	Return (t)	Return (3t)	Earnings (t-1)	Earnings (t)	Earnings (3t)	CL(t)
Return (t)	1.00000	0.25968 (0.0001)	0.03021 (0.0001)	0.13354 (0.0001)	-0.03231 (0.0001)	-0.00101 (0.7756)
Return (3t)	0.25968 (0.0001)	1.00000	0.01941 (0.0001)	0.03833 (0.0001)	0.09489 (0.0001)	-0.00581 (0.0838)
Earnings (t-1)	0.03021 (0.0001)	0.01941 (0.0001)	1.00000	0.22155 (0.0001)	0.22210 (0.0001)	-0.01041 (0.0086)
Earnings (t)	0.13354 (0.0001)	0.03833 (0.0001)	0.22155 (0.0001)	1.00000	0.27410 (0.0001)	-0.01027 (0.0056)
Earnings (3t)	-0.03231 (0.0001)	0.09489 (0.0001)	0.22210 (0.0001)	0.27410 (0.0001)	1.00000	-0.01478 (0.0001)
CL(t)	-0.00101 (0.7756)	-0.00581 (0.0838)	-0.01041 (0.0086)	-0.01027 (0.0056)	-0.01478 (0.0001)	1.00000

5. Results

To examine the relation between U.S cross-listing and stock price informativeness, we estimate variants of our equation (4). Because we are interested in whether cross-listing allows stock prices to impound more precise information about future earnings, we focus on the coefficient of the interaction variable CL_t*e_{3t}. If U.S cross-listing is associated with prices reflecting more information about future earnings, the coefficient of the interaction term CL_t*e_{3t} should be positive and significant.

Table 3 reports the coefficients estimates of equation (4). Model 1 serves as our starting point in that we drop future returns from equation (4) and include only country and industry fixed effects. Standard errors in all models are adjusted for heteroskedasticity and clustering at the firm level. In model 2, we estimate equation (4) adding only country and industry dummies. Model 1 and 2 yield similar results suggesting that our findings are not affected when we drop future returns from our main model specification. For model 2, the coefficient of the interaction term CL_t*e_{3t} is -0.0997 with a *p-value* of 0.06. This result suggests that there is a significant (10% level) negative association between U.S exchange cross-listings and price informativeness. In fact, U.S exchange cross-listed firms have lower future earnings response coefficient -0.1912 (-0.0915 + (-0.0997)) in comparison to non cross-listed firms -0.0915. On the other hand, when we include year fixed effects (model 3 and 4) to account for residual correlation across firms in a given year (cross-sectional dependence), our primary results change and the coefficient of interest in both models becomes non significant (-0.0543 with a *p-value* of 0.266 for model 4) suggesting that the relation between current returns and future earnings is the same for cross-listed and non cross-listed firms. Further, adding year dummies in model 2 increases R^2 from 0.2144 to 0.2452.

Table 3

Panel regressions of current returns on current and future earnings and interactions with cross-listing (ADRs II/III)

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t} + \varepsilon_t$$

Return (t) (Current return) is the fiscal-year-end adjusted share price, plus the adjusted dividends, all divided by the adjusted price at the end of the previous fiscal year (t-1). **Return (3t)** (Future return) is the buy-and-hold return for the three-year period following the current year (for years t+1, t+2 and t+3). **Earnings (t)** (Current earnings) for year (t) is income before interest, taxes, depreciation and amortization (EBITDA) for year (t) divided by the market value of equity at the beginning of the firm's fiscal year. **Earnings (3t)** (Future earnings) is the sum of earnings for the three years following the current year (for years t+1, t+2 and t+3). **CL_t** is a dummy variable that takes the value 1 if the firm is cross-listed on U.S. exchanges, and zero otherwise. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses. To avoid drawing spurious inferences from extreme values, regressions results are robust to outliers. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported

Independent Variables	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	1.5074	1.4528	1.2484	1.1103
	(0.001)	(0.001)	(0.001)	(0.001)
Earnings $_{(t-1)}$	0.0376	0.0351	0.0383	0.0359
	(0.007)	(0.014)	(0.005)	(0.010)
Earnings $_{(t)}$	0.3436	0.3369	0.3324	0.3253
	(0.001)	(0.001)	(0.001)	(0.001)
Earnings (3t)	-0.0668	-0.0915	-0.0583	-0.0847
	(0.001)	(0.001)	(0.001)	(0.001)
Return (3t)		0.0726		0.0822
		(0.001)		(0.001)
CL_t	-0.0753	-0.0324	-0.0660	-0.0340
	(0.081)	(0.506)	(0.118)	(0.466)
CL_t * Earnings$_{(t-1)}$	0.0450	0.0208	0.0545	0.0243
	(0.699)	(0.858)	(0.574)	(0.800)
CL_t * Earnings$_{(t)}$	0.4002	0.3867	0.2542	0.2338
	(0.024)	(0.028)	(0.094)	(0.117)
CL_t * Earnings (3t)	**-0.0984**	**-0.0997**	**-0.0577**	**-0.0543**
	(0.067)*	**(0.060)***	**(0.243)**	**(0.266)**
CL_t * Return (3t)		-0.0169		-0.0110
		(0.385)		(0.550)
Country dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	No	No	Yes	Yes
Adjusted R^2	0.1946	0.2144	0.2209	0.2452
N	58139	57653	58139	57633

So far, our evidence on how cross-listing activity impacts the relation between current returns and future earnings is mixed. However, in table 3, we do not control for various plausible factors known to affect the earnings-return relation. In the literature, timeliness and firm size have been shown to be significantly related to current and future earnings response coefficients. Therefore, an alternative explanation for our primary findings is that the cross-listing variable (CL_t) is merely proxying for these fundamental determinants of the earnings response coefficients. To explore this issue, we investigate whether our empirical coefficients are affected by timeliness and firm size. To control for these factors, we include the percentage growth in the firm's assets and firm size as control variables in equation (4). We follow Lundholm and Myers (2002) and interact

each control variable with the explanatory variables in equation (1). Note that we do not include all our control variables in the same regression because we need to interact each control variable with all the explanatory variables in equation (1). Therefore, in the interest of parsimony, we use each control variable separately.

A different picture emerges when we control for firm size. Consistent with our first hypothesis, we find that U.S exchange cross-listing is associated with stock prices reflecting more information about future earnings. This cross-listing impact is economically and statistically significant at 10% level. To allow a clear interpretation of our firm size specification checks, the results appear in table 4. The presence of firm size as a control variable (model 1) yields a positive and significant (10% level) coefficient for the interaction term CL_t*e_{3t}. Model 1 results suggest that the coefficient on future earnings is 0.2562 for the firm without a U.S cross-listing and 0.3404 (0.2562 + 0.0842) for the firm with a U.S exchange cross-listing; an increase of 32 percent. In other words, cross-listed firms' enhanced disclosure activities reveal credible and relevant information in the current period that changes expectations about future earnings which is consistent with these firms bonding themselves to greater transparency. Further, the results of model 1 in table 4 shed some light on how U.S cross-listing affects the importance of current earnings in current returns. If U.S cross-listing allows returns to be related more heavily on future earnings news, current earnings news might become less relevant. To test this hypothesis, we examine the coefficient of the interaction term CL_t*e_t. The latter is negative and not significant (-0.0573 with a *p-value* of 0.719) indicating that stock returns do not become less dependent on current earnings. Therefore, the cross-listing activity does not diminish the importance of current earnings news while, in the same time, it helps investors better predict future cash-flows.

We extend our robustness checks in many different ways. First, we include leverage to equation 4 (model 3 in table 4) in order to control for potential differences in the earnings-return relation between high leverage and low leverage firms. This additional test yields similar results to those found in our primary analysis suggesting that relying on EBITDA rather than net income does not affect our findings. Second, we explore whether differences in firms' operating cycles and institutional characteristics, familiarity and cultural proximity are associated with cross-differences in the benefits of the U.S cross-listing mechanism. We begin by analysing whether the length of the operating cycles impacts our findings. The intuition behind this idea is that future earnings will be considered as a better measure of value creation for industries with longer operating cycles, but a less relevant measure for industries with shorter operating cycles. Therefore, any commitment to reveal more information about future cash-flows should be more effective in industries with longer operating cycles, since firms in these industries have more future earnings news to disclose (Lundholm and Myers, 2002). To test this argument, we consider two operating cycles (shorter versus longer operating cycles) and partition our sample according to this classification. The results (not tabulated) show that the cross-listing effect on stock price informativeness is the same for both industries suggesting that our results are not driven by a subset of firms with longer operating cycles. The same conclusion holds when we partition our sample into

subsamples arranged by legal origin (common versus civil law countries) and the type of produced goods (tradable versus little tradable outputs).

Table 4

Panel regressions with controls for the determinants of earnings response coefficients

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t}$$
$$+ \delta_0 Control_t + \delta_1 Control_t * e_{t-1} + \delta_2 Control_t * e_t + \delta_3 Control_t * e_{3t} + \delta_4 Control_t * R_{3t} + \varepsilon_t$$

To avoid drawing spurious inferences from extreme values, regressions results are robust to outliers. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses

Independent Variables	Model (1) Size as a control	Model(2) Growth as a control	Model (3) Leverage as a control	Model(4) PDI as a control	Model(5) IDV as a control	Model(6) Liquidity as a control
Intercept	0.4328	1.0230	1.1103	-0.8834	-0.6564	1.1868
	(0.001)	(0.001)	(0.001)	(0.370)	(0.139)	(0.001)
Earnings $_{(t-1)}$	0.0403	0.0394	0.0371	0.0982	0.0157	0.0337
	(0.559)	(0.014)	(0.025)	(0.014)	(0.490)	(0.029)
Earnings $_{(t)}$	-0.5825	0.3661	0.3358	0.2194	0.2218	0.3510
	(0.005)	(0.001)	(0.001)	(0.036)	(0.007)	(0.001)
Earnings (3t)	0.2562	-0.1004	-0.0925	-0.1342	-0.0368	-0.0903
	(0.001)	(0.001)	(0.001)	(0.001)	(0.009)	(0.001)
Return (3t)	-0.0619	0.0954	0.0834	0.2962	-0.1172	0.0725
	(0.012)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CL_t	-0.0952	-0.0218	-0.0336	-0.0224	-0.0307	-0.0452
	(0.048)	(0.654)	(0.471)	(0.621)	(0.431)	(0.313)
CL_t * Earnings$_{(t-1)}$	-0.0880	0.0117	0.0240	0.0196	0.0233	0.0157
	(0.100)	(0.907)	(0.802)	(0.828)	(0.810)	(0.869)
CL_t * Earnings$_{(t)}$	-0.0573	0.2487	0.2361	0.2740	0.1979	0.2008
	(0.719)	(0.121)	(0.114)	(0.066)	(0.268)	(0.186)
CL_t * Earnings (3t)	**0.0842**	**-0.0136**	**-0.0547**	**-0.059**	**-0.0506**	**-0.0479**
	(0.087)*	**(0.800)**	**(0.263)**	**(0.246)**	**(0.328)**	**(0.333)**
CL_t * Return (3t)	-0.0917	-0.0242	-0.0112	-0.0258	-0.0177	-0.0018
	(0.001)	(0.210)	(0.541)	(0.150)	(0.168)	(0.921)
Control$_t$	0.0420	0.0001	0.0026	0.0336	0.2135	0.0001
	(0.001)	(0.007)	(0.126)	(0.023)	(0.076)	(0.005)
Control$_t$ * Earnings$_{(t-1)}$	-0.0022	-0.0006	-0.0069	-0.0009	0.0005	-0.0005
	(0.757)	(0.069)	(0.719)	(0.146)	(0.396)	(0.315)
Control$_t$ * Earnings$_{(t)}$	0.0928	0.0014	-0.0345	0.0017	0.0034	-0.0081
	(0.001)	(0.018)	(0.014)	(0.398)	(0.296)	(0.001)
Control$_t$ * Earnings (3t)	-0.0347	-0.0003	0.0272	0.0010	-0.0009	0.0029
	(0.001)	(0.028)	(0.003)	(0.008)	(0.077)	(0.004)
Control$_t$ * Return (3t)	0.01398	-0.0001	-0.0042	-0.0044	0.00315	-0.0003
	(0.001)	(0.011)	(0.001)	(0.001)	(0.001)	(0.005)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.2652	0.3199	0.2465	0.2618	0.2720	0.2214
N	57627	43519	57584	56886	56886	54450

Together, the observed relations for our control variables are intuitive and consistent with prior literature. For instance, the coefficient of the interaction variable leverage* e_{3t} (model 3 in table 4) is 0.0272 with a *p-value* of 0.003. This result suggests

that high leverage firms have more informative stock prices, which is consistent with the monitoring role of debt. Focusing on liquidity effects, the results of model 6 show that revealed future earnings is positively and significantly related to liquidity (0.0029 with a *p-value* of 0.004) indicating that changes in liquidity around cross-listing could possibly explain why we are witnessing an improvement in stocks price informativness in model 1 (table 4). To address this issue, we include both liquidity and firm size as additional control variables in our main regression specification (equation 4). The results (not tabulated) remain consistent with the prediction that U.S cross-listing allows stock prices to impound more information about future earnings. In particular, the coefficient of the interaction variable CL_t*e_{3t} is still positive and significant (0.0916 with a *p-value* of 0.067).

The above diagnostic checks have demonstrated that our empirical results are robust to controls for leverage, growth, differences in industry cycles and legal environment, familiarity and stock liquidity. As further diagnostic tests, we also study how differences in national culture may lead foreign managers to respond differently to the new legal environment they face once their firms' cross-list on U.S markets. Again, our primary findings remain unchanged when we use Individualism (IDV) and Power Distance Index as control variables (model 4 and 5 in table 4).

In addition, we re-estimate our regressions using fixed firm and year effects models instead of country and industry fixed effects models. Firm fixed effects estimation accounts for time-invariant firm characteristics that are unobservable. As suggested earlier, this should mitigate concerns about correlated omitted variables and selection bias based on unobservable time-invariant firm characteristics. The firm fixed effects estimates are obtained by demeaning the observations with respect to the firm average for each variable. Year dummies are included in the estimation. Again, our primary results remain the same when we re-estimate our regressions based on fixed firm and year effects models (results not tabulated).

So far, we have established that U.S exchange cross-listings improve stock price informativeness, particularly when we control for firm size. On the other hand, when we drop firm size from our regressions, we find that exchange listed firms experience an insignificant change in their price informativeness. We argue that it is important to control for firm size for several reasons. First, there is substantial evidence of a significant association between size and earnings response coefficients. Second, several studies show that larger firms are more likely to cross-list on U.S exchanges (NYSE and NASDAQ) because these markets require that firms (1) pay high fees and (2) meet minimum size requirements. The choice of cross-listing as a function of firm size is also consistent with our summary statistics (table 1). Therefore, it is highly plausible that our cross-listing variable CL_t is merely proxying for this potential omitted variable.

Table 5

Panel regressions using separate estimations for developed and emerging markets

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t}$$
$$+ \delta_0 Control_t + \delta_1 Control_t * e_{t-1} + \delta_2 Control_t * e_t + \delta_3 Control_t * e_{3t} + \delta_4 Control_t * R_{3t} + \varepsilon_t$$

To avoid drawing spurious inferences from extreme values, regressions results are robust to outliers. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and year dummy variables are included but not reported. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses

Independent Variables	Model (1) Developed markets	Model(2) Developed markets	Model (3) Emerging markets	Model(4) Emerging markets
Intercept	0.6808	0.1431	1.5170	0.5423
	(0.001)	(0.207)	(0.001)	(0.002)
Earnings $_{(t-1)}$	0.0230	0.1204	0.0376	-0.0161
	(0.571)	(0.545)	(0.006)	(0.827)
Earnings $_{(t)}$	0.5295	-0.3468	0.2398	-0.6205
	(0.003)	(0.606)	(0.001)	(0.001)
Earnings (3t)	-0.1152	0.3544	-0.0516	0.1466
	(0.001)	(0.001)	(0.001)	(0.001)
Return (3t)	0.1205	-0.0500	-0.0249	0.0048
	(0.001)	(0.093)	(0.001)	(0.649)
CL_t	-0.0019	-0.0591	-0.1163	-0.2339
	(0.972)	(0.357)	(0.044)	(0.001)
CL_t * Earnings$_{(t-1)}$	0.0557	0.0517	0.0678	0.0063
	(0.695)	(0.724)	(0.626)	(0.963)
CL_t * Earnings$_{(t)}$	-0.0410	-0.2990	0.4378	0.1476
	(0.868)	(0.218)	(0.027)	(0.491)
CL_t * Earnings (3t)	**-0.0323**	**0.1448**	**-0.0569**	**0.0325**
	(0.645)	**(0.063)***	**(0.429)**	**(0.627)**
CL_t * Return (3t)	-0.0068	-0.0981	-0.0050	-0.0092
	(0.657)	(0.001)	(0.685)	(0.410)
$SIZE_t$		0.0316		0.0731
		(0.001)		(0.001)
$SIZE_t$ * Earnings$_{(t-1)}$		-0.0102		0.0036
		(0.565)		(0.639)
$SIZE_t$ * Earnings$_{(t)}$		0.0871		0.0890
		(0.134)		(0.001)
$SIZE_t$ * Earnings (3t)		-0.0466		-0.0204
		(0.001)		(0.001)
$SIZE_t$ * Return (3t)		0.0161		-0.0021
		(0.001)		(0.038)
Country dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.3113	0.3260	0.1155	0.1458
N	33073	33053	24575	24569

In our analysis, we also estimate the relation between stock price informativeness and U.S cross-listing separately for developed and emerging markets. This additional analysis allows us to isolate the effect of the cross-listing decision in these two sets of environments with different characteristics. Models 1 and 2 in table 5 report the coefficient estimates for developed markets firms. For model 2, the results show that revealed future earnings is significantly and positively related to the cross-listing decision (0.1448 with a *p-value* of 0.063). In other words, the cross-listing of a developed market

firm increases the revealed future earnings news in current returns by 40 percent (0.1448/0.3544). The story is different when we examine the association between U.S cross-listings and price informativeness for emerging markets firms. Model 4 in table 5 reports regression results for the emerging markets sample using country, industry and year dummies. The cross-listing decision seems to have no impact on the information environment of emerging markets firms. These findings support the hypothesis of a differential effect across these two markets. This is consistent with the results of Fernando and Ferreira (2008) who also establish an asymmetric impact of cross-listing on stock price informativeness around the word.

In the case of emerging markets firms, we argue that the added level of disclosure associated with U.S exchange cross-listings seems to drive out private information acquisition by some market participants (e.g., financial analysts). The previous argument suggests that the commitment to reveal more information substitutes for the collection of private information, so that, on balance, we witness a neutral relation between U.S cross-listings and stock price informativeness.

We now turn to investigate whether the introduction of the Sarbanes-Oxley (SOX) Act in 2002 is likely to have an impact on the intensity of the association between current returns and future earnings. The argument is that SOX creates severe legal exposures for firms as well as for managers. Therefore, this new legal environment should reinforce the commitment to reveal more information about future earnings.

To examine this hypothesis, we re-estimate our regressions before and after the enactment of SOX and compare the coefficients of the future earnings. Indeed, our findings (Table 6) suggest that the degree to which future earnings news are reflected in current prices is more pronounced after the passage of SOX (coefficient of 0.2338 with a p-value of 0.002). The post SOX evidence provides further support for the effectiveness of U.S. laws and enforcement, which is consistent with the bonding hypothesis. These results are also consistent with recent evidence in Doidge el al.2009, Hail and Leuz, 2009, and Boubakri et al. 2010.

Table 6

Panel regressions using separate estimations before and after the enactment of SOX

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t}$$
$$+ \delta_0 Control_t + \delta_1 Control_t * e_{t-1} + \delta_2 Control_t * e_t + \delta_3 Control_t * e_{3t} + \delta_4 Control_t * R_{3t} + \varepsilon_t$$

To avoid drawing spurious inferences from extreme values, regressions results are robust to outliers. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and years dummy variables are included but not reported. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in

Independent Variables	Model (1) Before SOX (1990-2002)	Model (2) After SOX (2003-2006)
Intercept	-0.1839	0.7251
	(0.282)	(0.001)
Earnings $_{(t-1)}$	0.0635	-0.0071
	(0.605)	(0.943)
Earnings $_{(t)}$	-0.8892	-0.4110
	(0.001)	(0.233)
Earnings (3t)	0.1902	0.4268
	(0.001)	(0.001)
Return (3t)	0.0371	-0.1496
	(0.263)	(0.001)
CL_t	-0.0128	-0.1654
	(0.870)	(0.005)
CL_t * Earnings$_{(t-1)}$	0.1118	- 0.1059
	(0.395)	(0.463)
CL_t * Earnings$_{(t)}$	-0.1164	-0.0451
	(0.651)	(0.829)
CL_t * Earnings (3t)	**-0.0022**	**0.2388**
	(0.972)	**(0.002)*****
CL_t * Return (3t)	-0.0708	-0.1025
	(0.004)	(0.001)
$SIZE_t$	0.0538	0.0367
	(0.001)	(0.001)
$SIZE_t$ * Earnings$_{(t-1)}$	-0.0055	0.0026
	(0.669)	(0.785)
$SIZE_t$ * Earnings$_{(t)}$	0.1210	0.0779
	(0.001)	(0.016)
$SIZE_t$ * Earnings (3t)	-0.0263	-0.0545
	(0.001)	(0.001)
$SIZE_t$ * Return (3t)	0.0058	0.0207
	(0.049)	(0.001)
Country dummies	Yes	Yes
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
Adjusted R^2	0.3507	0.2027
N	33775	23852

Our final analysis addresses the relation between U.S cross-listing and stock price informativeness for non-exchange ADRs. As mentioned earlier, the legal and disclosure implications of ADRII/III and level I/Rule 144a programs are different because non-exchange listings require minimal disclosure and U.S GAAP reconciliation. Consistent with our hypothesis 2, non-exchange ADRs experience an insignificant change in their price informativeness (table 7).

Table 7

Panel regressions for non-exchange ADRs (Level1/Rule144a)

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + b_3 e_{3t} + b_4 R_{3t} + \theta_0 CL_t + \theta_1 CL_t * e_{t-1} + \theta_2 CL_t * e_t + \theta_3 CL_t * e_{3t} + \theta_4 CL_t * R_{3t}$$
$$+ \delta_0 Control_t + \delta_1 Control_t * e_{t-1} + \delta_2 Control_t * e_t + \delta_3 Control_t * e_{3t} + \delta_4 Control_t * R_{3t} + \varepsilon_t$$

To avoid drawing spurious inferences from extreme values, regressions results are robust to outliers. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively. Country, industry and years dummy variables are included but not reported. Standard errors are adjusted for heteroskedasticity and clustering at the firm level. P-values for two-tailed tests are in parentheses

Independent Variables	Model (1) 144a cross-listings	Model(2) 144a cross-listings	Model (3) OTC cross-listings	Model(4) OTC cross-listings
Intercept	1.2147	0.5598	0.8880	0.1658
	(0.001)	(0.001)	(0.001)	(0.106)
Earnings $_{(t-1)}$	0.0327	0.0689	0.0328	0.0869
	(0.026)	(0.291)	(0.023)	(0.208)
Earnings $_{(t)}$	0.3388	-0.6630	0.3284	-0.6685
	(0.001)	(0.002)	(0.001)	(0.001)
Earnings (3t)	-0.0911	0.2721	-0.0842	0.2644
	(0.001)	(0.001)	(0.001)	(0.001)
Return (3t)	0.0734	-0.0661	0.0838	-0.0730
	(0.001)	(0.011)	(0.001)	(0.004)
CL_t	0.1190	-0.0294	0.0767	-0.0247
	(0.010)	(0.582)	(0.042)	(0.512)
CL_t * Earnings$_{(t-1)}$	0.1044	0.1728	0.0257	0.0382
	(0.058)	(0.003)	(0.739)	(0.588)
CL_t * Earnings$_{(t)}$	-0.1329	-0.3032	0.1476	0.0151
	(0.239)	(0.011)	(0.210)	(0.893)
CL_t * Earnings (3t)	**0.0163**	**0.0856**	**-0.0219**	**0.0102**
	(0.749)	**(0.195)**	**(0.666)**	**(0.736)**
CL_t * Return (3t)	-0.0966	-0.1233	-0.0845	-0.0863
	(0.001)	(0.001)	(0.001)	(0.001)
$SIZE_t$		0.0537		0.0440
		(0.001)		(0.001)
$SIZE_t$ * Earnings$_{(t-1)}$		-0.0056		-0.0072
		(0.405)		(0.310)
$SIZE_t$ * Earnings$_{(t)}$		0.1028		0.1027
		(0.001)		(0.001)
$SIZE_t$ * Earnings (3t)		-0.0370		-0.0357
		(0.001)		(0.001)
$SIZE_t$ * Return (3t)		0.0137		0.0153
		(0.001)		(0.001)
Country dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Adjusted R^2	0.2110	0.2343	0.2419	0.2637
N	55697	55671	54869	54843

6. Conclusion

In this paper, we examine whether U.S cross-listings affect the information environment of non U.S corporations. We assume that the quality of the information environment improves after a listing on U.S exchanges because of more stringent disclosure rules. Our results indicate that exchange cross-listings are associated with more future earnings news reflected in current prices, which is consistent with the effectiveness of U.S laws and enforcement. However, the improvement in stock price

infomativeness is concentrated in developed markets. In the case of emerging markets firms, our results suggest that stringent disclosure requirements can sometimes have a counter-effect. As Fernandes and Ferreira (2008), we argue that the enhanced disclosure standards associated with U.S exchange cross-listings can crowd out private information collection in emerging markets. In fact, it is possible that the commitment to reveal more information substitutes for the collection of private information by some market participants, so that, on balance, an insignificant amount of future earnings news will be impounded into stock prices. Therefore, other type of policies should be developed by emerging markets regulators in order to complement the U.S stricter disclosure requirements and minimize the crowding out effect. This particularly important because a necessary condition for better functioning stock markets is that stock prices track firm fundamentals closely. Finally, we find a strong positive association between stock price informativeness and U.S exchange cross-listings after the enactment of SOX in 2002. The evidence that the benefits of U.S cross-listings are larger after the passage of SOX provides further support for the bonding hypothesis.

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Table 8. Cross-listings and delistings by country: 1990 to 2008

This table shows the number of cross-listings and delistings in the U.S by country. We obtain data on ADRs listing from the Bank of New York (BNY), Citibank (CB), Deutsche Bank (DB), JP Morgan (JPM), the OTCBB, The Pink Sheets, and CRSP. Information on direct listings (Canadian and Israeli firms) is from the NYSE and NASDAQ websites. The data provided by Citibank and CRSP allows us to keep track of firms that had been delisted by June 2008. Firms can cross-list in the U.S via Rule 144a private placement, level I Over-the-Counter, and Level II and III.

	U.S cross-listings			**U.S delistings**	
Country	Rule 144a	OTC	Exchange	OTC	Exchange
Argentina	7	3	16	6	8
Australia	6	92	13	37	33
Austria	3	10	0	0	0
Bahamas	0	0	3	0	0
Belgium	1	3	1	2	1
Bermuda	0	1	56	1	1
Bolivia	0	1	0	0	0
Brazil	27	25	38	36	13
Brit. Virgin Islands	1	0	20	0	0
Canada	0	0	123	0	0
Cayman Islands	0	0	16	0	0
Chile	3	1	12	1	18
China	4	28	67	2	4
Colombia	0	2	1	1	1
Croatia	4	0	0	0	0
Czech Republic	2	0	0	0	0
Denmark	1	0	2	1	4
Ecuador	0	1	0	0	0
Egypt	10	2	0	0	0
Estonia	1	0	0	0	0
Finland	1	2	2	2	4
France	3	16	12	9	19
Germany	0	23	18	6	13
Greece	3	3	12	0	1
Hong Kong	1	89	14	38	10
Hungary	4	3	1	2	0
India	74	2	13	1	3
Indonesia	3	5	2	1	1
Ireland	3	8	10	4	25
Israel	2	5	68	0	5
Italy	8	7	7	3	9
Jamaica	0	3	0	1	0
Japan	0	35	24	4	9
Jordan	1	2	0	0	0
Kazakhstan	9	1	0	0	0
Korea	17	5	9	1	4
Kuwait	1	0	0	0	0
Lebanon	3	0	0	0	0
Lithuania	2	0	0	0	0
Luxembourg	1	0	4	2	6
Malaysia	0	9	0	4	0
Malta	1	0	0	0	0
Marshall Islands	0	0	15	0	0
México	13	21	21	26	23
Netherlands	2	14	16	17	5
New Zealand	0	2	1	1	12
Nigeria	3	0	0	0	0

Table 8. continued

	U.S cross-listings			U.S delistings	
Country	Rule 144a	OTC	Exchange	OTC	Exchange
Norway	1	6	3	16	5
Oman	1	0	0	0	0
Pakistan	7	0	0	0	0
Panamá	0	2	3	0	0
Perú	1	4	1	0	2
Philippines	4	4	2	3	0
Poland	12	2	0	1	0
Portugal	1	4	1	2	2
Puerto Rico	0	0	9	0	0
Qatar	1	0	0	0	
Russia	36	39	5	4	1
Singapore	2	13	5	6	1
South Africa	5	30	7	17	6
Spain	2	2	3	2	10
Sri Lanka	1	0	0	0	0
Sweden	0	8	2	9	19
Switzerland	3	7	8	11	9
Taiwan	47	0	6	0	1
Thailand	0	14	0	4	0
Tunisia	1	0	0	0	0
Turkey	15	5	1	3	0
Ukraine	3	10	0	0	0
United Kingdom	9	65	41	99	166
Venezuela	1	5	0	6	4

Table 9. Hofstede cultural dimensions

Variable	Definition
Power distance index (PDI)	Degree to which the less powerful members of organizations and institutions (like the family) accept that power is unequally distributed.
Individualism/Collectivism (IDV)	Refers to the ties between individuals: in some societies, where everyone is expected to look after him/herself and his/her immediate family, these ties are weak. In other societies, individuals are integrated into strong cohesive groups.
Masculinity/Femininity (MAS)	Refers to the distribution of the roles between genders.
Uncertainty avoidance index (UAI)	Degree to which members of a society tolerate uncertainty and ambiguity
Long term/short term orientations (LTO)	Values associated with long term orientation are thrift and perseverance; while values associated with short term orientation are respect for tradition, fulfilling social obligations, and protecting one's 'face'.

Source : www.geert-hofstede.com

Table 10 : Hofstede cultural scores :

Country	PDI	IDV	MAS	UAI	LTO
Arab World (Egypt, Iraq, Kuwait, Lebanon, Libya, Saudi Arabia, United Arab Emirates)	80	38	52	68	
Argentina	49	46	56	86	
Australia	36	90	61	51	31
Austria	11	55	79	70	
Belgium	65	75	54	94	
Brazil	69	38	49	76	65
Canada	39	80	52	48	23
Chile	63	23	28	86	
China	80	20	66	30	118
Colombia	67	13	64	80	
Czech Republic	57	58	57	74	13
Denmark	18	74	16	23	
Estonia	40	60	30	60	
Finland	33	63	26	59	
France	68	71	43	86	
Germany	35	67	66	65	31
Greece	60	35	57	112	
Hong Kong	68	25	57	29	96
Hungary	46	80	88	82	50
India	77	48	56	40	61
Indonesia	78	14	46	48	
Ireland	28	70	68	35	
Israel	13	54	47	81	
Italy	50	76	70	75	
Jamaica	45	39	68	13	
Japan	54	46	95	92	80
Malaysia	104	26	50	36	
Malta	56	59	47	96	
Mexico	81	30	69	82	
Netherlands	38	80	14	53	44
New Zealand	22	79	58	49	30
Norway	31	69	8	50	20
Pakistan	55	14	50	70	0
Peru	64	16	42	87	
Philippines	94	32	64	44	19

Poland	68	60	64	93	32
Portugal	63	27	31	104	
Russia	93	39	36	95	
Singapore	74	20	48	8	48
South Africa	49	65	63	49	
South Korea	60	18	39	85	75
Spain	57	51	42	86	
Sweden	31	71	5	29	33
Switzerland	34	68	70	58	
Taiwan	58	17	45	69	87
Thailand	64	20	34	64	56
Turkey	66	37	45	85	
United Kingdom	35	89	66	35	25
United States	40	91	62	46	29
Venezuela	81	12	73	76	

Source : www.geert-hofstede.com