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The economic consequences of increased disclosure: Evidence from international cross-listings ☆

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Abstract

We examine market behavior around earnings announcements to understand the consequences of the increased disclosure that non-U.S. firms face when listing shares in the U.S. We find that absolute return and volume reactions to earnings announcements typically *increase* significantly once a company cross-lists in the U.S. Furthermore, these increases are greatest for firms from developed countries and for firms that pursue over-the-counter listings or private placements, which do not have stringent disclosure requirements. Additional tests support the hypothesis that it is changes in

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the individual firm's disclosure environment, rather than changes in its market liquidity, ownership, or trading venue, that explain our findings.

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1. Introduction

When a firm commits to increased levels of disclosure, the potential for information asymmetries to arise between the management of the firm and its shareholders or among buyers and sellers of the firm's shares diminishes. There are many reasons why a firm would choose to reduce information asymmetry by increasing disclosure. Managers who anticipate capital market transactions, such as issuing public debt or equity or acquiring another company in a stock transaction, can reduce the information risk borne by investors and, in turn, reduce the firm's cost of external financing by providing voluntary disclosure.[1] High levels of disclosure are also more likely to attract investors, who are more confident that stock transactions occur at "fair" prices, and thereby increase the liquidity in the firm's stock (Diamond and Verrecchia, 1991; Kim and Verrecchia, 1991a,b, 1994). Voluntary disclosure can also lower the cost of information acquisition for analysts and hence increase coverage.[2]

Most of the empirical evidence on the economic consequences of increased disclosure focuses on U.S. firms with publicly registered securities under current generally accepted accounting principles (GAAP). However, because this disclosure environment is already rich, commitments to increased levels of disclosure have limited economic impact. In contrast, the disclosure levels mandated by securities market regulators in many other countries are relatively low (Decker, 1994). Such international differences in disclosure standards might matter when non-U.S. firms choose to list their shares on U.S. exchanges or to register their securities with the Securities and Exchange Commission (SEC) for a public offering of shares.

There are, of course, many reasons why a non-U.S. firm may choose to list shares in the U.S., including improved access to capital, greater liquidity, lower capital costs, heightened corporate prestige, and the greater investor protection for minority shareholders that tougher U.S. securities laws confer upon such firms (Karolyi, 1998). However, surveys of corporate managers about the decision to list in the U.S. most often cite the process of reconciling home country and U.S. reporting and disclosure standards as a substantial challenge.[3] Indeed, the passage of the Sarbanes–Oxley Act in 2002 has led foreign firms with existing U.S. listings as well as those prospectively seeking them to raise concerns

[1]See Barry and Brown (1984, 1985), Myers and Majluf (1984), Merton (1987), and Healy and Palepu (1993, 2001).

[2]See Rajan and Servaes (1997), Lang and Lundholm (1996), and Healy et al. (1999). The ability to signal management or firm quality (Admati and Pfleiderer, 2000), concerns about litigation risk from delayed disclosure, and the importance of stock-based compensation contracts for managers are other potential motives (Healy and Palepu, 2001).

[3]Fanto and Karmel (1997) report that three of the top six difficulties experienced in a U.S. listing include accounting reconciliation (cited by 15% of listing managers, 21% of nonlisting managers), preparation of

about the accounting, corporate governance, and certification standards it requires, with some firms threatening to delist, and may explain the slowdown in the number of new firms listing on U.S. markets.[4]

The objective of this study is to evaluate the economic impact of the increased disclosure that non-U.S. firms face when they list their shares on U.S. markets. Specifically, we compare the volatility and volume reactions to foreign firms' earnings announcements before and after the U.S. listing. Toward this end, we assemble a sample of 2,503 earnings announcement events for 387 firms from over 40 emerging and developed markets around the world that cross-listed on U.S. markets between 1989 and 2001. Our goal is to understand how changes in volatility and volume reactions to earnings announcements around the U.S. listing relate to a variety of firm-specific, industry-level, and country-level attributes.

Our motivation stems from the intersection of two distinct literatures in finance. First, numerous analytical and empirical studies emphasize the role of both information asymmetry and differential information processing by investors in the price and volume reactions that obtain in response to public information announcements (Diamond and Verrecchia, 1991; Kim and Verrecchia, 1991a,b, 1994; Harris and Raviv, 1993; Kandel and Pearson, 1995). These studies show that the volume reaction to an earnings announcement is an increasing function of both the magnitude of the price reaction and the level of information asymmetry among investors. Thus, determining how the volume and volatility reactions to earnings announcements change after non-U.S. firms list in the U.S. should help us infer how the quality of the information environment has changed. If, for example, we find that the reactions diminish upon listing, one could infer that the quality of the pre-announcement information among investors has increased, generating less noise and lower residual uncertainty, or that there is relatively more liquidity trading. Volume and volatility reactions could also moderate if the costs of information acquisition decrease, resulting in more analyst coverage for the stock and allowing more precise private information to be incorporated into the stock's price. Finally, lower reactions could indicate less disagreement among investors in their interpretation of the information content of the public announcement.

Second, a number of studies find that U.S. listings by non-U.S. companies are associated with large, positive share price reactions. While the literature proposes a number of different hypotheses to explain these market reactions, only a few authors examine the potential importance of changes in the information environment as a factor.[5] Foerster and Karolyi (1999) and Miller (1999), for instance, show how the statistically significant share price effects around U.S. listings they document are consistent with the "investor recognition" hypothesis of Merton (1987), which proposes that investors pay a premium

(*footnote continued*)
Management Discussion and Analysis (10% listed, 7% unlisted), and segment reporting (6% listed, 11% unlisted).

[4]See the February 9, 2004 open letter to SEC Chair William Donaldson from the European Association for Listed Companies (EALIC) and his reply in a January 26, 2005 speech ("Why Our Markets Should Matter to Foreign Issuers") at the London School of Economics.

[5]Alexander et al. (1988), Foerster and Karolyi (1999), and Miller (1999) argue that the magnitude of investment barriers and the international segmentation of capital markets can explain the price effects. Lins et al. (2005) emphasize the greater liquidity and efficiency of U.S. capital markets. Coffee (1999), Stulz (1999), Reese and Weisbach (2002), Doidge et al. (2004), and Doidge (2003) focus on the enhanced legal protection for minority shareholders provided by U.S. securities law.

for familiar assets (a U.S. listing exposes more investors to the shares, the "unfamiliarity discount" dissipates, and stock price increases). However, at best, these studies only indirectly measure changes in the information environment. Baker et al. (2002) show that the share price reactions for U.S. listings by non-U.S. firms are associated with significant increases in the number of analysts that follow the stock and in the number of media "hits." Similarly, Lang et al. (2003a) find that cross-listed firms receive greater analyst coverage, and in turn improved forecast accuracy, and that they tend to enjoy higher valuations as a result.

Two unique aspects of this international setting make our experiment relevant to the literature on increased disclosure. First, disclosure standards and other capital market characteristics differ widely across countries. The disparity between local and U.S. GAAP should be particularly great for companies from emerging economies with poor disclosure standards. Our sample of listings affords us a cross-section of countries with which to relate the capital market reactions we uncover to the degree of increased disclosure the firm faces: after listing in the U.S., volume and volatility reactions around earnings announcements should change most dramatically for those companies from emerging economies or those with weaker disclosure standards. Second, our sample includes U.S. listings on major exchanges (New York Stock Exchange, NYSE, American Stock Exchange, AMEX, and Nasdaq), and over-the-counter (by means of the OTC Bulletin Board or "pink sheet") markets, as well as private placements by means of the SEC's Rule 144 (since April, 1990). Full reconciliation with U.S. GAAP is required only for exchange listings; the incremental disclosure requirements are lower for OTC listings and are minimal for Rule 144a private placements. This range of choices for a U.S. listing allows us to isolate the capital market and disclosure effects of listing.

Surprisingly, we find that home market abnormal return volatility and trading volume around earnings announcements are significantly *higher* in the period following the cross-listing. The three-day absolute abnormal returns are 15% higher subsequent to the listing than they were before the listing, and the associated abnormal volume reactions are more than twice as large. The results are both statistically and economically significant, and are robust to controlling for various changes in the information environment, such as the number of analysts covering the stock, the dispersion in their forecasts, and the absolute value of the earnings surprise relative to their median forecast. Even more surprisingly, the most dramatic increase in volatility and volume reactions occurs for firms that list from developed markets and for those that do not list on a major exchange. Each of these findings runs contrary to our hypothesis about the potential effects of increased disclosure.

We explore several explanations for these anomalous findings. First, we test whether they simply manifest the potential endogeneity of the listing decision itself. That is, the increased abnormal volatility and volume may stem from fundamental changes in the investment or operating activities that are typically associated with firms that choose to pursue U.S. cross-listings. To control for this factor, we measure our changes in volatility and volume relative to a broad-based benchmark sample of 43,634 earnings announcement events for 7,002 non-U.S. firms that never cross-listed in the U.S. We find evidence of endogeneity effects such that larger, more leveraged, faster growing firms are more likely to list. Once we take these effects into account, the abnormal volume reactions essentially disappear; however, the abnormal volatility reactions persist and are even more dramatic. Another possibility is that these anomalous volatility reactions reflect changes in the legal environment rather than in the quality of the information environment. Indeed, the "legal

bonding'' hypothesis of Coffee (1999) and Stulz (1999) suggests that the enhanced protections that U.S. securities laws provide minority shareholders of non-U.S. firms may not only influence management's decision to cross-list shares in the U.S., but also attract U.S.-based market intermediaries that are needed to foster a richer information environment.[6] However, even after controlling for differences between U.S. and home country legal standards, we show that differences in accounting standards remain significant factors in explaining changes in capital market reactions to earnings news.

Another competing alternative hypothesis is that changes in volatility reactions to earnings announcements around U.S. cross-listings stem from a change in the composition of the investor base that results from the listing event. For instance, non-U.S. firms often target U.S.-based investors in pursuing U.S. listings for their shares (Fanto and Karmel, 1997) and a number of recent studies document large block transactions and increased institutional ownership around a U.S. cross-listing (Doidge, 2003; Edison and Warnock, 2004; Bradshaw et al., 2004). Our inferences may therefore be confounded by the fact that the changes in the capital market reactions reveal more about changes in the level of information asymmetry due to greater participation by institutional investors with different investment horizons (say, due to taxes) than about changes in disclosure. In addition, our findings may simply derive from the generally more liquid trading environment in the U.S. After all, a number of studies show that firms realize lower nominal or effective spreads and greater trading volume around U.S. cross-listings (Noronha et al., 1996; Foerster and Karolyi, 1998; Domowitz et al., 1998). We test and find little empirical support for either of these alternative explanations, however.

Finally, in order to verify our evidence on increased disclosure, we introduce new firm-level data on disclosure activity from Standard and Poor's (S&P) Transparency and Disclosure Ratings (Patel et al., 2002), a survey-based scoring system on the quality of governance and disclosure practices, including board independence, accountability, enforcement, and minority shareholder protections. We find that, indeed, the increased volume and volatility reactions around earnings announcements are concentrated in the cross-listing firms with higher S&P disclosure scores and also in those that have also voluntarily aligned their reporting with International Accounting Standards (IAS). While these additional results are preliminary, they nonetheless reinforce the importance of changes in disclosure for non U.S. firms that cross-list in the U.S.

In the next section, we discuss the institutional and theoretical background and outline the main hypotheses. Section 3 describes the data and empirical methodology. Results are presented in Section 4. We conclude the paper discussing implications for further research and for policymakers.

2. Theory and hypotheses

2.1. Capital market reactions to earnings announcements

The market's reaction to public earnings announcements has been the focus of one of the primary streams of research in the accounting and finance literature. Diamond and

[6]The legal bonding hypothesis has received empirical support in studies by Reese and Weisbach (2002), Doidge (2003), Doidge et al. (2004), Lang et al. (2004a), Tribukait (2003), Leuz et al. (2003) and Lang et al. (2004b). Siegel (2005) challenges the premise.

Verrecchia (1991) and Kim and Verrecchia (1991a,b, 1994) argue that trading volume reactions reflect differences among individual investors in the price formation process, where the differences stem from information asymmetry that arises when investors acquire private information and the quality (precision) of the private information is not uniform. Specifically, these authors show that trading volume reactions to public announcements, such as earnings releases, are an increasing function of the magnitude of the price reaction and the level of information asymmetry among investors. With the announcement of new information, investors with more precise private information make smaller revisions to their expectations of the stock's value than do less-informed investors with less precise private information. The differential expected value revisions generate trading volume. Thus, while trading volume and absolute price changes reflect the average change in investors' expectations, which is related to the economic importance of the public information, trading volume also reflects differences across investors' expectations revisions, which are due to information asymmetry.[7]

Volume and volatility reactions to public earnings announcements can also be understood in terms of differences across investors' interpretations of public announcements, rather than in terms of asymmetry of private information. Grundy and McNichols (1989), Harris and Raviv (1993), He and Wang (1995), and Kandel and Pearson (1995) propose that trading volume reflects differences in opinion among speculative investors. Kandel and Pearson in particular use the example of earnings announcements to show that significant positive abnormal volume can arise even when there is no change in valuation in response to the announcements. They also show that analysts' forecast revisions around earnings can be sizable and varied, which, they argue, is consistent with public news being interpreted according to different likelihood functions.

2.2. *International cross-listings and disclosure issues*

Our study considers many types of U.S. cross-listings, including American Depository Receipts (ADRs), ordinary listings, and even global registered shares (GRSs).[8] Regardless of the form of listing, non-U.S. companies must satisfy two primary requirements to be listed in the U.S. First, they must designate transfer and settlement procedures consistent with those in the home market. Second, the company must usually file a registration statement with and furnish an annual report Form 20-F to the SEC, where the Form 20-F provides a reconciliation with U.S. GAAP. With regard to the choice of listing type, there are several considerations for issuers to weigh. Level 1 ADRs trade over-the-counter on the OTC Bulletin Board or as a pink sheet issue. These offer limited liquidity, but they require only minimal SEC disclosure and no GAAP reconciliation (exempt from Form 20-F by Rule 12g3-2(b)). Level 2 and 3 ADRs, on the other hand, are exchange-listed securities, and they require full SEC disclosure, that is, both Form 20-F and a "current events" Form 6K includes extensive information in compliance with exchange-specific

[7]A large body of empirical work validates these basic predictions. It includes Atiase and Bamber (1994), Bamber and Cheon (1995), Abarbanell et al. (1995), Utama and Cready (1997), Kim et al. (1997), and Barron and Stuerke (1998). The survey studies by Healy and Palepu (2001) and Verrecchia (2001) cite a number of these empirical papers.

[8]ADRs are the most popular vehicle for U.S. cross-listings. They are claims on shares in the home market created by a U.S.-based depositary bank to trade on a U.S. market. The depositary banks keep the home securities in a custodial account and convert all dividends and other payments into U.S. dollars for receipt holders.

listing rules.[9] Moreover, because Level 3 programs raise capital, they must also file Forms F-2 and F-3 for offerings. Finally, SEC Rule 144a issues, which raise capital as private placements to qualified institutional buyers (QIBs), do not require compliance with GAAP. Rule 144a programs trade on the PORTAL system with limited liquidity.[10]

Ordinary listings and GRSs represent important alternatives to ADRs for cross-listings in the U.S. Ordinary listings require an exact replication of the settlement facilities required for U.S. securities, and they go beyond Level 2 and Level 3 ADRs in requiring full annual and quarterly reports prepared in accordance with U.S. GAAP.[11] The GRS, introduced with the newly merged DaimlerChrysler (DCX) in November 1998 and employed today by Deutsche Bank, Celanese, and UBS, does not require an intermediary receipt as does an ADR, but does require a coordination of the transfer agent, clearance, and settlement procedures in the U.S., home, and other overseas markets. Disclosure standards for GRSs are equivalent to Level 2 and 3 ADRs; DCX, for example, files an annual 20-F. In our study of disclosure standards, we treat ordinary listings and GRSs as equivalent to exchange-listed ADRs.

There is a large literature on international cross-listings (Karolyi, 1998), much of which focuses on why so many non-U.S. firms have pursued listing in the U.S. markets over the past decade. Surprisingly, only a few studies attempt to measure the value-relevance of the increased disclosure that these firms face. Early (and still unpublished) papers by Cantale (1996), Fuerst (1998), and Moel (1998) build analytical models with signaling equilibria in which firms communicate their private information regarding their quality to outside investors by listing their shares in overseas markets. Their hypothesis presumes that the credibility of the signal stems from the stringent reporting systems mandated by U.S. exchanges and regulators. Huddart et al. (1999) and Barth et al. (1999) extend this work by establishing the conditions under which firms will list based on: (i) the disclosure standards defined by the exchanges and (ii) the benefits and costs to foreign analysts of becoming experts in local GAAP.

Empirical work explores some of these issues by focusing on the relative informativeness of accounting disclosures in different countries (Alford et al., 1993; Leuz et al., 2003), on the differential response of stock prices to earnings disclosed in overseas and local markets (Frost and Pownall, 1994; Fan and Wong, 2002; Lang et al., 2003b; Bailey et al., 2004), and most recently on the impact of analysts and their forecast accuracy on valuations (Lang et al., 2003a, 2004a). A number of recent studies examine capital market reactions to Form 20-F reconciliations by foreign firms that list in the U.S. or to voluntary reconciliations to IAS.[12] Most document that the corresponding changes are weak or negligible (Leuz and Verrecchia, 2000; Leuz, 2003; Blanco and Osma, 2004; Karamanou and Raedy, 1999).

[9]The NYSE, for example, also requires semi-annual, and encourages quarterly, reports by home country GAAP.

[10]More details are available from the websites of the three main depositary banks: Bank of New York (www.bankofny.com), JP Morgan (www.adr.com), and Citibank (wwss.citissb.com/adr/www).

[11]Canadian firms use ordinary listings rather than ADRs and can use Canadian GAAP that is very similar to U.S. GAAP as permitted by the Multi-Jurisdictional Disclosure System since 1991. See Multi-Jurisdictional Disclosure and Modifications to the Current Registration and Reporting System for Canadian Issues, Securities Act Release No. 6902 (July 1, 1991) and Foerster and Karolyi (1993, 1998).

[12]Consider, for example, Amir et al. (1993), Chan and Seow (1996), Rees and Elgers (1997), Alford and Jones (1998), Harris and Muller (1999), Karamanou and Raedy (2000), and Douthett et al. (2003).

2.3. Key hypotheses

We structure our empirical tests around hypotheses that follow from the two literatures we outline above. The models of Kim and Verrecchia (1991a,b, 1994), Harris and Raviv (1993), and Kandel and Pearson (1995) show that trading volume and price reactions to earnings announcements depend on the information content of the public announcement, the quality of the pre-announcement information, the cost of information acquisition, and the dispersion in investors' opinions or the degree of private information asymmetry. Our first hypothesis focuses on how the information environment of the firm affects the price volatility around earnings announcements. The magnitude of the price reaction stems from the average change in investors' beliefs and this, in turn, depends on the magnitude of the surprise and the precision of the announcement relative to the average precision of investors' information. If the quality of the information environment improves after listing in the U.S. because of more stringent disclosure requirements, the costs of information acquisition should decline, more analysts should cover the stock, and the precision of the prior private information should be greater.

Hypothesis 1. The abnormal absolute price change around the earnings announcement is lower following a listing in the U.S. for a company that faces increased disclosure requirements.

Hypothesis 1a. The decrease in abnormal absolute price change around the earnings announcement following a listing in the U.S. is greater for those companies pursuing listings that require full reconciliation with U.S. GAAP (Level 2/3 ADRs, ordinary listings, GRSs) and for those companies from countries with weaker accounting systems.

The supplementary hypothesis (H1a) seeks to isolate whether the U.S. listing type improves the quality of the information environment with greater precision of, and less residual uncertainty about, the information content of the announcement. In addition to controlling for the magnitude of the earnings surprise (absolute deviation of actual earnings from median analyst forecast) and the change in the number of analysts who cover the stock, we identify the type of U.S. listing pursued by the company and the rigor of home country accounting and disclosure standards to capture the magnitude of the change in the information environment. For companies that choose exchange listings (ordinary listings, GRSs, Level 2 or 3 ADRs) and for those from countries with relatively poor accounting standards, we expect a more dramatic decrease in abnormal absolute price changes around earnings announcements than for companies that choose OTC listings or Rule 144a private placements and for those from countries with relatively good accounting standards.

How trading volume reactions to an earnings announcement should change around a U.S. cross-listing may be a more complex question, however, due to two potential countervailing forces. The theory we outline in Section 2.1 conjectures that the volume reactions are proportional to the magnitude of the associated price reaction and the level of private information asymmetry or public information disagreement across investors. Thus, according to this theory, we would predict a positive relation between the abnormal trading volume around earnings announcements and the degree of information asymmetry, or disagreement, given the magnitude of the associated price reaction. On the other hand, the U.S. cross-listing event itself affects the overall liquidity of the stock due to changes in the composition of the investor base or due to changes in the strategic decisions of traders. Thus, the arrival of new investors or traders—particularly around important information events such as earning announcements—may mitigate or even

subsume the effect of information asymmetry on abnormal trading volume. This ambiguity leads us to structure a more complex, two-sided hypothesis.

Hypothesis 2. Abnormal trading volume around the earnings announcement is lower (higher) following U.S. listings by non U.S. companies, the lower (higher) the information asymmetry among investors.

Hypothesis 2a. The change in abnormal trading volume around earnings announcements following a listing in the U.S. is greater for listing companies that require full reconciliation with U.S. GAAP (Level 2/3 ADRs, ordinary listings, GRSs) and for companies from countries with weaker accounting systems.

Hypothesis 2b. The change in abnormal trading volume around earnings announcements following U.S. listings is weaker (and potentially reversed) for companies that experience a significant increase in liquidity after the U.S. cross-listing.

A key to testing this second hypothesis (H2) is not only to isolate the magnitude of the absolute price change for abnormal volume, but also to control for the degree of information asymmetry or disagreement. Toward this end, we construct a proxy based on the number of analysts and the dispersion of analysts' forecasts. However, our focus in the supplementary hypothesis (H2a) is on the type of listing the firm seeks and the level of home country disclosure standards. For companies that choose exchange listings and for those from countries with relatively poor accounting standards, we expect a more dramatic change in abnormal trading volume around earnings announcements for a given level of information asymmetry.

Our additional hypothesis (H2b) establishes conditions under which the abnormal trading volume around earnings announcements predicted by H2 and H2a may be weaker and even in the opposite direction. Circumstances may arise in which abnormal trading volume reactions for a given price reaction may actually decrease (increase) around earnings announcements after a U.S. cross-listing despite greater (lesser) information asymmetry among investors. For example, a U.S. cross-listing, especially one that takes place on a major exchange, could create a more liquid trading environment for shares in general. This could occur because greater visibility or investor recognition (Merton, 1987) leads to an increase in investor interest and an increase in overall trading volume. It could also manifest around important information events such as earnings announcements because liquidity traders recognize that the information advantage informed traders possess is weaker after an earnings announcement (Bhushan, 1991).[13] Existing findings on U.S. cross-listings are weakly consistent with this hypothesis (Noronha et al., 1996; Foerster and Karolyi, 1998; Domowitz et al., 1998; Welker, 1995; Healy et al., 1999; Leuz and Verrecchia, 2000).

3. Data and methodology

3.1. Data

We obtain details on foreign firms listing in the U.S. (NYSE, Nasdaq, AMEX, OTC, or Rule 144a) with a depositary receipt (ADR) or ordinary listing from the Bank of

[13]Of course, it is difficult to identify, let alone time, an information advantage for informed investors. However, Ivkovich and Jegadeesh (2004) evaluate the information content of analysts' one-quarter-ahead earnings forecast and recommendation revisions in event time relative to earnings announcement dates. They find that the stock price response to revisions (their measure of the information content of their revisions) is weakest in the week around earnings announcements.

New York and other sources.[14] We restrict the sample using the following criteria. First, the listing date must be available. Second, daily closing prices and trading volumes from the home market must be available from Datastream International for the five years both before and after the U.S. listing. This precludes IPOs, for which no information is available prior to listing in the U.S. Third, earnings announcement dates, values, and at least three analyst earnings forecasts per announcement must be available from the Institutional Brokers Estimate System (I/B/E/S) International Detail File both before and after U.S. listing.[15]

For each stock, we collect daily home market prices and trading volumes from Datastream, as well as capitalization, local market indices and trading volumes, and exchange rates. When possible, we obtain return and trading volume information for all five years before and after the first listing date in the U.S. However, the available time series are often shorter. When a security is not listed in the firm's country of incorporation, we take prices and trading volumes from the stock's primary market. Often, a company has several stock types trading in the home market. To identify the underlying stock type against which to match a cross-listed issue, we use Bloomberg, Bridge, SEC (20-F) filings, and web pages of depositary banks and stock exchanges. If these sources do not help us match the cross-listed shares to the underlying security in the home market, we check that the pricing relation between the U.S-traded shares and the underlying issue in the home market security is reasonably close.[16]

We also construct a benchmark sample of non-U.S. firms that never cross-listed in the U.S. Our concern is that, in comparing stock market behavior around earnings releases before and after cross-listing in the U.S., we may be capturing changes in firm or market characteristics rather than the impact of cross-listing. We start by collecting data on Datastream firms for our sample countries that are not cross-listed in the U.S. We retain all firms that fall within the 25th and 75th percentiles of our sample of cross-listed firms in terms of sales, assets, sales growth, the book-to-market ratio, and the long-term debt-to-equity ratio.[17] This procedure ensures a rough match between the firms in the benchmark sample and the firms in the U.S.-listed sample. We delete any earnings announcement event of a benchmark firm that has less than four individual analyst forecasts.

We obtain earnings announcements and forecasts from the I/B/E/S tapes. The frequency of earnings information releases varies across countries and firms. For cross-country consistency, we use earnings announcements at the annual frequency, which: maximizes the number of events over the widest range of countries. The absolute earnings surprise equals the absolute value of the difference between actual earnings and the mean of the most recent analyst forecasts normalized by the mean forecast. To calculate the

[14]See, for example, www.adrbny.com and www.adr.com. Our sample is biased towards recent events and may exclude DRs that were subsequently delisted or downgraded to a lower level program.

[15]See Atiase and Bamber (1994), Kim et al. (1997), and Chang et al. (2000). We do not attempt to follow the accounting literature in, for example, restricting the sample to EPS forecasts greater that $0.10 since EPS in our context is reported in many different currencies.

[16]Generally, arbitrage ensures insignificant differences between ADR and underlying share prices once the ADR ratio and exchange rate are taken into account (Gagnon and Karolyi, 2004). An important factor precluding arbitrage may be foreign ownership restrictions imposed by regulatory authorities (Bailey et al., 1999).

[17]We also try looser screens of 10th to 90th and 1st to 99th percentiles, exclude firms that were missing any of those accounting variables, and compute results without winsorizing the abnormal return and volume (versus our default of 1st to 99th percentile winsorizing). All results are very similar across a variety of such screens.

mean forecast, we take the last estimate for each analyst reporting forecasts for the current fiscal year.

Table 1 summarizes the number of firms and number of earnings events in the sample by country and by U.S. exchange. While there are large numbers of cross-listed firms from developed countries such as Canada (36) and the U.K. (40), surprisingly there are also large numbers of firms from developing countries such as Brazil (20), India (28), and Mexico (9). The number of earnings events ranges from just a handful for China and Indonesia to over a hundred each for Canada, Hong Kong, and the U.K. in both pre-listing and post-listing periods. The majority of firms are listed either over-the-counter (195) or as Rule 144a (90), rather than on the NYSE (76) or Nasdaq (26). Thus, this table verifies that our sample firms represent a broad cross-section of listing characteristics. The benchmark sample is generally similar in terms of its geographic distribution, though the numbers of earnings events and firms is much larger. Table 1 includes a summary of an indicator of the quality of the accounting standards across the sample countries from which the firms originate, namely, the index produced by the Center for International Financial Analysis and Research and used by La Porta et al. (1998) that scores annual reports based on the inclusion or omission of 90 key items.[18] The table also summarizes the anti-director rights index across the sample, again following La Porta et al. (1998). The anti-director rights index, which ranges from zero to five, reflects the strength of the laws and regulations that protect minority shareholders from majority shareholders and management. The distribution of the accounting standard index values and anti-director rights index values also represents a broad spectrum of home country environments across our sample.

3.2. Event study approach

In our first tests, we perform event studies performed on the returns and trading volumes around an earnings announcement. The estimation window is the interval $(-200, -11)$ with respect to the announcement day, day 0, as in existing studies. Following standard methodology as in Brown and Warner (1985), abnormal returns are prediction errors from the market model using the local market index.[19] Stock and local index returns are log-differences expressed in the home market currency. Given thin trading in some of the stocks, we follow the "trade-to-trade" approach of Maynes and Rumsey (1993). Following Kim and Verrecchia (1991a), we abstract from the sign of returns and use the absolute value of abnormal returns to measure return volatility. Following Tkac (1999), abnormal volume values are prediction errors from a "volume market model" using trading volume on the local market. To implement hypothesis tests, we use the nonparametric rank test of Corrado (1989) and Corrado and Zivney (1992), who demonstrate that their rank test is preferable in the presence of nonnormality and asymmetry.[20] We also compute a parametric t-test as used by Brown and Warner (1985) for comparison (unreported). All residuals are winsorized at the 1% and 99% levels prior to further processing and testing.

[18] *International Accounting and Auditing Trends* (4th edition, 1997), Center for International Financial Analysis and Research, Princeton, New Jersey.

[19] Our purpose is to generate residuals using a benchmark that mimics the behavior of local returns as closely as possible. We are not fitting an international asset-pricing model that would probably require us to use a two-factor model with both local and world stock return aggregates.

[20] Corrado and Zivney (1992) adjust for infrequent trading. When a stock trades daily, their rank statistic is identical to Corrado (1989).

Table 1
Descriptive statistics

This table describes the number of non-U.S. firms listing in the U.S. in our sample (classified by country of origin, country-level measures of accounting standards, AS, anti-director rights, AD, type of listing, and market), the number of earning announcement events available before and after the listing, and similar information for a benchmark sample of non U.S. firms that did not list in the U.S. We construct the benchmark sample of firms that have not cross-listed their shares in the U.S. from the I/B/E/S and Datastream International databases. The country-level measures for AS and AD come from La Porta et al. (1998). The AD measure is missing for 11 companies from China, Czech Republic, Hungary, Luxembourg, Poland, and Russia. For these countries and both Indonesia and Pakistan, the AS measure is also missing for 16 companies. Information on ADRs comes from the Bank of New York's complete DR Directory (www.adrbny.com) and information on firms from Canada and Israel that list their shares directly on the NYSE or Nasdaq come from the exchanges' web sites. We use the National Quotation Bureau's Pink Sheets to identify Canadian firms that are directly listed on the OTC market. These compiled lists are from Doidge et al. (2004). * denotes a country designated as an emerging market by Standard and Poor's Emerging Market Database.

	ADR firms	Non-ADR firms	Before Listing Events	After Listing Events	Non-ADR Events		ADR Firms	Non-ADR Firms	Before Listing Events	After Listing Events	Non-ADR Events
By country											
Argentina*	5	27	8	20	176	Korea*	12	194	43	47	1449
Australia	17	138	37	68	846	Malaysia*	4	252	10	13	1400
Austria	7	57	19	17	420	Mexico*	9	35	21	21	203
Belgium	3	75	16	14	569	Netherlands	7	120	16	29	1102
Brazil*	20	89	50	62	512	New Zealand	0	33	0	0	270
Canada	36	288	109	134	1739	Norway	5	110	18	24	497
Chile*	9	57	19	33	352	Pakistan*	0	42	0	0	197
China*	3	0	6	5	0	Peru*	2	14	2	6	55
Colombia*	3	11	4	8	57	Philippines*	4	68	5	19	412
Denmark	1	147	2	6	822	Poland*	2	0	2	2	0
Finland	3	71	10	10	424	Portugal*	1	53	2	3	301
France	10	419	29	52	2230	Russia*	2	0	2	2	0
Germany	13	361	53	44	2453	Singapore	12	158	33	42	1066
Greece*	2	130	7	7	771	South Africa*	12	113	48	38	668
Hong Kong	45	202	159	164	1099	Spain	2	84	12	20	734
Hungary*	4	0	7	7	0	Sweden	4	135	5	10	930
India*	28	103	46	86	461	Switzerland	7	117	25	30	1122
Indonesia*	1	111	2	1	617	Taiwan*	19	165	54	64	1299
Ireland	3	45	15	8	352	Thailand*	2	221	2	2	1495
Israel*	2	11	3	5	37	Turkey*	3	61	6	6	465
Italy	4	141	16	12	1165	UK	40	1140	155	136	7190
Japan	19	1400	74	74	7658	Venezuela*	0	4	0	0	19
						Total	387	7002	1151	1352	43634
By accounting standards						*By anti-director rights index*					
missing	15	198	34	25	1166	missing	11	0	17	16	0
AS $\leqslant$ 60	89	641	184	269	3792	AD = 0	3	75	16	14	569
60 < AS < 65	88	2987	296	336	19195	AD = 1	26	541	90	77	3840
65 < AS < 70	74	884	261	284	5389	AD = 2	42	1158	122	145	8263
70 < AS $\leqslant$ 75	58	536	164	226	3082	AD = 3	64	968	159	220	5845
75 > AS	63	1756	212	212	11856	AD = 4	67	2247	206	270	12999
Total	387	7002	1151	1352	43634	AD = 5	174	2013	541	610	12118
						Total	387	7002	1151	1352	43634

Table 1 (*continued*)

	ADR firms	Non-ADR firms	Before Listing Events	After Listing Events	Non-ADR Events		ADR Firms	Non-ADR Firms	Before Listing Events	After Listing Events	Non-ADR Events
By listing type/exchange						*By market*					
Rule 144a	90		224	283		Emerging	148	1708	347	454	10645
OTC	195		623	702		Developed	239	5294	804	898	32989
Nasdaq	26		70	87		Total	387	7002	1151	1352	43634
NYSE	76		234	280							
Total	387		1151	1352							

3.3. Cross-sectional regression tests

We cumulate abnormal returns over three-day windows (days −1 to +1) and take the absolute value to proxy for return volatility. We cumulate abnormal trading volume over identical three-day event windows. We then regress absolute abnormal returns and abnormal trading volume on a set of explanatory variables as follows. First, our cross-sectional specifications include several variables that we adopt from the earnings and dividends announcement literature. The absolute earnings surprise (a measure of information precision) serves in the cross-sectional regression to explain the absolute abnormal return in the event window. To detect the possibility that the reaction to an earnings surprise depends on the sign of the surprise (Hayn, 1995), we employ a dummy variable that is equal to one for positive earnings surprises, and zero otherwise. The number of analyst forecasts used to compute the mean forecast for the particular earnings event proxies for the degree of analyst attention, which is one facet of the information environment. To the extent that firms signal their quality with a U.S. listing and analysts tend to follow higher quality firms (Chung, 2000; Rajan and Servaes, 1997; Baker et al., 2002), the number of analysts following a firm should increase after the cross-listing. Forecast dispersion, a measure of predisclosure information asymmetry (Atiase and Bamber, 1994) and disagreement, equals the standard deviation of analyst forecasts (the last one before the announcement for each analyst) divided by the absolute value of the mean forecast.

Second, we construct variables to test our prediction that the change in the information environment upon listing in the U.S. will be greatest for firms that originate from poor quality environments. The change in information environment upon listing in the U.S. depends on the home country disclosure environment of the listing company, which we set equal to the index constructed by La Porta et al. (1998) to rate the quality of information in annual reports across countries.[21] La Porta et al. (1998) also supply indexes of legal quality and other country characteristics that differ across our sample countries. An enhanced legal environment may be one reason that foreign firms seek a U.S. listing or investors value such a listing (Coffee, 1999; Stulz, 1999). Although our focus is not on legal issues but rather on the change in the information environment engendered by a U.S. listing, we include one such variable, the anti-director rights index of La Porta et al. (1998),

[21]See Alford et al. (1993) for a detailed comparison of disclosure standards across developed countries.

to control for such effects. The index aggregates a variety of legal characteristics and is related to the degree of protection afforded to minority shareholders.

We categorize stocks into developed and emerging economy stocks according to the classification scheme of Standard and Poor's Emerging Market Database. We predict that the change in price and volume reactions to earnings announcements subsequent to a U.S. listing is greatest for firms from emerging markets with low accounting index values. In our cross-sectional regressions, we also employ a more direct measure of economic development, the per capita Gross Domestic Product (GDP), which we obtain from the World Bank's World Development Indicators database for the year corresponding to the earnings announcement date. Finally, we construct a variety of dummy variables to identify the geographic origins of firms, whether they are cross-listed or benchmark firms, the level of U.S. listing for those firms that did cross-list, and other control variables.

Prior to presenting the results of these cross-sectional regressions, we address the concern that more fundamental forces than changes in the disclosure or legal environment may be at work in comparing market responses to earnings releases of cross-listed firms. That is, a selection bias problem may exist. It may be the case, for example, that cross-listed firms realize larger market responses because the management of these firms chooses to strategically time the listing decision based on certain market conditions, certain fundamental attributes, or both. Based on previous analyses of the cross-listing decision (Reese and Weisbach, 2002; Doidge et al., 2004), we know that cross-listing firms are larger and they tend to be faster growing in terms of sales or profits than typical peer firms from their home country. We address this concern about selection bias with a battery of tests including two-stage estimation methods based on Heckman (1979).

4. Results

4.1. Event study results

Table 2 presents results of the event study of absolute abnormal returns (Panel A) and abnormal trading volume (Panel B) for the entire sample of 1,151 pre-listing events and 1,352 post-listing events for firms that cross-listed, and 43,634 events for benchmark firms that never cross-listed. The columns labeled Before Listing and After Listing present the means and medians of variables in the periods before and after the U.S. listing while the columns labeled Benchmark present similar figures for our sample of firms that never cross-listed. Asterisks next to medians indicate whether there is abnormal performance based on the nonparametric rank test of Corrado (1989). Though not reported, we also perform standard t-tests and Wilcoxon nonparametric tests of differences in means and medians, respectively, across pairs of subsamples (before listing, after listing, benchmark).

Our preliminary analysis shows statistically significantly greater return volatility and volume reactions to earnings shocks in the post-listing period. These heightened responses are particularly large for day 0 volume: the average abnormal volume on the announcement day is 21.15% (of the average volume across days -200 to -11) before a U.S. listing and 39.89% after a U.S. listing. This is statistically significant according to both the standard t-test and the Wilcoxon W-test. Positive outliers or skewness in abnormal volume appear to be present given that means are larger than medians across before, after, and benchmark samples. Furthermore, negative median abnormal volumes suggest that volume tends to recede around earnings releases. The differences in absolute

Table 2
Absolute abnormal returns and abnormal trading volume around earnings announcement dates before and after cross-listing

We report absolute abnormal returns and abnormal volumes around earning announcements both before and after cross-listing in the U.S. as well as for a benchmark sample. Abnormal returns are residuals from a one-factor OLS market model. Abnormal volumes are residuals from a "volume market model" (Tkac, 1999). In both cases, the estimation window uses days (−200, −11). Residuals have been winsorized, by day, at the 1% and 99% level. Corrado's (1989) nonparametric rank test is computed to test for significance. The abnormal returns sample includes 1,151 pre-listing events, 1,352 post-listing events, and 43,634 events for the benchmark firms; the abnormal trading volume sample represents 845 pre-listing events, 1,115 post-listing events, and 27,286 events for the benchmark firms. ** and * indicate 5% and 10% significance, respectively.

Day	Before listing		After listing		Benchmark	
	Mean	Median	Mean	Median	Mean	Median
Panel A: *Absolute abnormal returns*						
−5	0.0137	0.0080	0.0150	0.0099	0.0143	0.0078
−4	0.0137	0.0083	0.0139	0.0089	0.0143	0.0078
−3	0.0136	0.0086	0.0148	0.0097	0.0143	0.0078
−2	0.0138	0.0091	0.0155	0.0101	0.0145	0.0081
−1	0.0148	0.0092*	0.0157	0.0108	0.0151	0.0083
0	0.0149	0.0086*	0.0187	0.0115**	0.0168	0.0090**
1	0.0150	0.0092**	0.0160	0.0104*	0.0153	0.0084**
2	0.0143	0.0092	0.0151	0.0100	0.0143	0.0080
3	0.0124	0.0077	0.0135	0.0087	0.0142	0.0078
4	0.0131	0.0082	0.0142	0.0092	0.0142	0.0078
5	0.0133	0.0084	0.0138	0.0092	0.0139	0.0076
Panel B: *Absolute trading volume*						
−5	0.0800	−0.2316	0.1121	−0.1844	0.0425	−0.3749
−4	0.1278	−0.2038	0.0763	−0.1740	0.0714	−0.3637
−3	0.1969	−0.1699*	0.0772	−0.1953	0.0635	−0.3651
−2	0.1396	−0.1689	0.1085	−0.1474	0.0975	−0.3550
−1	0.1330	−0.1621	0.1858	−0.1414	0.1689	−0.3337
0	0.2115	−0.1661*	0.3989	−0.0670**	0.3123	−0.2914**
1	0.1630	−0.1920	0.4213	−0.0923**	0.2898	−0.3069**
2	0.1311	−0.1932	0.2722	−0.1086	0.1754	−0.3324
3	0.0708	−0.2139	0.1888	−0.1629	0.1246	−0.3512
4	0.1258	−0.1928	0.0631	−0.1853	0.1121	−0.3514
5	0.0680	−0.2327	0.1310	−0.1801	0.0987	−0.3591

abnormal returns are less dramatic, although they extend over a greater number of days before and after day 0. In the pre-listing period, we observe a mean announcement-day abnormal return of 1.49%. The comparable response in the post-listing period is a 1.87% abnormal return. This 38 basis point difference is statistically significant according to both the *t*-test and the W-test. Again, influential positive outliers appear to be present as means are larger than medians.

Unreported tests formally examine whether the before or after returns and volume residuals of the cross-listing sample are greater than those of the benchmark sample. For daily abnormal absolute returns, there is some evidence that cross-listed returns are lower than benchmark returns prior to cross-listing and are higher after cross-listing. For

example, mean (median) day 0 abnormal returns are 1.49% (0.86%) for cross-listing firms prior to U.S. listing, 1.87% (1.15%) for cross-listing firms after U.S. listing, and 1.68% (0.90%) for benchmark firms. The significance of the differences across categories is confirmed by the *t*-tests and W-tests, particularly for day 0. Further, W-tests for the after-benchmark differences are significant for all days, −10 to +10, in the event window for both return volatility and volume, suggesting a substantial and broad-based increase in volatility and volume after cross-listing.

Table 3 reports univariate tests of absolute abnormal returns (*cabsar*; left panel) and abnormal trading volume (*cabvol*; right panel) in a window of three days (−1 through +1) around the earnings announcement and compares the pre-listing, post-listing, and benchmark samples. The table reports results by market category (emerging and developed), by region (Asia, Europe, and the Americas), by listing type (Rule 144a, OTC, and exchange listing), and according to the number of analysts that follow each firm-event. The most striking result is that firms from developed economies realize statistically significant increases in return volatility following the U.S. listing (2.66% pre-listing to 3.24% post-listing with a W-statistic of −3.77) while return volatility of emerging market firms is unchanged. The trading volume results for developed market firms are similar: mean residuals increase from 62.50% pre-listing to 114.69% post-listing with W-statistic of −2.69. The increase in cumulative abnormal trading volume following a cross-listing is more strongly significant for developed market firms, though the increase for emerging market firms is also large in magnitude. In comparing pre-cross-listing, post-cross-listing, and benchmark subsamples with W-tests, the only consistent result, statistically, obtains for volatility changes for developed country firms. There is also evidence that abnormal volume differs across the before, after, and benchmark subsamples of both developed and emerging market firms.

These findings on return volatility and trading volume for developed market firms are somewhat surprising given our hypotheses that firms from less developed markets are likely to experience the most dramatic information environment change upon listing in the U.S. When we break the findings down by geographic area and degree of economic development, it appears that the post-listing changes in return volatility and trading volume around earnings announcements are most pronounced for Developed Europe firms. The mean absolute cumulative abnormal return for Developed Europe increases from 2.23% before listing to 3.12% after listing, with a W-statistic of −3.46. Other regions, notably Developed Asia, also show evidence of increases. For Developed Europe, the mean cumulative abnormal trading volume increases from 46.37% pre-listing to 123.94% post-listing with a W-statistic of −2.49. Except for Developed Asia, there are no comparable changes. Not surprisingly, we find no significant post-listing change for Canadian firms, but the direction of the volatility and volume responses are the opposite of those from Developed Asia and Europe. Canada is a particularly interesting case for study as its disclosure environment is very similar to that in the U.S., which implies that the factors involved in the cross-listing decision of Canadian firms differ from those of firms from other countries. Indeed, the uniqueness of the Canadian context for U.S. cross-listings has been the focus of a number of studies, including Alexander et al. (1988) and Foerster and Karolyi (1993). More interesting is the case of Latin America, for which the W-test indicates a large, significant *decline* (from 4.20% to 3.10%) in the absolute return responses to post-listing earnings announcements. This special case is the only one consistent with our hypotheses H1 and H1a.

Table 3
Univariate tests on absolute cumulative abnormal returns and cumulative abnormal trading volume before and after international cross-listings

We present means and medians of absolute cumulative abnormal returns (*cabsar*) and trading volumes (*cabvol*) for a three-day window $(-1,+1)$ around the earnings event for the period before versus after U.S. listing as well as for a control sample. The number of firm-events for each sample is indicated. Analysts is the number of analysts that follow the stock of the firm at the time of the earnings announcement. To test whether the absolute cumulative abnormal returns and cumulative abnormal volume are significantly different before and after cross-listing, and whether ADR and benchmark values differ, we compute two-sample Wilcoxon tests (W-test). For each group (before, after, benchmark), below each grouping criteria, we compute two-sample nonparametric Wilcoxon tests and Kruskal–Wallis H tests of the analysis of variance to test whether there are significant differences across the grouping criteria. ** and * indicate 5% and 10% significance, respectively.

Variable	Absolute cumulative abnormal return $(-1,+1)$ (*cabsar*)									Cumulative abnormal trading volume $(-1,+1)$ (*cabvol*)								
	Before listing (1)		After listing (2)		Benchmark (3)		Differences (1)-(2)	(1)-(3)	(2)-(3)	Before listing (1)		After listing (2)		Benchmark (3)		Differences (1)-(2)	(1)-(3)	(2)-(3)
	Obs	Mean	Obs	Mean	Obs	Mean	W-test	W-test	W-test	Obs	Mean	Obs	Mean	Obs	Mean	W-test	W-test	W-test
All	1151	0.0279	1352	0.0321	43634	0.0297	−3.85**	−0.05	5.25**	845	0.3914	1115	0.9314	27286	0.7863	−2.51**	2.19**	5.86**
Emerging markets	347	0.0308	454	0.0315	10645	0.0326	−1.11	−0.62	0.82	204	−0.3426	335	0.4298	6850	0.3156	−1.04	0.64	2.16**
Developed markets	804	0.0266	898	0.0324	32989	0.0287	−3.77**	0.08	5.25**	641	0.6250	780	1.1469	20436	0.9441	−2.69**	2.13**	6.01**
(Wilcoxon test)		(1.76*)		(0.13)		(12.50**)					(−3.69**)		(−5.08**)		(−15.03**)			
Emerging Asia	168	0.0250	237	0.0318	7133	0.0325	−1.98**	−2.05**	0.45	112	−0.4560	193	0.4362	5016	0.2735	−0.34	0.58	1.11
Developed Asia	302	0.0266	349	0.0316	10939	0.0294	−2.03*	−1.00	1.79*	275	0.5391	324	1.06937	8561	0.6280	−2.24**	1.40	4.64**
Emerging Europe	18	0.0143	18	0.0367	771	0.0341	−1.60	−2.73**	−0.08	15	−0.4436	15	0.1711	605	0.0918	−0.08	0.77	0.94
Developed Europe	393	0.0223	415	0.0312	20311	0.0278	−3.46**	−0.88	3.64**	268	0.4637	335	1.2394	10446	1.2251	−2.49**	0.88	4.08**
Middle East, Africa	57	0.0325	49	0.0295	1367	0.0340	0.77	−0.17	0.69	38	0.0593	46	0.6945	730	0.8566	−1.21	−0.46	0.77
Latin America	104	0.0420	150	0.0310	1374	0.0310	1.83*	3.05**	1.27	39	−0.3696	81	0.3120	499	0.2193	−0.52	−0.14	0.66
Canada	109	0.0420	134	0.0383	1739	0.0355	0.04	1.57	1.57	98	1.3075	121	1.0984	1429	0.7835	0.73	2.37**	1.60
(Kruskal–Wallis test)		(43.82**)		(8.16)		(412.4**)					(18.02**)		(35.16**)		(334.2**)			
144a private placements	224	0.0266	283	0.0316			−1.91*			142	−0.3033	233	0.5177			−1.39		
OTC listings	623	0.0268	702	0.0323			−3.71**			475	0.4254	566	1.1825			−2.65**		
Nasdaq/NYSE listings	304	0.0310	367	0.0313			−0.61			228	0.7533	316	0.7867			−0.36		
(Kruskal–Wallis test)		(2.33)		(0.55)							(7.95**)		(10.66**)					
Analysts$\leqslant$4	381	0.0316	186	0.0301	25978	0.0291	−0.07	2.57**	1.70*	267	0.1365	141	0.3265	14056	0.6625	0.71	0.55	1.18
5$\leqslant$Analysts$\leqslant$12	488	0.0260	461	0.0324	12563	0.0296	−3.43**	−1.75*	2.91**	370	0.3721	395	1.1496	8913	0.8044	−0.29	0.89	1.23
13$\leqslant$Analysts$\leqslant$25	243	0.0258	479	0.0332	4264	0.0327	−2.70**	−2.93**	0.50	182	0.7424	396	0.8828	3580	1.1560	0.32	0.32	0.15
Analysts$\geqslant$26	39	0.0279	226	0.0309	829	0.0325	−0.83	−0.77	0.16	26	0.8276	183	1.0315	734	1.1400	−0.48	0.03	1.28
(Kruskal–Wallis test)		(6.09)		(1.05)		(130.4**)					(12.68**)		(18.55**)		(293.4**)			

Table 3 also partitions the sample by listing type into Rule 144a, OTC, and exchange listings. The largest number of events corresponds to OTC listings and the smallest to Rule 144a private placements. The most significant changes in event period volatility and volume obtain for over-the-counter listings, followed by Rule 144a issues. The mean (median) increase in absolute cumulative abnormal returns is from 2.66% (1.94%) pre-listing to 3.16% (2.31%) post-listing for Rule 144a placements, and from 2.68% (1.76%) to 3.23% (2.17%) for OTC listings, statistically significant changes in both cases. A statistically significant increase in mean (median) cumulative abnormal trading volume, from 42.54% (−10.67%) to 118.25% (13.04%) obtains for OTC listings. In contrast, there is no significant change in either volatility or volume for exchange listings. Again, that the changes in the event study reactions are greatest for listings that require minimal incremental disclosure requirements for firms appear to contradict our main hypotheses. Other (unreported) summary statistics indicate that developed country firms tend to select OTC or exchange listings. Thus, the differences in the event study results across listing type are likely reflecting some of the same effects we find in comparing developed and emerging market results. We explore these types of interactions in the next subsection. Table 3 also indicates that the relation between the size of the volatility reaction and the number of analysts is complex, with the most prominent changes arising for firm-events with five to 12 analysts. Volume effects are largely indistinguishable across firms with different levels of analyst coverage.

4.2. Cross-sectional regressions

4.2.1. Summary statistics

Table 4 summarizes some of the key explanatory variables we use in the cross-sectional regressions. These variables include earnings announcement characteristics, such as the number of analysts, the dispersion of their earnings forecasts, and the direction of earning surprises, as well as firm attributes such as total sales, assets, book and market equity, sales growth, and leverage. It is evident that there are often large changes in these variables across the pre-listing and post-listing periods. For example, on average the number of analysts that follows a firm increases from 9.93 to 15.94, a statistically significant difference. Also, analyst coverage for these firms is significantly higher than that of the benchmark firms (6.01). The increase in the number of analysts is greater for firms from developed countries (from 10.77 to 17.75) and for firms that list on the OTC market (10.94 to 17.51).

The dispersion of analyst forecasts also increases significantly, from 0.30 to 0.36 across the pre-listing and post-listing periods, although in both cases this measure is much lower than that of the benchmark firms (0.40).[22] The increase in forecast dispersion after listing in the U.S. is significantly positive only for developed country firms (0.27 to 0.33) and firms that list on the OTC market (0.23 to 0.34), suggesting that only these U.S. cross-listings are associated with measurable increases in information asymmetry or disagreement. In contrast, dispersion drops marginally significantly for emerging market firms. Absolute earnings surprises appear to increase after listing in the U.S. (from 0.42 to 0.46, W-statistic

[22]The dispersion variable has little or no meaning when the number of analysts is very small. Empirical work in accounting typically generates a missing value for dispersion when the number of analysts for a given event is very small. We compute dispersion only if there are at least three analysts for the particular firm-event.

Table 4
Summary statistics of firm-level attributes around earnings announcement events

Analysts is the number of analysts that follow the stock of the firm at the time of the earnings announcement. Earnings Surprise is the absolute value of the difference between actual earnings and the mean analyst forecast, normalized by the mean forecast. Dispersion is the cross-sectional standard deviation of the analysts' forecasts when there are at least three forecasts available. The source is the Institutional Brokers Estimate System (I/B/E/S). Fundamental data are annual figures for the fiscal year just prior to the firm-event from Worldscope on total assets, sales, book equity, market capitalization (all in millions of U.S. dollars), one-year sales growth and the debt- to-assets and book-to-market equity ratios. The number of observations is restricted to those for which all accounting variables are nonzero and sales growth is greater than −100%. Sales growth rates, absolute earnings surprises, and dispersion are winsorized at the 1st and 99th quantiles. To test whether firm-specific variables are significantly different before and after cross-listing, and whether ADR and benchmark values differ, we compute two-sample Wilcoxon tests (W-test). For each group (before, after, benchmark), below each grouping criteria, we compute two-sample nonparametric Wilcoxon tests and Kruskal–Wallis H tests of the analysis of variance to test whether there are significant differences across the grouping criteria. ** and * indicate 5% and 10% significance, respectively.

Variables	Before listing (1)			After listing (2)			Benchmark (3)			(1)-(2)	(1)-(3)	(2)-(3)
	Obs	Mean	Median	Obs	Mean	Median	Obs	Mean	Median	W-test	W-test	W-test
Analysts												
All	845	9.9290	8	1173	15.9352	14	36017	6.0127	4	−13.64**	20.05**	37.47**
Emerging markets	193	7.0984	5	351	11.6752	10	7052	5.7680	4	−8.12**	3.90**	17.26**
Developed markets	652	10.7669	9	822	17.7543	16	28965	6.0723	4	−12.63**	20.55**	33.44**
(W-test)		(−7.16**)			(−8.59**)			(2.56**)				
144a private placements	113	6.6213	5	212	11.6008	10				−6.44**		
OTC listings	482	10.9401	9	641	17.5121	16				−10.16**		
Nasdaq/NYSE listings	250	9.4733	8	320	15.6547	14				−8.42**		
(KW-test)		(46.60**)			(50.14**)							
Earnings surprise												
All	845	0.4180	0.08	1173	0.4581	0.09	36017	0.6370	0.11	−1.67*	−4.64**	−3.03**
Emerging markets	193	0.6904	0.17	351	0.6668	0.14	7052	0.8328	0.17	0.62	−0.44	−1.57
Developed markets	652	0.3374	0.06	822	0.3690	0.07	28965	0.5893	0.10	−1.36	−5.32**	−3.87**
(W-test)		(5.75**)			(5.67**)			(19.51**)				
Negative surprises only	436	0.4346	0.09	665	0.5995	0.12	20031	0.7644	0.14	−3.04**	−3.89**	−0.40

Table 4 (*continued*)

Variables	Before listing (1)			After listing (2)			Benchmark (3)			(1)-(2)	(1)-(3)	(2)-(3)
	Obs	Mean	Median	Obs	Mean	Median	Obs	Mean	Median	W-test	W-test	W-test
Positive surprises only (W-test)	409	0.4003 (−2.11**)	0.06	508	0.2732 (−7.16**)	0.06	15986	0.4772 (−18.63**)	0.09	1.38	−2.55**	−4.75**
144a private placements	113	0.3275	0.16	212	0.4134	0.11				0.30		
OTC listings	482	0.3520	0.06	641	0.4882	0.08				−3.46**		
Nasdaq/NYSE listings (KW-test)	250	0.5862 (23.23**)	0.10	320	0.4277 (9.48**)	0.07				2.08**		
Dispersion												
All	741	0.3039	0.10	1115	0.3632	0.12	22370	0.3961	0.13	−3.11**	−4.41**	−0.83
Emerging markets	145	0.4442	0.20	332	0.4348	0.16	4505	0.5141	0.19	1.83*	0.87	−1.83*
Developed markets (W-test)	596	0.2698 (7.38**)	0.08	783	0.3330 (5.38**)	0.11	17865	0.3664 24.60**	0.11	−3.10**	−5.11**	−1.42
144a private placements	83	0.3441	0.19	200	0.3698	0.16				0.47		
OTC listings	446	0.2250	0.08	605	0.3438	0.11				−4.05**		
Nasdaq/NYSE listings (KW-test)	212	0.4541 (49.27**)	0.12	310	0.3972 (14.24**)	0.12				0.69		
Fundamentals												
Total sales (US$m)	845	4651.15	1262.03	1173	5028.10	1212.06	36017	1106.82	268.48	−0.30	22.70**	26.57**
Total assets (US$m)	845	14093.83	2076.36	1173	22826.45	2535.36	36017	2388.98	355.81	−1.25	25.70**	31.19**
Book equity (US$m)	845	1786.76	823.62	1173	2590.21	1002.11	36017	387.21	131.88	−2.98**	28.92**	36.05**
Market equity (US$m)	845	3170.57	1446.59	1173	4478.87	1914.69	36017	765.95	217.20	−3.07**	29.99**	36.80**
One-year sales growth	845	0.2101	0.12	1173	0.1451	0.09	36017	0.1149	0.06	3.45**	8.82**	5.54**
Debt/assets	845	0.5948	0.5788	1173	0.5767	0.5759	36017	0.5907	0.5980	1.55	0.33	−2.47**
Book/market equity	845	0.7084	0.53	1173	0.7279	0.54	36017	0.7957	0.61	−0.81	−5.10**	−4.88**

of −1.67), although they are always significantly smaller than those for benchmark firms (0.64). This increase is pronounced for firms that do not list on an organized exchange, that is, firms associated with more informative disclosures after cross-listing. In fact, exchange-listing firms experience a decrease in absolute earnings surprises (0.59 to 0.43).[23]

In comparing the cross-listed sample to the benchmark sample, it appears that benchmark firms have fewer analysts per event but greater forecast dispersion than cross-listing firms prior to listing in the U.S. Looking at company characteristics, it seems that these differences can be attributed in part to differences in size, as measured by total assets, book equity, and market equity, and to differences in growth opportunities as measured by past sales growth and book-to-market equity ratios. In terms of mean sales, for example, listing firms are around five times larger than benchmark firms ($5.028 billion versus $1.107 billion); similar differences obtain for assets, book equity, and market equity. Cross-listing firms' mean book-to-market ratio is lower (0.7279 versus 0.7957) and their mean sales growth rate significantly higher (14.51% versus 11.49%). It is also interesting to note that the listing event is associated with a significant increase in mean book equity ($1.789 billion to $2.590 billion) and mean market equity ($3.171 billion to $4.479 billion), and a slowdown in mean growth rates (from 21.01% to 14.51%).

4.2.2. *Preliminary cross-sectional tests*

Table 5, Panel A (Panel B) presents the basic regression results for *cabsar* (*cabvol*). The basic specification stacks earnings events of cross-listing firms both before and after cross-listing as well as the benchmark firms, differentiating these subsamples with dummy variables. We introduce as explanatory variables the standard earnings-related controls, such as analyst following, forecast dispersion, and absolute earnings surprise, as well as country and regional fixed effects.

The first specification reinforces our preliminary findings in Table 3 that the absolute cumulative three-day abnormal returns and three-day abnormal volume are significantly different from those of benchmark firms and are significantly higher after a U.S. cross-listing than before. In Panel A, the negative coefficient on Cross-list of −0.0047 (t-statistic of −4.69) can be compared with the constant of 0.0321 to show that cross-listed firms experience 14% lower *cabsar* before listing in the U.S. The significant positive coefficient (0.0069, t-statistic of 5.03) on the Cross-list × POST interactive term, however, implies that *cabsar* increases over 25% relative to before the cross-listing. The comparisons for *cabvol* are similar, with larger magnitudes but with less statistical precision as the sample declines substantially (from 24,226 to 17,295 observations). The negative coefficient on Cross-list of −0.29 (t-statistic of −1.96) represents a 32% lower cumulative abnormal volume than that for benchmark firms, but the positive Cross-list × POST coefficient (0.35, t-statistic of 1.84) implies an abnormal volume increase of 58% around the listing. These findings are robust to the inclusion of country and region fixed effects (Specifications 3 and 4).

Coefficients on the earnings-related control variables are statistically significant and generally of the expected sign for the *cabsar* and *cabvol* regressions. *cabsar* is significantly and positively related to the absolute magnitude of the earnings surprises, forecast dispersion, or number of analysts; *cabvol* is positively related to absolute earnings surprises

[23]Lang et al. (2003a) confirm that number of analysts increases after cross-listing, but report that forecast errors decline. However, their sample differs substantially from ours, given that most of their results are based on 1996 data only and refer only to exchange-listed firms.

Table 5
Testing for effects of self-selection bias on absolute cumulative abnormal returns and cumulative abnormal volume around earnings announcements

This table reports cross-sectional regressions to explain the absolute cumulative abnormal return (*cabsar*) and cumulative abnormal volume (*cabvol*) for a three-day window (−1, +1) around earnings events. Cross-list is a dummy variable that equals one if the earnings event involves a firm that is listed or will list in the U.S., and zero otherwise, and POST is a dummy variable that equals one if the earnings event occurs after a U.S. listing, and zero otherwise. Earnings Surprise is the absolute value of the difference between actual earnings and the mean analyst forecast, normalized by the mean forecast. Dispersion is the cross-sectional standard deviation of the analysts' forecasts when there are at least three forecasts available. The source is the Institutional Brokers Estimate System (I/B/E/S). Analysts is the number of analysts that follow the stock of the firm at the time of the earnings announcement. Fundamental data are annual figures for the fiscal year just prior to the firm-event from Worldscope on total assets, sales, book equity, market capitalization (all in millions of U.S. dollars), one-year sales growth and the debt-to-assets and book-to-market equity ratios. The number of observations is restricted to those for which all accounting variables are nonzero and sales growth is greater than −100%. Sales growth rates, absolute earnings surprises and dispersion are winsorized at the 1st and 99th quantiles. Specifications 1 and 2 are estimated using ordinary least squares with heteroskedasticity-consistent robust *t*-statistics reported under each estimated coefficient in parentheses. Specifications 3 and 4 are estimated using country or regional fixed effects. Specification 5 is a probit regression of the probability that a foreign firm cross-lists in the U.S. using the fundamental and country variables. The inverse-Mills ratio (λ) is computed from the probit model and used in the second-pass Heckman model regressions for *cabsar* and *cabvol* in Specification 6. Pseudo-R^2 is the goodness of fit using McFadden's (1974) likelihood ratio index. ** and * indicate significance at the 5% and 10% levels, respectively.

Variable	(1)	(2)	(3)	(4)	Probit model	(5)	Heckman model	(6)
Panel A: *Absolute cumulative abnormal returns* (*cabsar*)								
Constant	0.0321	0.0275	Fixed Effects		Constant	−1.5092	Constant	0.0106
	(138.9)**	(79.93)**				(−31.37)**		(5.86)**
Cross-list	−0.0047	−0.0048	−0.0061	−0.0049	Market value ($\times 10^{-6}$)	0.1062	Cross-list	−0.0039
	(−4.69)**	(−4.88)**	(−6.21)**	(−5.03)**		(14.86)**		(−2.98)**
Cross-list × POST	0.0069	0.0057	0.0066	0.0064	Total assets ($\times 10^{-6}$)	0.0192	Cross-list × POST	0.0057
	(5.03)**	(4.19)**	(4.87)**	(4.70)**		(11.00)**		(4.19)**
Earnings surprise ($\times 10^{-3}$)		0.3202			Total sales ($\times 10^{-6}$)	−0.0069	Earnings surprise ($\times 10^{-3}$)	0.2163
		(4.99)**				(−1.14)		(3.30)**
Dispersion ($\times 10^{-3}$)		1.3527			Sales growth ($\times 10^{-3}$)	−0.0011	Dispersion ($\times 10^{-3}$)	1.4199
		(4.96)**				(−0.24)		(5.23)**
Analysts ($\times 10^{-3}$)		0.1836			Book-to-market ratio	0.0608	Analysts ($\times 10^{-3}$)	0.4061
		(6.18)**				(2.58)**		(10.56)**
					Leverage	−0.8463	λ	0.0074
						(−11.94)**		(9.38)**
					Earnings surprise	−0.0152		
						(−3.53)**		

					Dispersion	0.0311		
						(1.88)*		
					Analysts	0.0249		
Country fixed effects	No	No	Yes	No		(15.10)**		
Regional fixed effects	No	No	No	Yes	Log likelihood	−5622.81		
Observations	24226	24226	24226	24226	Observations	24226	Observations	24226
Adjusted-R^2	0.0008	0.0072	0.0224	0.0058	Pseudo-R^2	0.0617	Adjusted-R^2	0.0101
Panel B: *Cumulative abnormal volume* (*cabvol*)								
Constant	0.8922	0.7211	Fixed Effects			−1.3205		−1.1965
	(27.51)**	(13.63)**				(−23.68)**		(−5.06)**
Cross-list	−0.2892	−0.3153	−0.3983	−0.2808	Market value ($\times 10^{-6}$)	0.1013	Cross-list	−0.1258
	(−1.96)**	(−2.14)**	(−2.59)**	(−1.89)**		(12.53)**		(−0.86)
Cross-list × POST	0.3515	0.2484	0.4361	0.4370	Total assets ($\times 10^{-6}$)	0.0191	Cross-list ×*POST	0.2657
	(1.84)*	(1.28)	(2.28)**	(2.28)**		(9.71)**		(1.37)
Earnings surprise ($\times 10^{-3}$)		0.0324			Total sales ($\times 10^{-6}$)	−0.0094	Earnings surprise ($\times 10^{-3}$)	0.0126
		(3.40)**				(−1.37)		(1.29)
Dispersion ($\times 10^{-3}$)		−0.1346			Sales growth ($\times 10^{-3}$)	−0.0002	Dispersion ($\times 10^{-3}$)	−0.1294
		(−3.68)**				(−0.05)		(−3.54)**
Analysts ($\times 10^{-3}$)		0.0202			Book-to-market ratio	−0.0079	Analysts ($\times 10^{-3}$)	0.0425
		(5.37)**				(−0.25)		(8.89)**
					Leverage	−0.9054	λ	0.8713
						(−11.19)**		(8.16)**
					Earnings surprise	−0.0254		
						(−4.23)**		
					Dispersion	0.0380		
						(1.93)*		
					Analysts	0.0195		
Country fixed effects	No	No	Yes	No		(10.49)**		
Regional fixed effects	No	No	No	Yes	Log likelihood	−4424.47		
Observations	17295	17295	17295	17295	Observations	17295	Observations	17295
Adjusted-R^2	0.0001	0.0025	0.0184	0.0082	Pseudo-R^2	0.0727	Adjusted-R^2	0.0052

and the number of analysts, but negatively related to forecast dispersion (-0.1346×10^{-3}, t-statistic of -3.68). The economic importance of these variables is less clear, however, as the adjusted-R^2s are low (less than 1% for both *cabsar* and *cabvol*). The Cross-list × POST coefficient for *cabsar* diminishes somewhat with these additional control variables, but it is still significant and positive (0.0057, t-statistic of 4.19). This is not surprising since an increase in the number of analysts following the U.S. cross-listing from 9.93 to 15.94 (in Table 4) implies an increase of 0.0011, or about 4%, in *cabsar* (given the coefficient of 0.1836×10^{-3}). However, the effect of these control variables for *cabvol* weakens the coefficient on Cross-list × POST to the point that it is no longer significant (0.2484, t-statistic of 1.28).

4.2.3. Tests for endogeneity in decision to cross-list

Our event study results indicate the presence of intriguing differences in the earnings responses of pre-listing, post-listing, and benchmark samples. However, a comparison of the characteristics of the cross-listing and benchmark samples suggests that the cross-listing firms may not be a random sample of non-U.S. firms and thus that the decision to cross-list is endogenously determined. In the presence of endogeneity, inferences obtained using classical statistical approaches may be afflicted by a selection bias problem. In this section, we conduct tests to control for potential endogeneity in the decision to cross-list in the U.S.

The econometric problem we face here is similar to that of the treatment effects model, which considers the effect of an endogenously chosen binary treatment (cross-listing, in our case) on another endogenous continuous variable, conditional on two sets of independent variables. In Table 5, we evaluate the potential impact of selection bias using a standard two-equation Heckman model for both *cabsar* and *cabvol* (Greene, 1997, Chapter 20). Specification 5 in each panel of Table 5 presents a probit regression that models the propensity to cross-list. Specification 6 in each panel of Table 5 presents the cross-sectional regressions, which are similar to those discussed above but now include the inverse-Mills ratio, λ, as an explanatory variable to pick up self-selection bias.

We find that the likelihood of cross-listing depends strongly and positively on market value and total assets. We also see, from Specification 5 in both panels, that growth opportunities, as captured by the book-to-market ratio, as well as leverage, are significantly related to the likelihood of cross-listing. The size and growth results are similar to previous findings (Reese and Weisbach, 2002; Doidge et al., 2004). Previous studies do not consider financial leverage, which we find to be significantly and negatively related to the likelihood of cross-listing. Finally, we include the earnings-related variables in the probit specification in order to calibrate the potential endogeneity problem for their explanatory power in the *cabsar* and *cabvol* regressions.[24] The magnitude of the earnings surprise is significantly negatively related to the likelihood of listing whereas the number of analysts is positively related to the likelihood of listing.

The second-pass Heckman regression estimates show that, indeed, the coefficient for λ, which we compute from the inverse-Mills ratio based on probit Specification 5, is strongly significantly positive, indicating the presence of an upward selection bias toward in the coefficient on Cross-list in *cabsar* and *cabvol*. The magnitude of the negative coefficient on

[24]In earlier versions of the paper, we investigate a number of different probit specifications with small, if any, qualitative differences for the second-pass *cabsar* and *cabvol* regressions.

Cross-list is now smaller in absolute magnitude given λ compared to the ordinary least squares estimates in Specification 2, but is still significantly negative. More importantly, the significantly positive coefficients on the Cross-list × POST interaction terms remain (0.0057, *t*-statistic of 4.19). Thus, our finding of larger volatility responses to post-listing earnings events holds up against the potential problem of selection bias. Panel B repeats these tests for abnormal trading volume, *cabvol*.[25] The coefficient on λ that we compute from the inverse-Mills ratio has a strongly significant coefficient in the second-stage Heckman estimates. However, in contrast to the *cabsar* findings, the coefficients on Cross-list dummy and Cross-list × POST now become insignificant, indicating that, to a large extent, the earlier findings are attributable to the selection bias.

In sum, Table 5 confirms that the apparent differences in earnings responses of return volatility across the before, after, and benchmark samples are not explained away by a self-selection bias measured by a variety of firm and country characteristics. While our analysis is limited, of course, by the particular proxy variables that we choose to represent the selection bias, we show there is some sensitivity in the results for *cabsar* and *cabvol* to the selection-bias correction, which suggests that our approach is useful to some extent.

4.2.4. Additional cross-sectional regression results

Our next objective is to decompose the changes in *cabsar* around U.S. cross-listings into components related to various firm-level and country-specific attributes. Table 6 presents estimates of additional cross-sectional regressions. Because the regressions of Table 5 disentangle cross-listing effects from selection-bias effects, we exclude the benchmark firms from the Table 6 results, and concentrate exclusively on the pre-listing versus post-listing earnings responses of the cross-listing sample firms. The specifications include indexes of accounting standards and anti-director rights, accounting-related control variables, home country GDP per capita (in current USD), the POST dummy, dummy variables for listing type, and various interaction terms. The table also reports White's heteroskedasticity-consistent *t*-statistics along with adjusted-R^2s.

The first specification confirms our most important previous finding: the coefficient estimate for POST indicates the presence of a statistically significant increase in abnormal returns of 0.0109% (*t*-statistic of 3.65) after listing in the U.S. The coefficient here is larger in magnitude than in previous tables because we also allow the earnings-related variables to interact with POST, and the additional interaction effects with respect to the absolute earnings surprise are statistically significant. Specifically, we see that the positive and significant absolute earnings surprise coefficient (2.63×10^{-3}, *t*-statistic of 4.41) associated with announcements in the pre-listing period is directly offset by a negative and significant coefficient of similar magnitude for the announcements in the post-listing period. This implies that the sensitivity of volatility responses to absolute earnings surprises is considerably weaker after a U.S. cross-listing. The dissipative effect is even more dramatic to the point of reversing the coefficient sign from positive pre-listing to negative post-listing for those earnings announcements associated with positive surprises (Positive Earnings).

[25]Note that the probit regressions reported in Panels B and D are not identical as missing values cause the *cabsar* and *cabvol* sample sizes to differ. By using a loose definition of *cabvol* (at least one nonmissing element among the −1, 0, and +1 residuals constitute a nonmissing value), we can increase the number of observations; across all our tables, results are virtually identical.

Table 6
Cross-sectional regressions of absolute cumulative abnormal returns (*cabsar*) around earnings announcements for U.S. cross-listed firms

This table reports cross-sectional regressions to explain the absolute cumulative abnormal return (*cabsar*) for a three-day window $(-1,+1)$ around earnings events. POST is a dummy variable that equals one if the earnings event occurs after a U.S. listing, and zero otherwise. AS is the country's accounting standards index measure, AD is the country's index of anti-director rights, and GDP per capita is the country's measure of economic development. Earnings Surprise is the absolute value of the difference between actual earnings and the mean analyst forecast, normalized by the mean forecast. Positive Earnings is the Earnings Surprise multiplied by a dummy variable if the actual earnings exceed the mean analyst forecast, and zero otherwise. Dispersion is the cross-sectional standard deviation of the analysts' forecasts when there are at least three forecasts available. The source is the Institutional Brokers Estimate System (I/B/E/S). Analysts is the number of analysts that follow the stock of the firm at the time of the earnings announcement. Absolute earnings surprises and dispersion are winsorized at the 1st and 99th quantiles. All specifications are estimated using ordinary least squares with heteroskedasticity-consistent robust *t*-statistics reported under each estimated coefficient in parentheses. The regressions use 1,814 observations. ** and * indicate significance at the 5% and 10% levels, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.0222	0.0391	0.0250	0.0515	0.0445	0.0493
	(11.15)**	(4.16)**	(16.62)**	(4.50)**	(4.49)**	(4.49)**
AS ($\times 10^3$)		−0.2059		−0.4919	−0.1407	−0.2907
		(−1.52)		(−2.57)**	(−1.04)	(−1.64)
Earnings surprise ($\times 10^{-3}$)	2.6357	1.1361	1.1438			
	(4.41)**	(1.79)*	(1.77)*			
Dispersion ($\times 10^{-3}$)	2.5556	1.5720	1.6309			
	(1.24)	(1.29)	(1.33)			
Analysts ($\times 10^{-3}$)	−0.0577	−0.0299	−0.0264			
	(−0.49)	(−0.37)	(−0.32)			
Positive earnings ($\times 10^{-3}$)	3.6590	−0.4489	−0.3494			
	(1.92)*	(−0.32)	(−0.25)			
AD ($\times 10^{-3}$)				2.0955		1.2414
				(2.67)**		(1.63)
GDP per capita					−0.0004	−0.0004
					(−4.04)**	(−3.73)**
POST	0.0109	−0.0163		−0.0261	−0.0216	−0.0252
	(3.65)**	(−1.32)		(−1.88)*	(−1.71)*	(−1.86)*
AS × POST ($\times 10^{-3}$)		0.3332		0.5170	0.3110	0.3682
		(1.86)*		(2.27)**	(1.70)*	(1.62)
Rule 144a placement × POST			0.0079			
			(3.38)**			
OTC listing × POST			0.0068			
			(3.83)**			
Exchange listing × POST ($\times 10^{-3}$)			0.0045			
			(2.22)**			
Earnings surprise × POST ($\times 10^{-3}$)	−2.6582					
	(−3.62)**					
Dispersion × POST ($\times 10^{-3}$)	−0.7045					
	(−0.28)					
Analysts × POST ($\times 10^{-3}$)	0.0395					
	(0.26)					
Positive earnings × POST (10^{-3})	−7.1911					
	(−2.69)**					
AD × POST ($\times 10^{-3}$)				−0.8143		−0.1792
				(−0.75)		(−0.16)

Table 6 (*continued*)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
GDP per capita × POST					0.0003	0.0003
					(2.20)**	(2.20)**
Adjusted-R^2	0.0424	0.0272	0.0262	0.0147	0.0186	0.0193

Thus, the interaction of these two variables with POST frees the Cross-list dummy variable to take on the larger volatility response overall.[26]

Specification 2 inserts the accounting standards variable (AS) and its post-listing interactive, AS × POST. The explanatory power of POST is now subsumed by the AS × POST variable, suggesting that the large increase in absolute return responses to earnings is concentrated in the firms from home countries with higher quality information environments. This is surprising in the same way that our developed market dummy variable in Table 3 is significant. Our central hypothesis is that the strongest change in volatility reactions upon listing would be realized by those firms domiciled in less developed countries with weaker accounting standards, for which the incremental disclosure requirements would be most stringent. In Specification 3, we replace POST by the three listing type dummy variables (Rule 144a issues, OTC, and exchange listing). Again, we obtain the surprising finding that the increase in volatility reactions to earnings news is concentrated in the private placement issues and OTC listings, that is, in listings which are associated with little incremental disclosure requirements. Indeed, the coefficient on the dummy variable for Rule 144a issues is largest (0.0079), followed by the OTC listing (0.0068) and the exchange listings (0.0045).

One important alternative hypothesis that we propose above is that the changes in capital market reactions to earnings announcements around U.S. cross-listings may be falsely associated with increased disclosure and reporting requirements when such changes actually stem from the special legal protections afforded to minority shareholders by U.S. securities laws and their enforcement. Although it is difficult to disentangle these two effects with country-level variables, in Specification 4, we include interactions of POST with both accounting standards (AS) and the La Porta et al. (1998) variable on anti-director rights (AD). The two variables AS and AD are correlated, and the interaction between themselves is such that the AS coefficient for *cabsar* now becomes significantly negative in the pre-listing period and that of AD is positive and significant. However, the resulting impact on post-listing volatility responses for AS (AS × POST) is greater than before, as its coefficient increases in magnitude and significance (0.5170, *t*-statistic of 2.27) from Specification 2. The coefficient on AD × POST is insignificant.

Finally, Specifications 5 and 6 include a further interaction variable, namely, GDP per capita, in addition to AS and AD. The goal of these robustness tests is once again to disentangle for the volatility reactions to earnings announcements around U.S. cross-listings the effects of a change in the disclosure environment from that of differences in

[26]Why this sensitivity of the volatility responses to earnings surprises dissipates upon cross-listing is not obvious given the existing theory. Maybe this arises because of a greater occurrence of confounding information events around the earnings announcements (e.g., management guidance statements, rival earnings reports, or industry reports).

economic development between the U.S. and the firm's home market. The introduction of GDP per capita × POST weakens the impact of AS × POST, although it does remain marginally significant. These results, together with the negative coefficient on GDP per capita for the pre-listing earnings announcements, jointly confirm our earlier findings that companies from better developed economies not only have lower volatility reactions to earnings before cross-listing in the U.S., but also experience a greater increase in volatility reactions upon listing in the U.S. Even after controlling for the level of economic development at home, firms from countries with better accounting standards experience a more significant increase in volatility reactions.

In sum, Table 6 suggests that the surprising finding that cross-listing in the U.S. increases return volatility persists. Second, it appears that the phenomenon of increased market responses to earnings news after cross-listing in the U.S. is concentrated in countries with higher disclosure standards and economic development. This reinforces our earlier and seemingly counterintuitive findings that, at least up to this point, reject our central hypotheses.

5. Evaluating alternative hypotheses

One specific alternative hypothesis is that, since non-U.S. firms typically utilize U.S. cross-listings as a means to attract U.S. investors, the resulting changes in share ownership might explain why we observe an unexpected increase in volatility reactions to earnings following the listing. The rationale for this alternative hypothesis is that greater participation by institutional investors with different investment horizons, tax exposures, and liquidity constraints should alter the level of information asymmetry or the precision of private information about the earnings events, even after controlling for increases in the number of analysts and in the dispersion of their earnings forecasts. Another possible outcome of a change in the investor base is a more liquid trading environment, which managers of many non-U.S. firms have declared to be an important priority for them in pursuing U.S. cross-listings. According to this latter explanation, the increased volatility around earnings may simply be a manifestation of the heightened attractiveness of the stock's trading environment for liquidity-based traders, rather than an outcome of increased disclosure activity. We test these alternatives and others in this section.

5.1. Changing composition of ownership

The significantly higher volatility reactions to earnings announcements following a U.S. listing might arise in spite of the higher quality information environment because of lower precision with respect to, and greater residual uncertainty about, the information content of the announcement. Less precise private information might arise because the stock has attracted a new cohort of investors with greater cross-investor variation in the precision of private information. For instance, one possible shift in the investor mix is that toward institutional investors. We know that institutional investors own a substantial fraction of the shares of internationally cross-listed stocks and especially ADRs,[27] and we also know

[27]See Citibank Report (July 2001) by Michael Chafkin on "U.S. Investment in Non-U.S. Equities" http://wwss.citissb.com/adr/www/adr_info/chaf.pdf. More recent research studies include Edison and Warnock (2004), Leuz et al. (2005), and Bradshaw et al. (2004).

that heightened institutional investor participation can impact volatility and trading volume reactions to earnings announcements. Utama and Cready (1997), for example, show that ownership structure, as indicated by the percentage of outstanding shares held by institutional investors, is positively associated with trading volume reactions around earnings announcement dates. Also, Hotchkiss and Strickland (2003) find that market responses to negative earnings announcements are greater for firms with higher levels of ownership by institutions, especially those that are momentum- and aggressive growth-oriented.

Another element that can create greater variation in the precision of private information following U.S. cross-listings is the geographic mix of the investor base (Doidge, 2003). Several studies argue that foreign investors have an informational disadvantage compared to local investors; these studies argue that this fact explains the phenomena associated with cross-border equity and bond flows (Brennan and Cao, 1997), and the home bias puzzle (French and Poterba, 1991; Kang and Stulz, 1997). More recent studies, however, counter that foreign institutional investors actually have information that is superior to that of local investors because of access to international expertise and talent and considerable local resources (Grinblatt and Keloharju, 2000; Seasholes, 2000; Choe et al., 2005). Seasholes, in particular, shows that foreign investors buy (sell) ahead of good (bad) earnings announcements in Taiwan, while local investors do the opposite. Tribukait (2003) uncovers significant pre-announcement drift in stock prices around earnings announcements that declines upon cross-listing, especially for firms from countries with weaker investor protection at home. He interprets this result as an informational advantage for local investors (especially insiders) that is neutralized upon listing in the U.S. Thus, whichever way the asymmetry lies, there is strong evidence that it exists.

We extend the current experiment to study the composition of the ownership base of the cross-listing firms among institutional versus retail, and foreign versus local investors, and we test whether this is related to the abnormal volatility reactions around earnings announcements. Toward this end, we compute two variables to proxy for ownership composition. The first proxy measures U.S. institutional holdings of cross-listed shares as a fraction of the shares outstanding as reported in SEC 13-F filings tabulated by SDA Spectrum, a Thomson Financial data product. We compute the fraction as of the end of the quarter that contains the earnings announcement of interest.[28] The second proxy is the fraction of trading in the U.S. relative to the total trading volume in both the U.S. and home markets in the pre-announcement period for the earnings date. This alternate proxy has the advantage that it includes activity by retail as well as institutional traders in the stock, although it does not reveal the extent to which home market investors also trade in the U.S. market. We obtain the trading volume in the home market and in the U.S. market during the pre-announcement period (days -200 to -11) from Datastream International. For ADRs, we adjust the latter proxy by the prevailing ratio of home market shares to ADRs at the time of the earnings announcement. Obviously, our second proxy is only available for those earnings announcements in the post-listing period during which U.S. trading exists. There is no such constraint for the institutional ownership proxy, although

[28]We also compute a yearly average measure of U.S. institutional ownership for the four quarters corresponding to the year that contained the earnings announcement and found for our sample of firms that the correlation was 0.95, so we report only the results using end-of-quarter holdings.

in practice, U.S. institutional investors rarely report by way of SEC 13-F filings on holdings of non-U.S. securities that do not trade in the U.S.

For the sake of brevity, we do not report any summary statistics on these two firm-level variables. It is interesting to note, however, that the first measure, which we denote 13-F ownership, averages 2.4% across the 1,093 observations for which data are available. Interestingly, this measure is considerably smaller (0.6%) among the 318 emerging market firms' earnings announcement quarters than those among the 775 developed-market firms (3.2%). The U.S. fraction of trading volume proxy averages only 6.6% in the quarters for which data are available and emerging market firms achieve a higher average (9.4%) than developed-market firms (5.5%).

Table 7 presents a number of additional regressions for *cabsar* using these and other measures. The results offer no support for the ownership hypothesis. Specification 1 verifies our basic finding that *cabsar* is statistically significantly larger following a U.S. listing (POST is significant and positive), though for a much smaller cross-sectional sample of 1,307 earnings announcements for which our new variables are available. However, the 13F ownership variable for *cabsar* is negative and insignificant. We cannot infer therefore that the capital market reactions to earnings announcements change upon listing any differently for those firms that have attracted a greater U.S. institutional ownership relative to those that have not. In Specification 2, the coefficients associated with the U.S. fraction of trading volume variable fare no better. It appears that the geographic distribution of trading does not explain the changes in capital market reactions upon listing. Moreover, neither extended specification subsumes the basic *cabsar* effect.

These weak results do not necessarily lead us to reject the alternative hypothesis that changing ownership composition drives the increased volatility reactions to earnings announcements upon cross-listing in the U.S. First, there are obvious sample constraints that limit our analysis. Moreover, our results here may reflect the limited power of our tests as changes in ownership are known to be correlated with the increased disclosure associated with conformity to U.S. GAAP (Bradshaw et al., 2004), which is, after all, our maintained hypothesis.

5.2. Improvement in liquidity

In Section 2, we propose the alternative hypothesis H2b that a more liquid environment for newly cross-listed stocks in the U.S. can complicate our inference regarding abnormal volume reactions to earnings news. That is, the greater attraction of relatively uninformed liquidity investors to the stock may result from the improved information environment reducing their risks of transacting with investors who have superior information. In turn, the larger pool of liquidity investors should increase the interest of informed investors (Bhushan, 1991). However, we do not know whether earnings announcements exacerbate the information advantage that informed traders may have, which would lead liquidity traders to withdraw strategically at that time, or whether they weaken the advantage of informed traders, which would attract the liquidity traders to the markets. In either case, we may observe abnormally higher or lower trading volume around earnings announcements following U.S. cross-listings regardless of any changes in information asymmetry, in cross-investor variation in the precision of private information about the earnings news, or in increased disclosure required in the U.S. markets.

Table 7
Cross-sectional regressions of absolute cumulative abnormal returns (*cabsar*) around earnings announcements for U.S. cross-listed firms with liquidity, trading, ownership, and disclosure factors

This table reports regressions of market responses to earnings releases on proxies for firm-specific liquidity, trading, ownership, and disclosure attributes representing alternative explanations for market responses to earning releases. Illiquidity is the Amihud (2002) average ratio of absolute return to trading volume in the pre-announcement window. U.S. fraction of trading volume is the average ratio of U.S. to total trading volume in the pre-announcement window. POST is a dummy variable that equals one if the earnings event occurs after a U.S. listing, and zero otherwise. 13-F Ownership is institutional holdings of cross-listed shares (scaled by shares outstanding) for the quarter of the earning announcement. Firm-level disclosure indicators from S&P Transparency and Disclosure Rankings are: IASGAAP (a dummy indicating whether the firm reports according to IAS or U.S. GAAP), Firm disclosure score (an index of individual firm disclosure practices), and Reconciliation (a dummy indicating whether a company reports a reconciliation of its domestic accounting standards to IAS or U.S. GAAP). Citibank's Universal Capital Raising Database is the source of Capital Raising, a dummy set to one if an issuer raises funds at the time or following its U.S. cross-listing. A table of summary statistics of these variables is available from the authors upon request. U.S. fraction of total trading volume, 13-F Ownership, and Capital Raising refer to cross-listed stocks only and, therefore, are observed only after cross-listing. ** and * indicate 5% and 10% significance, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.0256	0.0256	0.0221	0.0227	0.021	0.0303	0.0251
	(25.74)**	(25.82)**	(20.54)**	(11.04)**	(11.88)**	(3.41)**	(24.60)**
Illiquidity			0.0097				
			(3.89)**				
IASGAAP dummy				−0.0040			
				(−1.47)			
Reconciliation dummy					0.0034		
					(0.69)		
Firmdisclosure score						−0.0001	
						(−1.10)	
POST	0.0063	0.0065	0.0090	0.0047	0.0057	−0.0141	0.0065
	(4.57)**	(4.60)**	(5.87)**	(1.74)*	(2.20)**	(−1.20)	(4.46)**
13-F Ownership	−0.0015						
	(−0.16)						
US fraction of trading volume		−0.0034					
		(−0.77)					
Illiquidity dummy × POST			−0.0070				
			(−2.61)**				
IASGAAP dummy × POST				0.0087			
				(1.73)*			
Reconciliation dummy × POST					0.0005		
					(0.06)		
Firm disclosure score × POST						0.0003	
						(1.91)*	
Capital-raising dummy							−0.0032
							(−0.96)
Observations	1814	1814	1307	525	382	525	1627
Adjusted-R^2	0.0096	0.0099	0.0564	0.0225	0.0087	0.0228	0.0101

In order to test this alternative hypothesis, we need to be able to observe changes in the composition of trader types, which is not available. As a proxy, we choose to construct a measure of illiquidity based on Amihud (2002) using the average of the daily ratio of the absolute return to its trading volume using the pre-announcement period (from days −200

to −11). Our rationale is that those firms that are most illiquid before an announcement, whether before or after the U.S. listing, are likely to have attracted relatively fewer liquidity traders, and, if this is so, earnings announcements should lead to an even larger increase in volume reactions. Though our argument does not provide for any direct implications about illiquidity for changes in the volatility reactions to earnings announcements, we investigate these interactions to develop a complete picture of the results.

Table 7 includes Specification 3 for *cabsar* that allows Illiquidity to interact with the POST dummy variable and the constant (since this measure is also available before U.S. cross-listings). Our corresponding results for *cabvol* are weak, thus we do not report these results here. However, we find some surprising interactions for *cabsar*. Firms with greater illiquidity have significantly higher *cabsar* values before U.S. listings as indicated by the significant coefficient of 0.0097 (t-statistic of 3.89). However, the increase in *cabsar* is smaller for these illiquid firms following the U.S. cross-listing; the coefficient on Illiquidity × POST is significant and negative at −0.0070 (t-statistic of −2.61). Most importantly, we show that the coefficient on POST is not subsumed by this liquidity effect; rather, it is even larger than in Specification 1.

What we can conclude from the above investigation is that there is some support for the alternative explanation that the changes in the trading environment for the cross-listing firms play a role in the capital market reactions that we uncover. However, the effect is not necessarily what we expect. Increases in *cabsar* are concentrated in those firms that were more liquid before the listing; those less liquid before the U.S. listing had already experienced large volatility reactions to earnings. This evidence is somewhat consistent with existing research in that increased disclosure associated with these U.S. listings is generally associated with an increase in liquidity (Healy and Palepu, 2001). Nonetheless, it is still puzzling that the greatest increases in *cabsar* obtain for the most liquid firms that are, in turn, most likely to be the larger firms from better developed capital markets with better accounting standards. One remaining explanation is that the changes in disclosure activity do not arise simply from the differences in accounting standards in the home country relative to those of U.S. GAAP or from the choices implied by the listing vehicle (Rule 144a issue, OTC, or exchange listing). Instead, such changes may arise from actions taken by the firm even after the U.S. listing. We explore this possibility in the next section.

5.3. Additional evidence on increased disclosure

In this section, we investigate whether unique firm-level choices affect the extent to which they disclose financial statement information following a U.S. listing, that is, whether those disclosure decisions are necessarily those mandated by the country in which it is domiciled or the exchange on which it chooses to list. For example, it may be the case that a firm that accesses the U.S. markets by way of a Rule 144a private placement or OTC listing, which require little or no conformity with U.S. GAAP, actually chooses to disclose more than required because it anticipates a subsequent upgrade to an exchange listing at some later point. Similarly, a firm that chooses to list its shares on the NYSE or Nasdaq may have anticipated doing so for some time and thus had voluntarily chosen to present its financial statements in accordance with IAS or U.S. GAAP in the years before the U.S. listing. Moreover, Lang et al. (2004b) show that U.S. cross-listed firms report financial statement information that is systematically different from that of equivalent U.S. firms

with less timely recognition of losses and generally more smoothed earnings. Each of these examples would complicate inferences about the consequences of increased disclosure from the tests we conduct up to this point.

To investigate the role of incremental disclosure activity, we obtain data on firm-level disclosures from Standard and Poor's Transparency and Disclosure Rankings (Patel et al., 2002). The S&P ratings cover both developed and emerging economies with a number of indicators of firm governance and disclosure practices, including categories related to managerial incentives, timely and accurate disclosures, board independence, board accountability, enforcement and management accountability, minority shareholder protection, and social responsibility. The sample we obtain from Standard and Poor's in April 2003 covers 901 firms from 40 countries based on reports compiled during 2000 and 2001. S&P compiles the ratings by examining firms' annual reports and standard regulatory filings for the disclosure of 98 items, which are divided into three sections: financial transparency and information disclosure (35 items), board and management structure and process (35 items), and ownership structure and investor relations (28 items). S&P uses a binary scoring system whereby it awards one point if a particular item is disclosed. Recent studies of corporate governance by Durnev and Kim (2005) and Klapper and Love (2004) also use these data.

We construct several proxies from components of this data. The Firm Disclosure Score is the composite index score of the 35 different individual firm disclosure practices in the survey, including, among others, whether the company provides quarterly reports, segment results, consolidated financial statements, output or earnings forecasts, or industry-specific ratios in its management discussion and analysis. The variable IASGAAP is a dummy variable set to one if the firm reports any of its balance sheet, income, or cash-flow statements according to IAS in addition to domestic accounting standards. Finally, Reconciliation is a dummy variable set to one if the company reports a reconciliation of its domestic accounting standards to IAS or U.S. GAAP. Though available for a large number of our cross-listing firms, an important limitation of this survey data is that they are available only for one year (2000), so it is difficult to identify when the firms with higher disclosure scores decided to take these actions. We do know that many of our cross-listings will have taken place before this date, so the cross-sectional variation in their scores could capture at least some of the increases in *cabsar* around the listing date.

Raising equity capital by way of a public issue (Level III ADR or equivalent) requires additional disclosure of an SEC F-1 filing (prospectus) for a public offering and an F-2 or F-3 filing for subsequent offerings. Many of these offerings are often accompanied by a road show with investment bankers, depositary banks, investor relations consulting firms, accounting firms, and legal firms in tow. Whether this represents an increase in disclosure activity relative to straight U.S. cross-listings (Level II ADR or equivalent) is debatable, but we construct a dummy variable that is equal to one if an issuer raises funds (publicly or privately by means of a Rule 144a issue) at the time of or following its U.S. cross-listing, and we test whether this choice is related to the changes in *cabsar*. Our data source is Citibank's Universal Capital-Raising Database (www.citibank.com/adr).

Specifications 4–7 of Table 7 present the results of simple regressions of *cabsar* on the firm-level disclosure indicators. In Specification 4, we simply include the IASGAAP dummy variable along and with an interaction with POST in order to determine whether firms that indicate some harmonization with IAS before the U.S. cross-listing (though it is only recorded by S&P in 2000) would experience a smaller increase in *cabsar* around a U.S.

cross-listing. The coefficient on IASGAAP is insignificant, but the interaction with POST shows a marginally significant increase in *cabsar* for IAS-reporting firms following a U.S. listing (coefficient 0.0087, *t*-statistic of 1.73); however it does not completely subsume POST (coefficient of 0.0047, *t*-statistic of 1.74). In spite of IAS harmonization that may have taken place before or after the listing, the U.S. cross-listing effect still affects the volatility around earnings announcements. Specification 5 provides evidence on the incremental impact of Reconciliation for the cross-listing effect on *cabsar*. All of these interactions are negligible. The overall Firm Disclosure Score from S&P does show a statistically significant interaction with POST in specification 6, which again indicates that part of the cross-listing effect may be associated with the increased disclosure activity of these firms after they list in the U.S. In fact, the significance of POST itself disappears in this specification. Finally, the Capital-raising dummy variable has no explanatory power.

While the limitations of the smaller sample sizes available for the firm-level disclosure variables must be kept in mind, it does appear that part of the *cabsar* effect around U.S. cross-listings may be driven by the extent of disclosure activity of the individual firm: more effort to disclose financial information yields higher *cabsar* responses to earnings releases. These diagnostic results help sharpen our understanding of seemingly anomalous findings that responses to earnings releases may be strongest for cross-listed firms from developed, rather than emerging, market environments, and for firms that adopt U.S. listing vehicles that require less disclosure. A higher quality disclosure environment may yield more informative earnings releases that generate a larger *cabsar* response, perhaps because the information contained in the releases is more credible or induces more pre-announcement information gathering and processing. Furthermore, the effect is not driven exclusively by the quality of the home country disclosure environment, but also on the disclosure activity elected by the individual firms.

6. Conclusions

We present 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. Our analysis is based on 2,503 earnings announcements for 387 non-U.S. companies from over 40 emerging and developed countries that listed shares in the U.S., and a benchmark sample of 43,634 earnings announcements from 7,002 firms that never listed overseas. These findings are surprising, given that the increased disclosure standards and requirements these firms face by listing in the U.S. create a richer information environment with higher quality (more precise) prior information, lower information acquisition costs, and possibly lower disagreement or information asymmetry among investors. We show further that the increase in absolute abnormal returns is concentrated among those firms from more developed environments and those firms that pursue U.S. listings by means of Rule 144a private placements and OTC listings, which require only incremental disclosure relative to their home markets.

The results are robust to a number of specifications. First, we control for accounting-related variables such as the absolute earnings surprise (using earnings forecasts by analysts) and the increase in the number of analysts following the stocks. We also cumulate absolute abnormal returns over different window lengths around the earnings announcements. Third, we control for potential endogeneity effects in the sample of cross-listing firms by modeling

for selection bias relative to firms that never cross-listed shares in the U.S. The results indicate that our findings above are not an artifact of U.S. listings or earnings announcements in a particular year or of firms from a particular region or industry.

We evaluate two specific alternative interpretations that receive limited empirical support. One possibility is that listing in the U.S. significantly alters the composition of the ownership mix among institutional versus individual and local versus foreign investors, creating substantially greater variation in the precision of prior private information around the earnings announcement. To test this alternative hypothesis, we collect data on U.S. institutional holdings and U.S.-based trading activity in these firms around the cross-listings and find no evidence that those firms that attracted a larger U.S. investor following experienced different changes in the capital market reactions to their earnings announcements after the U.S. listing. Another possibility is that the increased volatility reactions to earnings announcements after a U.S. listing may arise because of the increased liquidity in the stock's trading environment rather than any consequence of increased disclosure requirements. We construct measures of illiquidity in the pre- and post-listing environment of these firms around their earnings announcements and find some evidence to support this alternative. However, it is the case that more liquid firms experience increased volatility reactions to earnings upon listing in the U.S. This finding is contrary to our expectation, as these more liquid firms are more likely to come from developed markets with better accounting standards and better functioning capital markets in the first place.

To lend some additional credence to the central hypothesis that increased disclosure is associated with these changes in capital market reactions to earnings news around U.S. cross-listings, we obtain additional firm-level disclosure data from Standard and Poor's Transparency and Disclosure Rankings, a survey of governance and disclosure practices that encompasses a subset of our cross-listing firms. Our results, while weak due to the limited power of the reduced sample size, are consistent with the hypothesis that increased disclosure activity, which likely stems from actions taken by individual firms in the post-listing environment, are positively associated with even greater volatility reactions to earnings announcements.

We recognize that these interpretations, though supported by our findings, are largely conjectures at this point. Part of the problem is that researchers are still unable to determine clearly the motivations for pursuing international cross-listings in the first place. New hypotheses focus, for example, on the presence of large, dominant controlling shareholders (Doidge et al., 2005) and on geographic, economic, cultural, and industrial proximity as dominant factors in the choice of overseas listing venue (Pagano et al., 2002; Sarkissian and Schill, 2004). Increased uncertainty over expanding into new geographic markets or over the actions of controlling shareholders of newly cross-listed stocks may explain our increased volatility reactions to earnings news. We invite continued development of alternative explanations and further empirical investigations of this puzzle.

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