



Contents lists available at ScienceDirect

## Journal of Financial Economics

journal homepage: [www.elsevier.com/locate/jfec](http://www.elsevier.com/locate/jfec)

# Has New York become less competitive than London in global markets? Evaluating foreign listing choices over time <sup>☆</sup>

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## ARTICLE INFO

### Article history:

Received 18 July 2007

Received in revised form

8 November 2007

Accepted 28 February 2008

Available online 10 December 2008

### JEL classifications:

F30

G15

G32

G38

### Keywords:

International cross-listings

Sarbanes-Oxley Act

## ABSTRACT

We study the determinants and consequences of cross-listings on the New York and London stock exchanges from 1990 to 2005. This investigation enables us to evaluate the relative benefits of New York and London exchange listings and to assess whether these relative benefits have changed over time, perhaps as a result of the passage of the Sarbanes-Oxley Act in 2002. We find that cross-listings have been falling on US exchanges as well as on the Main Market in London. This decline in cross-listings is explained by changes in firm characteristics instead of by changes in the benefits of cross-listing. We show that after controlling for firm characteristics there is no deficit in cross-listing counts on US exchanges related to SOX. Investigating the valuation differential between listed and non-listed firms (the cross-listing premium) from 1990 to 2005, we find that there is a significant premium for US exchange listings every year, that the premium has not fallen significantly in recent years, and that it persists when allowing for time-invariant unobservable firm characteristics. In contrast, no premium exists for listings on London's Main Market in any year. Firms increase their capital-raising activities at home and abroad following a cross-listing on a major US exchange but not following a cross-listing in London. Our evidence is consistent with the theory that an exchange listing in New York has unique governance benefits for foreign firms.

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## 1. Introduction

In 1998 the major New York exchanges, the New York Stock Exchange (NYSE), the American Stock Exchange

(Amex), and Nasdaq, collectively attracted 30% of all the foreign listings in the world; the London Stock Exchange's (LSE) Main Market and Alternative Investment Market (AIM) had 16%; and no other exchange had more

<sup>☆</sup> We are grateful to Rose Liao, Alvaro Taboada, Jérôme Taillard, and Peter Wong for research assistance. Kee-Hong Bae, Paul Bennett, Jack Coffee, Eli Fich, Jesse Fried, Michael Halling, Roger Loh, Carrie Pan, Sergei Sarkissian, Paola Sapienza, Geoff Smith, Christof Stahel, Ralph Walkling, Adam Yore, Josef Zechner, Luigi Zingales, and an anonymous referee provided useful comments, as did seminar participants at Cornell University, Drexel University, Instituto Superior de Ciências do Trabalho e da Empresa (Lisbon), New York Stock Exchange, New York University, Ohio State University, Queen's University, Securities and Exchange Commission, Universidade Católica Portuguesa, University of Michigan, University of Texas, University of Utah, National Bureau of Economic Research Summer Institute, University of North Carolina's Global Issues in Accounting Conference, and the Canadian Corporate Governance Institute Conference. We also thank Herman Raspé (Patterson, Bellknap, Webb, & Tyler), Mike Chafkin (Citibank), Matthew Leighton (London Stock Exchange), Dori Flanagan (Bank of New York), Jeff Singer and Chris Spille (Nasdaq), and Paul Bennett and Jean Tobin (New York Stock Exchange) for their help with data and background information on listings. Craig Doidge thanks the Social Sciences and Humanities Research Council of Canada for financial support.

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than 7%.<sup>1</sup> In 1998 New York's share of cross-listings exceeded London's share by 74%. By 2005, London's share of cross-listings increased so that New York's share exceeded London's share by only 59%.<sup>2</sup> It is now almost conventional wisdom in policy circles and in the financial press that London has become more competitive in attracting foreign listings than New York.<sup>3</sup> In this paper, we investigate how and why the flow of listings on the New York and London stock exchanges has evolved as it has and whether one should infer from this evolution that foreign corporations now find a New York exchange listing less attractive compared with a London listing.

A popular explanation for the decrease in foreign listings on the exchanges in New York is that the passage of the Sarbanes-Oxley Act (SOX) in 2002 has made US listings significantly less attractive to foreign companies—so much so, it is argued, that many listed firms would delist and deregister if it were easy to do so (see, among others, Berger, Li, and Wong, 2005; Chaplinsky and Ramchand, 2008; Hostak, Lys, Karaoglu, and Yang, 2007; Li, 2006; Litvak, 2007a, b; Marosi and Massoud, 2008; Piotroski and Srinivasan, 2008; Smith, 2007; Witmer, 2006; Woo, 2006; Zingales, 2007). The argument is that SOX makes a US listing less advantageous because it imposes severe costs on companies and their managers, especially through the compliance requirements of Section 404, which aims to reduce the market impact of accounting errors from fraud, inadvertent misstatements, or omissions, by assuring effective management controls over reporting.

A number of observers have taken the view that evidence of a decrease in the flow of new listings in New York and an increase in the flow of new listings in London is, in and of itself, proof that New York has become less attractive. A listing has both costs and benefits. If all firms for which it is advantageous to list in New York are already listed there and nothing else changes, we would not expect new listings in New York. In this case, this dearth of new listings in New York would not be evidence that New York has become less competitive. It would just imply that all firms that can benefit from a New York listing already have one. For the purpose of our analysis, we regard New York as having become less competitive if it no longer attracts listings it would have attracted in the past, say, for example,

during the 1990s. Admittedly, such a definition is restrictive. Moreover, our approach says nothing about whether the major exchanges in New York have pursued appropriate strategies to attract cross-listings. In our analysis, then, New York has not lost its competitive position if we are unable to reject the hypothesis that the New York exchanges have been able to compete for cross-listings just as effectively in recent years as during the 1990s.

A London listing is not the same as a New York listing; each listing location offers a unique bundle of attributes. For a firm to choose to cross-list when it was not cross-listed before, the attractiveness of a listing must have changed. The attractiveness of a listing to a firm can change because the bundle of attributes of the listing location has changed or because the firm itself changed so that a different bundle of attributes has become more attractive. Consequently, London listings could have become more attractive even if the bundle of attributes of a listing in New York did not change. After all, changes in firm characteristics could have rendered London listings more valuable for firms that did not yet have a listing. To use an analogy, an increase in Nice's market share of the tourism market compared with St. Moritz's does not necessarily mean that St. Moritz has become less competitive. It could just mean that the season has changed. Similarly, it could be that the firms that did not list in the US in the 1990s have characteristics that now make a London listing advantageous compared with a US listing. Such an outcome could be possible even if the New York exchanges are as competitive as ever compared with London in attracting listings from the types of firms that found these listings valuable in the 1990s.

As reviewed in Karolyi (2006), a foreign listing has many benefits. In particular, through cross-listing, firms can access new investors, have their stock traded on a more efficient market, overcome barriers to international investment, and so on. However, much of the recent literature on cross-listings has emphasized the governance benefit of cross-listing on a major US exchange. This governance benefit is the gain made by the shareholders of the cross-listing firm because they gain access to better investor protection when their firm lists on a US exchange as, by doing so, their firm opts into the US investor protection regime, which includes securities laws and regulations, regulatory oversight and enforcement by the Securities and Exchange Commission (SEC), and monitoring by gatekeepers such as analysts and institutional investors. We focus on this benefit because it crucially distinguishes among different types of listings and because the benefit of listing that most financial economists focused on in the past, namely, overcoming barriers to international investments, is losing its relevance in an increasingly global financial marketplace.<sup>4</sup>

<sup>1</sup> Technically, the listings of foreign firms are cross-listings of their existing shares in home markets. It has become common to refer to listings by foreign firms as foreign listings. In this paper, we use the term "foreign listing" to denote a cross-listing of the home-market shares of a firm in a market abroad.

<sup>2</sup> Using market capitalizations of cross-listed firms instead of the number of cross-listed firms is problematic because we do not have the market capitalization of all cross-listed firms. However, for the firms for which data are available from our primary datasource, Thomson Financial's Worldscope, the market capitalization of cross-listed firms in New York corresponds to 177% of the market capitalization of cross-listed firms in London in 1998. It rises to 316% in 2005.

<sup>3</sup> See, for example, the Interim Report of the Committee on Capital Market Regulation (November 30, 2006) and several related news reports, such as "London Calling," *Forbes* (May 8, 2006); "Wall Street: What Went Wrong?" *The Economist* (November 25, 2006); "Is a US Listing Worth the Effort?" *Wall Street Journal* (November 28, 2006); "Is Wall Street Losing its Competitive Edge?" *Wall Street Journal* (December 2, 2006); and "In Call to Deregulate Dusiness, A Global Twist" *Wall Street Journal* (January 26, 2007).

<sup>4</sup> The bonding hypothesis, originally proposed by Coffee (1999) and Stulz (1999), predicts that after listing on a US stock exchange foreign firms become subject to more stringent investor protections and insiders find expropriating from minority shareholders more difficult. Benos and Weisbach (2004) and Karolyi (2006) provide comprehensive surveys of the cross-listing literature and, in particular, of the emergence of corporate governance explanations of the cross-listing phenomenon.

The typical foreign firm has a controlling shareholder (La Porta, Lopez-de-Silanes, and Shleifer, 1999) and comes from a country where controlling shareholders have more of an opportunity to make themselves better off at the expense of minority shareholders compared with the US. Because a firm that cross-lists on a US exchange subjects itself to the US investor protection regime and because it thereby reduces the controlling shareholder's ability to extract private benefits from the corporation at the expense of minority shareholders, it commits itself to better governance, which benefits its minority shareholders (see, e.g., Doidge, 2004, for empirical evidence). Some controlling shareholders are willing to bear the cost of better governance because it enables them to raise capital on better terms to fund their firm's growth opportunities. Consequently, controlling shareholders trade off the cost of cross-listing, defined by the improved investor protection that reduces their private benefits, against the benefit of cross-listing, captured by their ability to fund growth opportunities on better terms. Only firms for which the benefits exceed the costs choose to list in the US. As a result, US cross-listed firms are worth more because they have better growth opportunities and better governance. We use the short-hand of cross-listing premium to denote the greater value of US cross-listed firms (Doidge, Karolyi, and Stulz, 2004). Many firms choose not to list in the US as long as by not doing so their controlling shareholders have more freedom to run their corporations to benefit themselves at the expense of minority shareholders.

If the costs for the controlling shareholder of a US exchange cross-listing rise or if the benefits fall, new listings will be fewer and the value of firms with listings will fall relative to the value of firms without listings. We show first that the exchanges in London have gained relative to the US exchanges only because of the spectacular growth of AIM, an exchange started in 1995 to accommodate smaller firms. Though the success of AIM is impressive, the typical firm that lists on AIM is a small firm that would not have been eligible to list on a US exchange, either in the 1990s or in more recent years. Consequently, AIM does not directly compete with US exchanges, so it is incorrect to interpret the success of AIM and the resulting growth in market share of London as evidence of a decline in the attractiveness of US exchanges.

To investigate whether US exchanges could have become less attractive because they no longer attract new listings that they would have attracted in the 1990s, we examine whether a firm with given characteristics is less likely to list on an exchange in New York now than in the 1990s. We find little evidence to support such a conclusion. In particular, firm attributes affect the listing decision similarly in the period before SOX as they do after SOX. Further, the number of listed firms and of new listings in the US is larger than what we would expect based on how firms made the choice to cross-list before SOX. In fact, the number of listed firms and of new listings on the Main Market in the UK declines over this period.

If New York has become less attractive, we would expect the cross-listing premium to decrease, everything

else remaining constant. We first show that this premium is significantly positive every year. Next, we test and confirm that no evidence exists that the listing premium in New York decreased relative to the listing premium in London. We show that there is no listing premium in London over the 1990–2005 period. Consequently, firms that list in London do so for reasons other than for a governance benefit. Our conclusions on the listing premium hold using several different estimation approaches, including an approach that allows for unobservable time-invariant firm characteristics to influence the valuation of firms. Thus, the listing premium does not inadvertently proxy for such characteristics.

It is surprising that we find no evidence of a cross-listing premium in London, but it turns out that this result is fully consistent with our evidence on the actions of firms following a listing. Earlier work by Reese and Weisbach (2002) shows that, following a US cross-listing, firms raise more funds, both in their home market and abroad, than firms without such a listing because investors believe that they are better protected when investing in such firms. We build on the work of these authors by investigating the security-issuance behavior of firms cross-listed in New York compared with firms cross-listed in London. We provide evidence that firms listed in New York raise more funds after the listing (including in the home, US, and other markets) than firms that list in London, so that more evidence emerges of a benefit of listing for firms that list in New York than for firms that list in London.

The paper proceeds as follows. We describe our data in Section 2 and show how the number of listings evolves over time across types of listings in New York and London. We compare the characteristics of new cross-listings in New York and London in Section 3. We then examine in Section 4 the determinants of the listing decision in New York and London and investigate whether fewer New York listings were made in recent years than we would expect given how firms handled their listing decision in the 1990s. In Section 5, we report evidence on the listing premium over time across types of listings. In Section 6, we show the capital raising activities of firms before and after listings in New York and London. We conclude in Section 7.

## 2. The evolution of cross-listings in New York and London over time

The World Federation of Stock Exchanges (WFE) publishes data on cross-listings reported by member exchanges (the data are for companies and exclude investment funds and unit trusts). These data provide an official perspective on the role of the New York and London exchanges in the world of cross-listings and how the relative importance of New York and London has changed. We use these data for 1998 and for 2005, the last year of our sample. The New York and London exchanges have attracted the lion's share of foreign listings during the past decade relative to other exchanges. In 1998, London had 487 foreign listings, or 16% of the 2,978

foreign listings around the world, and the cross-listings on the New York exchanges totaled 894, or 30% of the total. The next three largest exchanges in terms of the global market share of foreign listings in 1998 were the Luxembourg exchange (7%), Deutsche Börse (7%), and the Swiss Exchange (6%). By 2005, the London exchanges had increased their global market share to 19%. The New York-based exchanges maintained their share at 30% (884 listings out of the 2,929 globally). Both the Deutsche Börse and the Swiss Exchange lost market share (4%) and, though Euronext (a consolidation of the former Paris, Amsterdam, Brussels, and Lisbon bourses) emerged as the next largest with a 10% global market share, its market share was lower than what it would have been in 1998 (15%). This decline could, however, be overestimated because the sum of foreign listings of the Paris, Brussels, Amsterdam, and Lisbon stock exchanges in 1998 ignores double-counting of cross-listings among the four exchanges, which would not have been included in the 2005 Euronext count.

London has two exchanges: the Main Market and AIM. The evolution of the importance of London relative to New York is dramatically different when AIM is omitted. Without AIM, the New York exchanges had 92% more foreign listings than London in 1998. By 2005, they had 165% more foreign listings. The Main Market in London saw its share of foreign listings fall from 16% in 1998 to 11% in 2005. All of the perception of the growing competitiveness of London is due to the tremendous success of the AIM.

The WFE provides aggregate data only, which precludes us from investigating whether characteristics of listed firms by type of listing changed over time and from evaluating the relative success of New York and London in attracting new listings and retaining existing listings. Before we introduce the database we construct to help us assess the evolution of the competitiveness of New York relative to London, we review the types of listings available in New York and in London and the implications of these types of listings for corporate governance.

### 2.1. Regulatory and listing requirements for foreign listings in New York and London

Foreign firms that list on US exchanges, such as the NYSE and Nasdaq, have to register with the SEC and become subject to US securities laws and face additional requirements if they issue new shares to US investors. These laws not only increase disclosure and financial reporting requirements (e.g., reconciliation of financial accounts with US Generally Accepted Accounting Principles (GAAP) and other disclosures), but also reduce agency costs and restrain controlling shareholders by imposing substantive obligations on them (the regulatory and listing requirements for US listings have been discussed extensively in the literature, e.g., *Coffee, 1999, 2007; Greene, Beller, Rosen, Silverman, Braverman, and Sperber, 2000*). Since 2002, foreign firms listed on US exchanges have been subject to some of the provisions of the Sarbanes-Oxley Act, but they are not subject to

Section 404 during our sample period.<sup>5</sup> In addition to the SEC's requirements, foreign firms have to satisfy the listing requirements and governance standards of the individual exchanges, although the exchanges can waive some of the governance standards on a case-by-case basis. In general, whether they list on the NYSE or Nasdaq, firms are subject to SEC oversight, are exposed to class action lawsuits, and face additional monitoring by market participants, such as analysts and institutional investors. The bottom line is that controlling shareholders of foreign firms that list on a US exchange face more constraints and obligations than controlling shareholders of similar firms that are not listed. Foreign firms can also list in the US via SEC Rule 144a or in the over-the-counter (OTC) market (these listings are omitted from the WFE data because they are not on formal exchanges). These firms are exempt from SEC registration and many disclosure requirements and therefore face few additional obligations when they list.<sup>6</sup>

In London, firms can list on the Main Market as a depositary receipt (DR) or ordinary issue or they can list on the AIM.<sup>7</sup> Firms that list as ordinary issues must be admitted to listing by the UK Listing Authority (UKLA), part of the Financial Services Authority (FSA), and then be admitted to trading by the LSE. Most foreign firms that list as ordinary issues in London seek a secondary listing (the primary listing usually being the home market). In general, the provisions of the UKLA's listing rules that seek to protect minority investors do not apply to foreign firms with a secondary listing (*Coffee, 2007*). For example, the Combined Code on Corporate Governance does not apply to firms with (secondary) foreign listings.<sup>8</sup> The main requirement for firms with ordinary listings on the Main

<sup>5</sup> Registered foreign companies initially were expected to comply with the internal control reporting provisions of Section 404 for fiscal years ending on or after June 15, 2004. On February 24, 2004 the SEC, in recognizing the importance of these provisions and the time needed to implement them properly, extended the compliance starting date to fiscal years ending July 15, 2005. The deadlines were extended a second time on March 2, 2005 and a third time on September 22, 2005 to fiscal years ending July 15, 2007. See SEC Release No. 33-8618 (September 22, 2005) [70 FR 56825] at [www.sec.gov](http://www.sec.gov).

<sup>6</sup> We include in OTC listings both Pink Sheet and OTC Bulletin Board (OTCBB) issues. Prior to April 1, 1998, foreign equities and American Depositary Receipts (ADRs) did not need to be registered with the SEC under Section 12 of the Exchange Act to be quoted on the OTCBB (operated by Nasdaq). After 1998, unregistered securities were no longer eligible for quotation on the OTCBB. Most unregistered foreign issuers were removed from the OTCBB and moved to the National Quotation Bureau's Pink Sheets.

<sup>7</sup> See "Listing in London: Listing Depositary Receipts" (2000, 2003); "Listing in London: Listing Shares" (2000); "How to Join the London Markets" (2001); "London Stock Exchange Admission and Disclosure Standards" (2005); and "Joining AIM: A Professional Handbook" (2005), all published by the LSE. Additional details on the listing and reporting requirements of the UK Listing Authority can be found in the "Index to Listing, Disclosure and Prospectus Rules" (particularly LR 18.1–18.4 and 19.1–19.3) at the UK Financial Services Agency website (<http://fsahandbook.info/FSA/html/handbook/D85>).

<sup>8</sup> The Cadbury Report, published in 1992, included a "Code of Best Practice." In 1998 the Hampel Report led to the publication of the Combined Code of Corporate Governance ("Combined Code"). The code was revised in 2003. The 2003 revision is widely viewed as the UK's response to the corporate scandals that induced SOX and could be considered to be a regulatory cost-increasing change.

Market is to file financial information prepared in accordance with UK or US GAAP or International Accounting Standards (IAS), although exceptions are made to this requirement in some cases. This requirement does not apply to firms that list on the Main Market via DRs, perhaps because most DRs cannot be traded by ordinary retail investors. MacNeil and Lau (2001) conclude that the considerable exceptions from the listing rules made for foreign firms suggests a deliberate policy of competing for foreign listings and that bonding is not the main explanation for London's success in attracting foreign listings.

Listing requirements on AIM are minimal. There are no requirements for prior trading, prior shareholder approval for transactions, admission documents to be pre-vetted by the exchange or by the UKLA, minimum market capitalization, or minimum public float. All that is required for a firm to be admitted to AIM is that it has the support of a nominated advisor ("Nomad") and subsequently the firm's only disclosure obligation is the "general duty of disclosure requiring information which it (the issuer) reasonably considers necessary to enable investors to form a full understanding of the financial position of the applicant."

## 2.2. Data sources on foreign listings in New York and London

To build a data set that contains information on firms' listing decisions, firm characteristics, as well as home country characteristics, our first step is to construct a list of firms that have foreign listings in the US or in the UK for the end of each year from 1990 through 2005. We keep track of US listings on the major exchanges via Level 2 or 3 American Depositary Receipts (ADRs), direct listings, or New York Registered Shares as well as listings by means of a Rule 144a private placement, an OTC issue by means of the Bulletin Board (OTCBB), or Pink Sheets. In the UK, we keep track of listings on the Main Market (ordinary and DR listings) as well as listings on AIM. Information on foreign listings comes from a variety of sources, including the Bank of New York, Citibank, JP Morgan, the NYSE, Nasdaq, the LSE, the OTCBB, end-of-year editions of the National Quotation Bureau's Pink Sheets, the Center for Research in Security Prices (CRSP), firms' annual reports, SEC Form 20-F filings, and Factiva searches. Information from the various data sets is manually cross-checked and verified. The data provided by Citibank and CRSP allows us to keep track of both active and inactive issues for US listings, which mitigates concerns about survivorship bias. However, a limitation of the data provided by the LSE is that the earliest information on Main Market listings we are able to obtain is the list of firms listed as of 1997. As such, we are unable to verify that we have the complete list of UK listings prior to that year. Our list in 1997 and later years is complete, however.

In addition to listing dates, we keep track of changes in firms' foreign listing status, either through upgrades, downgrades, or delistings. If a firm upgrades from a Rule 144a private placement or OTC listing to a US exchange listing, the upgrade is counted as a new US exchange

listing and as a delisting from the Rule 144a or OTC markets. Firms that change their listing location are assigned to a listing type according to their status as of December 31 of the year, regardless of when the change took place during the year. Firms' foreign listings are frequently terminated, and we keep track of the dates on which a firm delists. For firms that delist from a US stock exchange or from an ordinary listing in the UK, we also record the reason for delisting. A delisting is classified as "voluntary" if a firm is in compliance with an exchange's listing standards and voluntarily takes steps to delist its shares or DRs. Firms are also delisted when they are acquired, and these cases are classified as a "merger/acquisition." The final category is "other." This includes cases in which firms are delisted when they fail to meet their exchange's listing requirements, when firms are bankrupt, in financial distress, or are undergoing some kind of restructuring or liquidation.

## 2.3. The time-series of listings: levels and flows

Table 1 provides summary statistics for the total number of cross-listings from 1990 to 2005 in the US and in the UK. The US exchange listing counts are almost identical to those reported in the WFE statistics and the LSE Main Market counts are similar (Rule 144a and OTC counts are not reported by WFE). The number of exchange listings in the US peaks in 2000 at 960. The number of exchange listings increases each year before the peak and falls in all years afterward except 2004. By 2005, the number of listings had fallen by 94 from its peak, standing at 866. The number of OTC listings peaks in 2002 at 993. Though the number of OTC listings increases monotonically from 1990 to 2002, it falls by 98 listings in 2003 and then stays close to that number until 2005. Finally, the number of Rule 144a issues reached its peak of 312 in 2005, but little variation is seen in the number of Rule 144a issues from 1999 to 2005.<sup>9</sup> A steady decline in DR and ordinary listing counts has taken place in the UK since 1997 from a peak of 491 to only 327 in 2005. AIM listings jumped dramatically in 2004 and 2005 to 242 following a slow, steady increase over the 1995–2003 period. So, foreign listing counts have been steadily decreasing on the major exchanges in New York since 2001 and the Main Market in London since 1998. The listing counts on the Rule 144a and OTC markets in the US have held steady and those on AIM in London have been increasing, especially in 2004 and 2005.

<sup>9</sup> Challenges arise in precisely measuring the size of the Rule 144a market. Some data sources, such as Dealogic used in Zingales (2007, Fig. 4), report that the size of the market is much larger than what we report. For example, in 2005, Dealogic lists 186 Rule 144a issuances constituting \$82 billion in new capital raised. Our count is only 25 which represent less than \$10 billion in new capital raised (according to Citibank's Universal Issuance Guide, <http://www.citissb.com/adr/www/brokers/index.htm>). One potential explanation for this discrepancy is that some firms that raise capital in their home markets may apply to the National Association Of Securities Dealers (NASD), which oversees the PORTAL market where Rule 144a issues trade, for the right to a private resale to qualified institutional buyers on PORTAL, but they might not exercise it at the time of the issue. One source might count it as capital raised via this market, another might not.

**Table 1**

Summary statistics for the total number of cross-listings each year.

This table shows the total number of firms cross-listed in either the US or the UK, each year from 1990 to 2005. The table includes all cross-listings in the US and the UK in a given year. Information on cross-listings comes from the Bank of New York, Citibank, JP Morgan, the NYSE, Nasdaq, the London Stock Exchange (LSE), the Over-the-Counter Bulletin Board, the Pink Sheets, Center for Research in Security Prices (CRSP), firms' annual reports, 20-Fs, and Factiva searches. Firms can cross-list in the US via Rule 144a, over-the-counter (OTC) as Bulletin Board or Pink Sheet issues, or on the Amex, Nasdaq, or NYSE. Firms can cross-list in the UK via the Alternative Investment Market (AIM) or on the Main Market via depositary receipts or an ordinary listing.

Year	US cross-listings			UK cross-listings		
	Rule 144a	OTC	Exchange	AIM	Depositary receipts	Ordinary listings
1990	15	139	328	0	3	333
1991	21	180	343	0	3	350
1992	35	226	387	0	3	361
1993	57	281	460	0	3	367
1994	144	380	538	0	9	378
1995	172	449	606	2	27	394
1996	221	510	722	10	52	418
1997	261	570	809	12	76	415
1998	281	632	851	18	98	391
1999	297	730	876	20	111	372
2000	296	764	960	29	122	363
2001	285	938	950	44	117	327
2002	283	993	902	55	115	291
2003	297	895	881	70	110	265
2004	298	901	883	131	108	241
2005	312	909	866	242	111	216

Table 2 presents the flows of new listings and delistings that correspond to the listing counts in Table 1. These data are again reported by year for New York and London and by type of listing. The biggest years on record for new listings on US exchanges were 2000 (164), which coincides with the peak foreign listing count, as well as 1996 and 1997. The new listings have slowed since 2000. The pace of delistings rose from a level that averaged 25% of new foreign listings to 50% between 1998 and 2000 and, finally, to a level over 100% of new foreign listings after 2001. New foreign listings on the OTC market peaked in 2001 (205 in total) and in only one year (2003) has the pace of OTC foreign delistings exceeded that of new listings. Similarly, in only two years (2001 and 2002) have foreign delistings from the Rule 144a market exceeded those of new listings, but the delisting rate has distinctly risen since 1999. The annual rates of new foreign listings in London on the Main Market have slowed since 1996 for DRs and, since 2000, for ordinary shares. Like the New York exchange listings, the pace of delistings in London has increased since 1999 to the point where the delisting rate exceeds (and often more than doubles) the rate of new listings in each year. The AIM market represents a distinct exception with few delistings relative to the high rate of new listings. During our sample period slightly more than a third of the AIM delistings (six firms out of 15) correspond to firms moving to the Main Market. We found only three Main Market cross-listed firms that moved to AIM.

Though we do not reproduce the results in a table, we examine the distribution of new listings from 1990 to 2005 by country. Canadian and UK firms dominate the new OTC and exchange listings in New York. Together, they comprise 28% and 10% of these listings, respectively.

India, Taiwan, Mexico, and South Korea have the greatest number of listings on the Rule 144a market. For ordinary listings on the LSE's Main Market, Irish firms are well represented (58 firms), as well as those from Canada, Japan, and the United States.<sup>10</sup> As noted by Salva (2003), firms from developed countries are more likely to have an ordinary listing, while firms from emerging markets, such as India, Poland, South Korea, and Taiwan, dominate the DR market. Finally, Australian, Canadian, Irish, and US firms dominate the AIM sample of new listings, constituting together over 61% of the total.

Most delistings on the exchanges in New York and London over the 1990–2005 period are due to either mergers/acquisitions or for other reasons such as distress, restructuring, or failure to comply with the exchange's listing standards.<sup>11</sup> Table 3 presents the annual delisting flows for exchange listings in New York and for ordinary listings in London separately for voluntary, merger/acquisition, and other reasons. Overall, voluntary delistings represented only 13% (95 of 726 total delistings) in New York and 33% (105 of 317 total delistings) in

<sup>10</sup> There are also a substantial number of ordinary listings from tax-haven countries such as Bermuda and the Cayman Islands. The raw data on foreign listings provided by the LSE contain investment funds and trusts, and we include these in our listing counts. These mainly affect the listing counts from tax-haven countries, such as the Cayman Islands, where almost all of the foreign listings are funds or trusts.

<sup>11</sup> The cumulative number of foreign delistings in London and New York over this period far exceeds those on other exchanges around the world, according to the WFE. Between 1995 and 2005, WFE reports that New York (three exchanges, 404 delistings) and London (238) are followed by Luxembourg (204), Euronext and its constituent exchanges (204 delistings), the Swiss Exchanges (138), and Canada's TSX Group (92).

**Table 2**

New cross-listings and delistings: 1990–2005.

This table shows the total number of new cross-listings and delistings, in either the US or the UK, each year from 1990 to 2005. The table includes all cross-listings in the US and the UK in a given year. Information on cross-listings comes from a variety of sources described in Table 1. Firms can cross-list in the US via Rule 144a, over-the-counter (OTC) as Bulletin Board or Pink Sheet issues, or on the Amex, Nasdaq, or NYSE. Firms can cross-list in the UK via the Alternative Investment Market (AIM) or on the Main Market via depositary receipts or an ordinary listing. All delistings are included in the counts, regardless of the reason for delisting. If a firm upgrades from a Rule 144a or OTC listing to a US exchange listing, the upgrade is counted as a new US exchange listing and as a delisting from the Rule 144a or OTC market.

Year	US cross-listings						UK cross-listings					
	Rule 144a		OTC		Exchange		AIM		Depositary receipts		Ordinary listings	
	New listings	Delistings	New listings	Delistings	New listings	Delistings	New listings	Delistings	New listings	Delistings	New listings	Delistings
1990	15	6	40	29	32	9	0	0	0	0	29	0
1991	13	6	47	6	31	17	0	0	0	0	17	0
1992	17	1	47	1	54	10	0	0	0	0	11	0
1993	27	3	63	3	90	17	0	0	0	0	8	2
1994	97	6	107	6	103	26	0	0	6	0	11	0
1995	35	6	79	8	94	29	2	0	18	0	17	1
1996	58	7	79	16	142	25	8	0	25	0	26	2
1997	45	4	97	33	129	41	5	3	24	0	12	18
1998	29	8	76	14	95	55	6	0	22	0	10	34
1999	28	11	122	22	91	65	4	2	14	1	15	39
2000	18	17	52	18	164	81	11	2	13	2	22	32
2001	9	20	205	31	70	81	16	1	3	8	10	51
2002	7	9	70	14	46	94	12	1	3	5	3	40
2003	20	6	69	166	38	58	18	3	1	6	5	37
2004	20	18	46	35	62	52	62	1	3	5	6	33
2005	25	11	45	34	58	66	114	2	11	8	4	28
Total	463	139	1,244	436	1,299	726	258	15	143	35	206	317

**Table 3**

The type and frequency of delistings: 1990–2005.

This table shows the number of delistings from US stock exchanges (Amex, Nasdaq, or the NYSE) and from ordinary listings on the Main Market in the UK over the period from 1990 to 2005. Information on cross-listings comes from a variety of sources described in Table 1. A delisting is classified as voluntary if a firm is in compliance with an exchange's listing standards and voluntarily takes steps to delist its shares or depositary receipts. Firms are also delisted when they are acquired, and these cases are classified as a merger/acquisition. Finally, firms are delisted for other reasons, most often by the exchanges when they fail to meet listing standards, when a firm is bankrupt, in financial distress, or undergoes restructuring. The first number for each category is the number of delistings of that type. The second number is the number of delistings as a percentage of the total number of listings that year.

Year	US exchange delistings						UK ordinary delistings					
	Voluntary		Merger/acquisition		Other		Voluntary		Merger/acquisition		Other	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1990	1	0.30	2	0.61	6	1.83	0	0.00	0	0.00	0	0.00
1991	1	0.29	3	0.87	13	3.79	0	0.00	0	0.00	0	0.00
1992	0	0.00	2	0.52	8	2.07	0	0.00	0	0.00	0	0.00
1993	1	0.22	7	1.52	9	1.96	1	0.27	1	0.27	0	0.00
1994	1	0.19	7	1.30	18	3.35	0	0.00	0	0.00	0	0.00
1995	0	0.00	17	2.81	12	1.98	0	0.00	1	0.24	0	0.00
1996	1	0.14	14	1.94	10	1.39	1	0.21	0	0.00	1	0.21
1997	3	0.37	17	2.10	21	2.60	3	0.61	8	1.63	7	1.43
1998	4	0.47	31	3.64	20	2.35	5	1.02	22	4.50	7	1.43
1999	0	0.00	32	3.65	32	3.65	3	0.62	25	5.18	11	2.28
2000	6	0.63	39	4.06	36	3.75	5	1.03	20	4.12	7	1.44
2001	5	0.53	42	4.42	34	3.58	12	2.70	26	5.86	13	2.93
2002	19	2.11	24	2.66	51	5.65	18	4.43	7	1.72	15	3.69
2003	17	1.93	22	2.50	19	2.16	24	6.40	10	2.67	3	0.80
2004	15	1.70	17	1.93	20	2.27	18	5.16	7	2.01	8	2.29
2005	21	2.42	33	3.81	13	1.50	15	4.59	8	2.45	5	1.53
Total	95		309		322		105		135		77	



Panel B																	
1990–2001																	
US Rule 144a	215	1.37	149	0.10	252	1.22	252	999.4	252	0.22	139	0.47	25	3.0	20.9	4,430	0.56
US OTC	690	1.23	493	0.08	747	1.16	747	341.7	746	0.20	485	0.40	69	4.0	40.0	20,560	0.99
US Exchange	609	1.53	414	0.16	674	1.28	674	729.6	673	0.21	383	0.39	52	4.0	40.0	24,560	1.04
UK AIM	16	2.32	4	-0.04	16	1.15	16	6.39	16	0.04	16	0.45	94	4.0	40.0	20,030	0.81
UK DR	81	1.38	47	0.12	84	1.18	84	1290.0	83	0.17	52	0.55	22	3.0	18.7	4,260	0.32
UK Ordinary	85	1.33	69	0.14	96	1.16	96	701.2	96	0.16	80	0.43	54	4.0	31.2	21,370	0.67
Not listed	123,581	1.11	107,121	0.03	143,111	1.13	142,999	138.72	142,223	0.21	104,875	0.50	40.2	3.5	31.4	20,110	0.67
2002–2005																	
US Rule 144a	51	1.32	44	0.20	51	1.08	51	990.4	51	0.29	46	0.40	33	3.0	20.9	13,736	0.36
US OTC	168	1.42	143	0.06	190	1.16	190	81.25	189	0.15	131	0.46	65	4.0	40.0	24,560	1.04
US Exchange	142	1.77	83	0.11	148	1.25	148	215.4	148	0.08	110	0.34	71	4.0	35.0	20,000	0.77
UK AIM	64	1.94	28	0.17	68	1.52	68	12.16	67	0.00	47	0.32	97	4.0	40.0	25,700	1.20
UK DR	8	1.16	7	0.18	8	1.04	8	2463.4	8	0.27	3	0.43	38	4.0	19.1	1,990	0.55
UK Ordinary	8	2.15	7	0.15	9	1.28	9	689.5	9	0.13	8	0.27	63	4.0	35.7	24,560	0.84
Not listed	70,480	1.08	67,283	0.04	76,864	1.10	76,844	79.49	76,713	0.19	76,713	0.49	59.8	3.5	31.4	24,560	0.80
Rule 144a: pre-/post-SOX		0.51		0.00		0.00		0.74		0.19		0.46	0.23	0.09	0.38	0.82	0.00
OTC: pre-/post-SOX		0.00		0.05		0.64		0.00		0.02		0.04	0.43	0.00	0.07	0.00	0.06
Exchange: pre-/post-SOX		0.17		0.02		0.83		0.00		0.00		0.37	0.00	0.27	0.01	0.00	0.00
AIM: pre-/post-SOX		0.27		0.69		0.00		0.14		0.25		0.33	0.52	0.56	0.31	0.00	0.00
DR: pre-/post-SOX		0.62		0.29		0.01		0.78		0.66		0.74	0.38	0.12	0.94	0.21	0.37
Ordinary: pre-/post-SOX		0.22		0.69		0.24		0.87		0.98		0.27	0.73	0.42	0.03	0.26	0.55
Not listed: pre-/post-SOX		0.00		0.00		0.00		0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00

London.<sup>12</sup> If we include delistings by firms with DRs in London, the count of voluntary delistings in London is even higher. The rise in delisting activity since 2000 has been mostly voluntary in nature.<sup>13</sup> But, a salient fact is that the increase in annual delisting activity in recent years, measured as a fraction of the respective total number of outstanding foreign listings, has been somewhat greater in London than in New York (around 2% per year in New York and around 4% per year in London).

What, then, can we learn from this analysis of listing counts and flows about the competitiveness of New York's markets relative to London? Foreign listings increased sharply in both markets in the 1990s, but, after 2000, the numbers fell on the main exchanges both in London and in New York, as well as on the OTC market in the US. The shift resulted from both a decrease in the number of new listings and an increase in the number of voluntary delistings. Our firm level evidence confirms the results from the WFE data that the New York exchanges gained market share relative to London's Main Market, but that London gained ground relative to New York because of the spectacular growth of AIM. To judge the success of AIM as evidence of a potential decline in US market competitiveness, we need to understand whether the typical firm that lists on AIM has similar characteristics to a firm that would have listed on a US exchange in the 1990s.

### 3. The characteristics of foreign listings in New York and London over time

If New York has become less competitive, some firms that would have listed in New York in the 1990s would not do so today. Consequently, we would expect the characteristics of firms that list to be different in recent years from what they were in the 1990s. Previous research has established that larger, more profitable, and faster-growing firms from countries with better-developed financial and legal institutions and economies are more likely to pursue US listings, in the first place, and to do so on major exchanges instead of OTC or Rule 144a private placements, as predicted by theory (Reese and Weisbach, 2002; Pagano, Roell, and Zechner, 2002; Doidge, Karolyi,

and Stulz, 2004). Less is known about the attributes of firms that pursue UK listings (Baker, Nofsinger, and Weaver, 2002; Salva, 2003). In this section, we investigate whether the characteristics of listing firms have changed over time and how these characteristics differ between firms that list in London versus those that list in New York. We also divide our sample into listings that took place before the end of 2001 and listings that were made after that year. The choice also corresponds roughly to a pre-SOX and a post-SOX period.

Our data source for firm characteristics is Thomson Financial's Worldscope database. Worldscope covers companies in more than 50 developed and emerging markets, representing more than 96% of the market value of the world's publicly traded companies. Although the Worldscope database provides the broadest available coverage of international companies, not all firms in our lists are covered by Worldscope and many of the smaller countries for which we have information on listings (e.g., the Bahamas, Bahrain, Barbados, among others) are not covered at all. Following the literature, we use Tobin's  $q$  as our valuation measure and compute it as follows. For the numerator, we take the book value of total assets, subtract the book value of equity, and add the market value of equity. For the denominator, we use the book value of total assets. All variables are in local currency, although it makes no difference if we use local currency or US dollars because the numerator and denominator are denominated in the same currency. Sales growth is measured as a two-year geometric average of annual inflation-adjusted growth in sales and is winsorized at the first and 99th percentiles to reduce the impact of outliers (inflation is based on the change in the consumer price index (CPI) for each country as reported by the International Monetary Fund). Global industry  $q$  is the median Tobin's  $q$  of the global industry to which a firm belongs and is calculated annually for each industry. Total assets (in millions of US dollars) is adjusted for CPI inflation where 1990 is the base year. Leverage is total debt divided by total assets and ownership is the data item "closely-held shares" from Worldscope. We also use as country variables the anti-director rights variable from Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008), legal origin and rule of law from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) and Pistor, Raiser, and Gelfer (2000), and stock market capitalization divided by gross domestic product (GDP) and gross national product (GNP) per capita from the World Bank World Development Indicators (WDI) Database.

Panel A of Table 4 reports summary statistics on each of these characteristics for listed firms by type of listing in New York and London in the listing year and for non-listed firms over the full period using the entire sample of new cross-listings by non-US firms that are in the Worldscope database. In the listing year, the foreign firms attracted to the exchanges in New York and London are large (median total assets between \$600 million and \$700 million for US exchange-listed firms and for London ordinaries), are fast growing with trailing two-year annualized sales growth figures in excess of 14%, are moderately leveraged (less than 20% of debt to total assets), and have somewhat

<sup>12</sup> Classifying voluntary and involuntary delistings is complex. For example, our count of 95 voluntary delistings from US exchanges risks overstating the number of true voluntary delisting firms. Many delisting firms are often close to financial distress so that what appears to be a firm's choice could, in fact, simply be a preemptive action of an inevitable involuntary delisting by the exchange. We identify 14 (out of 95) cases, in which the delisting is announced as voluntary but coincides with financial difficulties, cost-cutting, or restructuring programs. Chaplinsky and Ramchand (2008) use a conservative classification approach and uncover only 48 voluntary delistings from US exchanges between 1961 and 2004.

<sup>13</sup> We examine delisting reports from Bloomberg, Lexis-Nexis, and other news services to uncover that, of the delistings due to acquisitions, only 12 in the US and 16 in the UK arose from private equity buyouts. We also determine that, of the 72 voluntary delistings in the US since 2002, 21 (29% of total) had some mention about the Sarbanes-Oxley Act or regulatory and compliance costs in the US.

concentrated ownership structures.<sup>14</sup> There are mostly statistically significant and economically large differences in size, sales growth, and leverage between US and UK exchange-listed firms and their counterparts on the Rule 144a/OTC markets in New York and AIM listings (median size of only \$11.5 million, sales growth of 10%, and median leverage of 0%). Only 11% of the firms listed on Amex, 5.5% of firms listed on Nasdaq, and none of the firms listed on the NYSE had total assets less than the median total assets of firms listing on AIM.

The small size of the typical firm listed on AIM raises the question of whether firms that list on AIM are firms that could have listed on Nasdaq. Officials from the LSE note that most firms that list on AIM are different from those that list on Nasdaq.<sup>15</sup> To examine this issue in more detail, we determine how many firms in our sample of 258 AIM listings would meet the listing standards of Nasdaq (either their Global Market or Capital Market as of May 2007). Thirty firms are from the US and eight of these are in Worldscope (at the time we constructed our database). Of the remaining non-US firms, only 80 have data in Worldscope, even though the database covers 33,300 currently active and 20,000 inactive companies as of March 2007. We do not have data to examine whether a firm satisfies all of Nasdaq's listing criteria, but we find that 21 of the 80 non-US firms and only one of eight US firms, or about 25% of the firms for which we have data, meet the criteria that we can check (Piotroski and Srinivasan, 2008, use a different data set and find a higher fraction). It is therefore not the case that AIM is a close substitute for Nasdaq or that listings on AIM take listings away from Nasdaq. A fortiori, AIM does not compete with the NYSE.<sup>16</sup>

The firms that are attracted to the US Rule 144a market and the LSE DR market are larger firms than those that cross-list on US exchanges or as ordinaries in the UK, have notably higher fractions of closely held shares, and are also more likely to come from less-developed countries with lower GNP per capita, lower market capitalization-to-GDP ratios, and lower scores on legal protections of minority shareholders. Statistically significant differences in Tobin's  $q$  valuation ratios exist not only between US exchange listings and Rule 144a/OTC firms (median ratios of 1.56 versus 1.35), but also between AIM firms and London's Main Market listings (median of 2.01 versus 1.35 for DRs and ordinary shares). A striking result is that AIM

firms have extremely large  $q$  ratios in the listing year, compared with those that choose any other way to cross-list. However, these are small firms concentrated in a few high  $q$  industries. Finally, in the listing year, the valuation of London-listed firms is indistinguishable from the valuation of US exchange listed firms.

This panel also shows that non-listed firms are different from US exchange-listed firms. Not surprisingly, the number of non-listed firms (firm-year counts) is extremely large compared with the total number of newly listed firms. The median total assets of non-listed firms correspond to less than 20% of the median total assets of US exchange-listed firms. The median total assets of non-listed firms are much smaller than the median total assets for all firms with a listing except relative to AIM firms, which are one-tenth of the median total assets of non-listed firms. Non-listed firms have low sales growth, low Tobin's  $q$  ratios, and high insider ownership compared with US exchange-listed firms or even compared with other listed firms.

The differences in listing year firm characteristics between the pre-SOX 1990–2001 and post-SOX 2002–2005 periods are neither statistically nor economically large. Panel B of Table 4 shows negligible differences in total assets (in constant 1990 dollars), leverage, ownership, sales growth, and even Tobin's  $q$  ratios across the two subperiods. There are exceptions in the US markets: Foreign firms listing on the OTC market and on the major exchanges are smaller, have slightly lower sales growth, and have less leverage in the post-SOX period. Also, some evidence exists that foreign firms on AIM were drawn from industries with higher median Tobin's  $q$  ratios and from countries with better economic and financial development (GNP per capita and market capitalization/GDP ratios) after SOX. One has to be cautious about interpreting changes across subperiods for AIM, however, as there are so few listings before 2002.

While the characteristics of newly listed firms on US exchanges do not appear to change much from before to after SOX, the characteristics of non-listed firms change significantly. In particular, the typical non-listed firm has much smaller size in total assets and its Tobin's  $q$  ratio falls. Though sales growth increases for non-listed firms, it is still very small compared with the sales growth of listed firms. As non-listed firms change, it is not surprising that their appetite for listings might change also.<sup>17</sup>

Our evidence on firm characteristics across listing types and across pre- and post-SOX periods reveals that the firms that are attracted to the major exchanges in New York and London are not very different; the firms that are attracted to the Rule 144a/OTC markets in New York and AIM in London, however, are different from those that pursue exchange listings; and little about these

<sup>14</sup> Doidge, Karolyi, Lins, Miller, and Stulz (2009) show that more shares are held by controlling shareholders in firms that are not cross-listed than in firms that are cross-listed. The data used in their study employs ownership by controlling shareholders, so it is not directly comparable to the closely held blocks of shares data we use.

<sup>15</sup> For example, Anne Moulrier, a business development manager at the LSE, notes in the Winter 2006 issue of *Equities Magazine* that "It [comparing Nasdaq companies and AIM companies] is not comparing eggs with eggs. Companies joining the AIM are far more junior, far more early stage, than most of the companies on Nasdaq" (p. 81).

<sup>16</sup> Further evidence that AIM does not compete with Nasdaq or the NYSE is that, of the 95 voluntary US foreign delistings, only three of them listed subsequently on AIM and all three were UK firms. By contrast, we found that five of the 105 UK voluntary delistings subsequently listed on AIM. Of those five firms, three appear to have established AIM listings two years before the official delistings from the LSE Main Market.

<sup>17</sup> In addition to the possibility of changes in the characteristics of non-listed firms, it is also interesting to note that the number of non-listed firms (that is, those that are listed only domestically) is declining recently. According to the WFE, the number of domestically listed companies in 69 major stock markets around the world increases from around 26,000 stocks in 1995 to a peak of almost 40,000 stocks in 2002 and falls to 37,000 in 2005.

characteristics changes between the pre- and post-2001 periods, especially in the UK. However, the characteristics of non-listed firms have changed.

#### 4. The determinants of listing choices

If the rising-then-falling pattern of foreign listings on US exchanges is explained by a decrease in the competitiveness of these exchanges, we would expect that firms make their listing decisions differently from before. That is, a firm with characteristics that made it likely to list in the past would be less likely to list now. In this section, we first examine the determinants of firms' decisions to cross-list in the US or UK using a competing-risks hazard model. Specifically, we estimate a model that simultaneously considers the determinants of listings in both the US and the UK. This allows us to test whether the factors that affect these listing choices differ. This first step helps us to understand which characteristics influence the different types of foreign listing outcomes in the US and UK markets during the overall 1990–2005 period. Next, to evaluate the decline in the competitiveness of US markets, we examine whether the propensity of firms with given characteristics to list in the US and UK changed after 2001.

In the following empirical work, we use a subset of the firms for which we present data in Table 4. We choose a subset of firms that are reasonably comparable across countries. The subset of firms we use consists of non-financial, non-US, non-UK firms with total assets of at least \$100 million (in 1990 dollars) that are in the Worldscope database with available data on firm characteristics in a given year (we also tried using a size cutoff of \$10 million and find that our results are similar; this is true for all subsequent tables as well). We also exclude firms from tax havens because, though they are foreign-domiciled firms, they typically have their primary listing in New York or London instead of a secondary cross-listing and are foreign firms only for tax purposes. The results of Section 3 hold for this restricted sample.

##### 4.1. Competing risks models for New York and London listings

The competing risks model we estimate extends the standard Cox (1972) proportional hazard model developed for single-event data to multiple-event data. Although previous papers have estimated single-event Cox models to investigate the factors that affect firms' foreign listing decisions, they do not distinguish among different types of listings (Pagano, Roell, and Zechner, 2002; Doidge, Karolyi, Lins, Miller, and Stulz, 2009). Pagano, Roell, and Zechner (2002) model separately the probability of a European firm cross-listing in another European country or one of the US exchanges or both in a year  $t$ , given that the firm has not yet listed. Other listing choices are not considered, and, after a firm lists abroad on one market or another, it is excluded from the model estimation because it is no longer at risk of listing. With a competing risks model where listing choices include both the US and the UK, a firm that lists in the US is no longer at risk of listing

in the US, but it is still at risk of listing in the UK. Similarly, a firm that lists in the UK would continue to be at risk of listing in the US.

The case we analyze is sometimes referred to as "unordered failure events of different types" and the model we estimate is referred to as a stratified proportional hazard model. In our application, there are two possible failure events, cross-listing in the US or in the UK, and the listings can occur in either order. The model allows both the baseline hazard and the parameter estimates to differ for US and UK listings. To estimate the model, we follow the procedure outlined in Cleves (1999) and Lunn and McNeil (1995). Lunn and McNeil show that, by augmenting the data using a duplication method, Cox models can be adapted to take account of multiple failure types. In our case, two failure types are given by  $\delta$  equal to zero or one. The first failure type is listing in the US ( $\delta = 0$ ) and the second is listing in the UK ( $\delta = 1$ ). Because there are two failure types, each firm-year observation in the data set should be duplicated once. For each pair of observations, the first observation is associated with US listings and the second observation is associated with UK listings. Each year, each firm is at risk for both types of listings. However, if a firm lists in the US (UK) it is no longer at risk for a US (UK) listing and future observations associated with US (UK) listings are removed from the data set. However, the firm is still at risk for a UK (US) listing, so those observations remain in the data set. If the firm later lists in the UK (US), then any future observations for that firm would be removed from the data set. While estimating this model is equivalent to estimating proportional hazard models separately for each listing type (treating the other listing type as censored data), this approach allows us to test whether the estimated parameters for each listing type are different.

In this event-time experiment, we consider firms over the period from 1991 to 2005. The firm-level and country-level explanatory variables we use are given in Table 4, although we lag all variables by one year because we are trying to explain why a firm with specific characteristics at the end of one year chooses to list during the following year. Because variables are lagged by one year, we cannot use new listings in 1990. We also remove from the sample firms that have a US and a UK listing prior to 1991. We report the coefficients in exponentiated form. The advantage of exponentiated coefficients is that they can be interpreted as the effect of a unit change in the explanatory variable on the baseline hazard. For example, an exponentiated coefficient of 1.2 (0.8) implies that a one unit increase (decrease) in the explanatory variable increases (decreases) the probability of cross-listing by 20% relative to the baseline hazard. The standard errors are adjusted for firm-level clustering, so that we assume errors are independent across firms, but not across time.

The first two models reported in Table 5 include all types of listings in the US and UK and provide a broad comparison of firms that choose to list in each market. The next two models focus only on exchange listings in the US and ordinary listings in the UK. We focus on ordinary listings in the UK as they are the most comparable type of

**Table 5**

Competing risks models of the determinants of the listing decision.

The Cox proportional hazard models estimate the probability of listing in the US or in the UK in year  $t$ , given that the firm does not yet have a listing of that type, over the period from 1991 to 2005. The sample includes all non-financial, non-US, non-UK firms that are in the Worldscope database and have total assets of at least \$100 million (in 1990 dollars) in a given year. Firms from Bermuda and the Cayman Islands are excluded. Information on cross-listings comes from a variety of sources described in Table 1. Models 1 and 2 include all types of listings in New York and London, while Models 3 and 4 include only exchange listings in New York and ordinary listings in London. Sales growth is inflation-adjusted two-year sales growth (winsorized at 1% and 99% tails); global industry  $q$  is the median global industry Tobin's  $q$ ; total assets is in millions of dollars adjusted for inflation; leverage is defined as total debt divided by total assets; and ownership is the data item closely-held shares from Worldscope. Legal is anti-director  $\times$  rule of law, from Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008) and La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). Log of gross national product (GNP) per capita (dollars) and stock market capitalization to gross domestic product (GDP) are from the World Bank WDI Database. All independent variables are lagged by one year. The hazard ratios for US exchange listings and UK ordinary listings are estimated jointly but are allowed to vary across outcomes and the baseline hazard for each listing choice is assumed to be different. The model does not estimate a constant. The table reports hazard ratios (i.e.,  $\exp(\beta_x)$ , not  $\beta_x$ ). The  $t$ -statistics test the null hypothesis that the hazard ratio is equal to one. The  $t$ -statistics are adjusted for clustering on firms. They are computed assuming observations are independent across firms, but not across time. The column "Test" tests whether the hazard ratios for US listings are different from UK listings. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	All listing types in the US and UK						US exchange listings and UK ordinary listings					
	(1)			(2)			(3)			(4)		
	US hazard ratios	UK hazard ratios	Test	US hazard ratios	UK hazard ratios	Test	US hazard ratios	UK hazard ratios	Test	US hazard ratios	UK hazard ratios	Test
Sales growth	1.09 (7.11)***	1.08 (2.46)**	0.27	1.11 (5.77)***	0.59 (-0.53)	0.40	1.11 (7.18)***	1.09 (2.58)**	0.09	1.12 (4.85)***	0.78 (-0.34)	0.25
Global industry $q$	4.56 (11.50)***	5.57 (4.18)***	0.23	4.22 (9.14)***	5.63 (3.65)***	0.36	7.64 (11.7)***	6.05 (3.86)***	0.20	8.65 (11.9)***	4.63 (2.51)**	1.01
Log (Assets)	1.88 (18.90)***	1.64 (4.56)***	1.49	1.91 (16.8)***	1.68 (4.12)***	0.94	2.04 (15.00)***	1.87 (4.87)***	0.35	2.12 (12.9)***	1.85 (4.75)***	0.96
Leverage	0.46 (-3.36)***	1.00 (0.00)	0.82	0.32 (-4.23)***	1.32 (0.27)	1.88	0.38 (-2.90)***	0.94 (-0.05)	0.59	0.15 (-4.65)***	1.29 (0.19)	2.40
Ownership				0.35 (-4.38)***	0.68 (-0.53)	0.76				0.20 (-4.07)***	1.12 (0.17)	4.70**
Legal	4.23 (11.2)***	2.57 (2.09)**	1.16	4.49 (9.98)***	3.32 (2.35)***	0.34	5.51 (8.21)***	2.04 (1.18)	2.26	5.45 (6.64)***	2.98 (1.68)*	0.77
Log (GNP)	0.84 (-3.93)***	0.91 (-0.64)	0.21	0.84 (-3.21)***	0.92 (-0.46)	0.26	1.04 (0.59)	0.93 (-0.36)	0.41	1.04 (0.45)	0.85 (-0.74)	0.73
Stock market cap/GDP	0.73 (-3.34)***	0.65 (-1.40)	0.14	0.74 (-2.99)***	0.59 (-1.37)	0.30	0.56 (-2.99)***	1.02 (0.07)	2.96*	0.51 (-2.41)**	0.86 (-0.43)	1.33
Number of failures	573	39		425	30		266	24		183	20	
Number of observations		145,061			118,109			136,059			110,583	
Log likelihood		-6050.18			-4367.82			-2731.71			-1849.64	
$\chi^2$		760.71			593.13			615.48			483.49	
Prob > $\chi^2$		0.0000			0.0000			0.0000			0.0000	

listing in London to exchange listings in New York. This choice should make it more difficult to find differences between New York and London listings, because the majority of firms that list as ordinaries in London are from developed markets. Requiring data on lagged ownership imposes a tight constraint on the data set, which is why we report results without the ownership variable in Models 1 and 3 and with it in Models 2 and 4. In Model 1, there are 573 new listings by firms in the US and 39 new listings in the UK that have all the required data available and have total assets of at least \$100 million (in 1990 dollars). In Model 2, there are 425 new listings by firms in the US and 30 new listings in the UK. By focusing only on exchange listings in Models 3 and 4, the number of failure events is approximately halved.

Overall, we find that large firms with positive sales growth in industries with high Tobin's  $q$  ratios and from countries with better legal regimes for minority investors are more likely to cross-list in the US and the UK markets. None of the differences in the exponentiated coefficients between the US and UK listings is statistically significant.

When we replicate the competing risks estimation for exchange listings in New York and ordinary share listings in London, some of the coefficient differences become statistically significant. For example, the positive coefficients on Legal widen further and the negative coefficient on ownership for US listings in Model 4 is significantly different from that for UK listings indicating that it is the major exchanges in New York, not the Rule 144a and OTC listings, that represent the primary deterrent for closely held firms from poorer legal regimes at home. UK ordinary listings do not deter such firms at all. This latter result is consistent with the findings in Doidge, Karolyi, Lins, Miller, and Stulz (2009) and with the idea that US listing choices tend to be significantly associated with a governance benefit. That is, if foreign firms with closely held shares are controlled by a dominant shareholder and if they come from a country where it is easier for the controlling shareholders to expropriate firm assets at the expense of minority shareholders, they are less likely to seek a listing on a US exchange because the additional investor protection granted their minority shareholders

**Table 6**

Logit regressions of the characteristics of exchange-listed firms.

This table analyzes the characteristics of firms that cross-list on a US stock exchange (Amex, Nasdaq, or the NYSE) and on the London Stock Exchange (UK ordinary listings) over the period from 1990 to 2005. The sample includes all non-financial, non-US, non-UK firms that are in the Worldscope database and have total assets of at least \$100 million (in 1990 dollars) in a given year. Firms from Bermuda and the Cayman Islands are excluded. Information on cross-listings comes from a variety of sources described in Table 1. Firms with other types of cross-listings (Rule 144a or over-the-counter (OTC) in the US and Alternative Investment Market or depository receipts in the UK) are excluded. Sales growth is inflation-adjusted two-year sales growth (winsorized at 1% and 99% tails); global industry  $q$  is the median global industry Tobin's  $q$ ; total assets is in millions of dollars, adjusted for inflation; leverage is defined as total debt divided by total assets; and ownership is the data item closely-held shares from Worldscope. Legal is anti-director  $\times$  rule of law, from Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008) and La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). Log of gross national product (GNP) per capita (dollars) and stock market capitalization to gross domestic product (GDP) are from the World Bank WDI Database. A logit regression is estimated over the periods from 1990 to 2001 (pre-Sarbanes-Oxley Act (SOX)) and from 2002 to 2005 (post-SOX). In the columns "Listing stock," the dependent variable equals one if a firm is cross-listed in the US or in the UK, in any year. In the columns "Listing flows", the dependent variable equals one in the year that a firm cross-lists. Results for listing flows are not reported for 2002–2005 for UK ordinary listings (in total, only five new listings). The  $t$ -statistics are adjusted for clustering on firms. They are computed assuming observations are independent across firms, but not across time for each firm. Pseudo- $R^2$  is a goodness-of-fit measure based on the difference between unrestricted and restricted likelihood functions. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. #, ##, and ### indicate statistical significance at the 10%, 5%, and 1% levels, respectively, for a chi-squared test that tests whether the coefficients are equal between the two subperiods and "Chi-squared" indicates the joint test that all coefficients are equal between pre- and post-SOX periods.

	US exchange listings				UK ordinary listings			
	Listing stock		Listing flows		Listing stock		Listing flows	
	1990–2001	2002–2005	1990–2001	2002–2005	1990–2001	2002–2005	1990–2001	2002–2005
Constant	-9.02 -(11.65)***	-11.57 -(17.23)***, ###	-13.47 -(12.32)***	-17.17 -(6.57)***	-8.83 -(8.17)***	-12.50 -(11.14)***, ###	-20.51 -(7.34)***	-
Sales growth	0.93 (7.73)***	-0.42 -(1.93)*, ###	1.32 (7.25)***	1.73 (4.32)***	-0.38 -(1.44)	-1.28 -(2.06)**	0.92 (1.75)*	-
Global industry $q$	1.52 (8.30)***	2.32 (10.11)***, ###	1.97 (7.85)***	3.01 (6.08)***	0.68 (2.34)**	1.26 (3.06)***	1.28 (1.96)**	-
Log (Assets)	0.80 (17.65)***	0.87 (20.48)***, #	0.86 (13.97)***	0.64 (5.32)***, #	0.96 (13.54)***	0.93 (11.71)***	1.12 (7.49)***	-
Leverage	-1.46 -(4.98)***	-1.21 -(3.53)***	-1.82 -(3.94)***	-2.78 -(2.67)***	-3.33 -(7.11)***	-1.21 -(2.17)**, ###	-3.33 -(2.85)***	-
Ownership	-2.35 -(9.45)***	-2.33 -(9.33)***	-1.85 -(4.69)***	-1.55 -(1.99)**	-3.81 -(10.24)***	-3.10 -(7.23)***	-1.03 -(1.52)	-
Legal	0.08 (7.06)***	0.05 (5.15)*, ###	0.05 (3.04)***	0.07 (2.30)**	0.04 (3.04)***	0.03 (2.13)**	-0.07 -(1.86)*	-
Log (GNP)	-0.81 -(13.72)***	-0.63 -(9.69)***, ###	-0.66 -(8.15)***	-0.33 -(1.62)	-0.83 -(9.84)***	-0.54 -(5.05)***, ###	-0.25 -(1.21)	-
Stock market cap/GDP	-0.11 -(1.20)	0.12 (1.61)###	0.05 (0.34)	-0.46 -(1.46)#	0.21 (1.75)*	0.06 (0.34)	0.78 (2.41)**	-
Chi-squared test ( $p$ -value)		154.73 (0.00)		19.27 (0.02)		58.53 (0.00)		
Number of observations	45,176	19,840	43,302	18,256	44,315	18,844	39,220	-
Average Pseudo $R^2$	0.2273	0.2646	0.1910	0.1874	0.2807	0.2474	0.2158	-

makes it harder for them to run the corporations they control for their own private gain.

#### 4.2. Changing firm characteristics and the propensity to list in New York and London

If New York has become less competitive in attracting foreign listings since 2001, perhaps because of the passage of SOX in 2002, the actual number of listing firms would have declined relative to what would have been expected based on how firms made listing choices before 2001. The expected number of listing firms is jointly a function of the propensity to list given certain firm characteristics and the changing characteristics of the eligible set of firms. We estimate separate logistic regressions for the US exchanges and ordinary listings on the UK Main Market for the probability that a firm is listed (listing stock) and the probability that a firm is listed given that it has not yet done so (listing flow). The listing stock regressions are

subject to the criticism that, while firms that cross-list in the US on an exchange can easily delist, they face considerable obstacles in deregistering their shares.<sup>18</sup> The listing flow regressions estimate the probability that a firm will acquire a new listing and are not subject to this concern, but they ignore delistings. We then apply the regression models estimated for the pre-SOX period (1990–2001) to the pool of firms available in Worldscope

<sup>18</sup> Delisting from a US exchange eliminates the obligation to meet the exchange's listing requirements, but it does not eliminate SEC registration requirements. It has been difficult for foreign firms to meet the SEC's deregistration requirements, especially for large firms with broad share ownership in the US. Until recently the rules governing deregistration were more arduous for foreign firms than they were for US firms. See Leuz, Triantis, and Wang (2008) and Chaplinsky and Ramchand (2008) for further details on the specific requirements for delisting and for deregistering. On March 21, 2007, the SEC adopted amendments to the deregistration rules (Rule 12h-6), which eases the process for foreign firms. Doidge, Karolyi, and Stulz (2008) study the impact of this rule change.

in the post-SOX period to estimate the expected fraction of these firms that would have listed had firms made listing decisions post-SOX in the same way that they made these decisions pre-SOX. This approach is similar to that used by Fama and French (2001) to evaluate whether the propensity to pay dividends has declined.

Table 6 shows estimates of logit regressions that show the relation between the probability that a firm is listed or lists and the firm's sales growth, global industry Tobin's  $q$ , size as Log (Assets), leverage, ownership, and the country variables Legal, Log (GNP), and the Stock market cap/GDP ratio. We show estimates of pooled logit regressions with standard errors clustered by firm, although estimates using the approach of Fama and MacBeth (1973) yield similar results.

The slopes from the regressions for the pre-SOX period confirm our inferences about the roles of sales growth, size, and leverage from the competing risks Cox models in Table 5. The coefficients on sales growth are positive for US exchange listings if we estimate the regression for the whole sample period (not reported) as well as for the 1990–2001 period. Surprisingly, the coefficient turns negative in the 2002–2005 period for the listing stock regressions, although it is still positive and significant in the listing flow regressions. The sales growth coefficient is negative for UK ordinary listings for the listing stock regression over the whole period (not reported) and negative but insignificant for the 1990–2001 period. By

contrast, it is positive and significant for the listing flow regression for 1990–2001. Though the coefficients (except for sales growth) differ little economically from the pre-SOX period to the post-SOX period, they are estimated with enough precision that they are significantly different at the 10% level except for the coefficients on total assets, leverage, and ownership. The average pseudo- $R^2$ s are similar for the models estimated in the post-SOX period compared with the pre-SOX period for both US and UK listings. Overall, these findings offer little evidence of changes in the characteristics of listing firms from the pre- to post-SOX period. We estimate logit regressions for new listings as well, but too few observations are available to estimate a regression over the post-SOX period for London. The coefficients are similar in the pre-SOX and post-SOX periods for the US. Only two coefficients are significantly different between the two periods (the coefficients on Log (Assets) and on Stock market cap/GDP), and even they are significant only at the 10% level.

Using the pre-SOX regressions of Table 6, we can assess to what extent firms would have been listed post-SOX had firms chosen to list in the same way as in the pre-SOX period. Table 7 shows the expected percent of US and UK foreign listings for 2002–2005 using the regression models estimated for 1990–2001. We compute the expected and actual fraction of US and UK listings for both the listing stock and flow regressions. The expected percent of firms with an existing listing (listing stock) or a

**Table 7**

The propensity to cross-list on major exchanges over time.

This table examines whether the propensity to cross-list on a US stock exchange (Amex, Nasdaq, or the NYSE) and on the London Stock Exchange (UK ordinary listings) has declined since 2001. The sample includes all non-financial, non-US, non-UK firms that are in the Worldscope database and have total assets of at least \$100 million (in 1990 dollars) in a given year. Firms from Bermuda and the Cayman Islands are excluded. Information on cross-listings comes from a variety of sources described in Table 1. Firms with other types of cross-listings (Rule 144a or over-the-counter (OTC) in the US and Alternative Investment Market (AIM) or depositary receipts in the UK) are excluded. A logit regression is estimated over the period from 1990 to 2001. In the columns, "Listing stock", the dependent variable equals one if a firm is cross-listed in the US (Panel A) or in the UK (Panel B), in any year. In the columns "Listing flows", the dependent variable equals one in the year that a firm cross-lists. In each regression, the explanatory variables are sales growth, global industry  $q$ , log of total assets, leverage, ownership, legal, log of gross national product, stock market capitalization to gross domestic product, and year dummies. "Firms" is the number of firms in the sample for a given year. "Listed" is the number of firms with a cross-listing in a given year. "New listings" is the number of firms listing in a given year. "Actual percent" is the percent of firms with a cross-listing. "Expected percent" is computed by applying the average logit coefficients for 1990 to 2001 (Table 6) to the values of the explanatory variables for each firm each year between 2002 and 2005, obtaining the predicted probability that a firm has a listing each year, summing the predicted probabilities over firms each year, dividing by the number of firms, and multiplying by 100.

Year	Listing stock					Listing flows				
	Firms	Listed	Actual percent	Expected percent	Expected-actual	Firms	New listings	Actual percent	Expected percent	Expected-actual
<i>Panel A. US exchange listings</i>										
1990–2001 (average)	3,765	170	4.515			3,609	14	0.388		
2002	4,738	343	7.239	3.811	–3.428	4,395	21	0.476	0.064	–0.412
2003	4,939	322	6.519	4.197	–2.322	4,617	3	0.065	0.080	0.015
2004	5,189	347	6.687	4.905	–1.762	4,843	11	0.227	0.108	–0.119
2005	4,974	344	6.916	5.664	–1.252	4,630	6	0.130	0.140	0.010
<i>Panel B. UK ordinary listings</i>										
1990–2001 (average)	3,693	99	2.690			3,542	2	0.057		
2002	4,494	99	2.201	2.253	0.052	4,396	1	0.023	0.021	–0.001
2003	4,708	91	1.933	2.572	0.639	4,618	1	0.022	0.033	0.011
2004	4,934	91	1.844	2.817	0.973	4,846	3	0.062	0.049	–0.013
2005	4,708	78	1.657	3.112	1.455	4,630	0	0.000	0.057	0.057

new listing (listing flow) is computed by applying the logit coefficients for 1990–2001 (from the corresponding models in Table 6) to the values of the explanatory variables for each firm each year between 2002 and 2005. We obtain the predicted probability that a firm has an existing listing or a new listing each year, sum the predicted probabilities over firms each year, and divide by the number of firms in the sample that year to compute an expected percent.

We first consider the results obtained for the probability of existing listings from the estimates of the listing stock regressions. Strikingly, the actual listing percents are higher than expected for the US exchange listings, while those for UK ordinary listings are lower than expected. For example, in 2002 on the major US exchanges, there were 343 listings, or 7.24% of 4,738 eligible firms in the Worldscope database (non-financial firms with over \$100 million in assets and available data, from non-UK, non-tax haven countries) while the logit models would have predicted 3.81% US exchange listings. The economic magnitude of this difference is large. In terms of total firm counts, there are about 163 fewer expected listings than actual listings. The differences between actual and expected listing propensities for UK listings are smaller than those for US listings. For example, there were 78 ordinary listings on the Main Market in 2005, 1.63% of the 4,708 eligible firms, but 3.11% were expected based on the propensity to list during the 1990–2001 period. Finally, the proportion of firms expected to be listed is very low in 2002 compared with the 1990s, but it increases thereafter. Most likely, the economic difficulties of the early 2000s had an impact on the demand for listings. In particular, they reduced growth opportunities and firms are more likely to list when they have good growth opportunities.

We investigate further whether our inferences about the US and UK expected listing counts in the post-SOX period are sensitive to the base period chosen to estimate the logit models that predict the expected percent of listed firms. If we use two recent subperiods, 1995–2001 and 1997–2001, instead of the full period, 1990–2001, the expected percent of US listed firms does increase in the post-SOX period. The surplus of US listed firms in 2002–2005 using the full-period logit model becomes a small deficit (0.27%) of listed firms in 2005 using 1995–2001 as the base period for estimation and a larger deficit for 2004 (0.52%) and 2005 (1.31%) using the 1997–2001 base period. However, as we use these more recent periods, the deficit of listed firms in London increases as well. We also use a more distant base period, 1990–1995, and find results similar to those reported in the table. Consequently, using different base periods for the stock regressions does not change the conclusion that SOX did not make London more attractive relative to the US exchanges for firms wishing to list on a foreign exchange.

If firms could easily exit from the US exchanges by delisting and deregistering and if the competitiveness of the US exchanges had declined, we would observe missing listings. That is, firms predicted to be listed based on their characteristics would not be listed. Table 7 shows no missing listings. Each year, more firms are listed than predicted. One might argue that many firms that would

like to delist do not do so because they face insurmountable obstacles to deregistering with the SEC and it makes little sense for a firm to delist if it cannot deregister. Consequently, with this claim, many of our listed firms are captive listings not voluntary listings. This could be true. However, none of our evidence is consistent with the claim that London has become more competitive relative to New York. If London has become more competitive, we would expect that London would have more foreign listings compared with the number expected by extrapolating from the behavior of firms in the 1990s. The opposite is true.

Another way to address concerns about the difficulty of the deregistration process in the US is to focus only on newly listed firms after the passage of SOX in 2002. In Table 7 we also compare the predicted and actual new listings over 2002–2005 using the corresponding logit regressions in Table 6 of the probability to newly list (listing flows) in the US and UK markets. Not surprisingly, the number of new listings is small, especially in the UK. However, no consistent pattern of a new listing deficit emerges from our regressions in either market. Whereas we find that cumulatively there are more new listings in the US than we would have expected based on the 1990–2001 regression model estimates, there are fewer new listings in the UK than we would have expected. Again, we estimate our logit regressions over different periods to check the robustness of our inferences. The only results that are not supportive of our conclusions are when we use the period 1990–1995 to estimate the logit regressions. For New York, we find a deficit of new listings after 2002 when using that base period. We cannot meaningfully estimate a flow regression for London for 1990–1995 because of the small number of observations. One might choose to focus on the results using the earlier base period if one believed that the late 1990s were exceptional years. However, those concerned about missing listings in the post-SOX period tend to focus on comparisons with the second half of the 1990s, in which case all of our results suggest that no deficit of listings exists.

We also estimate logit regressions and listing deficits for Rule 144a listings. Using stock regressions, we find a surplus of such listings irrespective of the base period used to estimate the logit regressions. Using flow regressions, we find a deficit in 2004 and 2005 in all specifications except the one using 1997–2001 as the base period. This result does not seem supportive of the view that firms chose to use Rule 144a listings instead of exchange listings to avoid SOX.

## 5. The valuation premium for New York and London listings over time

The governance benefit for a foreign firm listing implies that US cross-listed firms should be worth more because they have better growth opportunities, because by cross-listing they can take advantage of growth opportunities that they could not have taken advantage of without a listing, and because a smaller fraction of the

cash flows generated by the firms are expropriated as private benefits by insiders (Doidge, Karolyi, and Stulz, 2004; Hail and Leuz, 2008). As firms take advantage of growth opportunities, we expect their Tobin's  $q$  ratios to fall (see, for instance, Li, Livdan, and Zhang, 2007). So, the first source of the valuation effect of a listing does not persist. However, the second and third sources of the valuation effect persist. Consequently, on theoretical grounds, part of the high Tobin's  $q$  ratios of firms at the time they list is temporary, but part is not.

If the net benefit for shareholders of a listing on a New York exchange has fallen, we would expect to see a decrease in the listing premium in New York, or at least a decrease in that premium relative to London. We therefore estimate cross-listing premiums from annual regressions of Tobin's  $q$  on control variables based on firm characteristics and country-level factors each year from 1990 to 2005. Our approach controls for proxies for a firm's growth opportunities, so that, if we were completely successful in doing so, the cross-listing premium would measure only the contribution to firm value of cross-listing, but most likely we capture only part of a firm's growth opportunities. Doidge, Karolyi, and Stulz (2004) establish that there is a premium, but their analysis focuses on US listings in 1997 only. To our knowledge, no study has tested for the existence of a premium for UK foreign listings.<sup>19</sup> Because we have panel data, we can use firm fixed effects to account for time-invariant unobservable firm characteristics. Finally, we perform a subperiod analysis of the cross-listing premium comparing the pre-SOX 1990–2001 and post-SOX 2002–2005 periods.

### 5.1. The cross-listing premium in New York and London over time

Table 8 reports regression results of Tobin's  $q$  on different dummy variables associated with various types of US and UK listings as well as a set of firm characteristics, including sales growth, the median Tobin's  $q$  of the global industry to which the firm belongs, log of total sales (in US dollars) as size proxy, and country dummy variables. The listing dummies equal one in all years a firm has a listing of a given type. If a firm has both a US listing and a UK listing, both dummies equal one in the relevant years. If we exclude firms with listings in the US and in the UK, our results are unchanged.

The regressions are estimated using OLS and the standard errors are clustered on countries, that is, observations are assumed to be independent across countries, but not within countries. We considered an

alternative estimation approach using country random effects, following La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2002), but Hausman (1978) tests indicate that the assumptions of this model are not met in all years. Panel A presents the regression results year by year across the 1990–2005 period, and Panel B provides panel data results using Fama and MacBeth (1973) methods, pooled OLS with firm fixed effects, and pooled OLS with firm-level clustering to compute the standard errors. The sample is the same as the one used for the logit regressions (the results are similar when we add back the UK firms or if we use a \$10 million size screen). The size of this sample ranges from 2,764 firms in 1990 to 7,302 firms in 2005. The dummy variable associated with a given type of listing requires at least ten listings with available data for  $q$  ratios as well as the independent variables. So, for example, Rule 144a listings are not considered until 1992, UK DR listings until 1996, and UK AIM firms until 2005.

Panel A of the table shows that the cross-listing premium for US exchange listings is large, positive, and statistically significant in each year from 1990 to 2005. The magnitude and precision of the coefficient is weaker in the first three years of the sample period, but it averages around 0.24 for the remainder of the sample period. Even after controlling for firm and country characteristics, the premium is economically large: Compared with the average Tobin's  $q$  ratios of firms that are not cross-listed, our estimates imply that firms listed on US exchanges are worth about 17% more. There is no statistically significant cross-listing premium for US Rule 144a private placements, except marginally so in the very early years of the program (1992–1993). There is a premium for OTC cross-listings in many years (12 of 16 years), although the overall magnitude averages around 0.13, which is about half that of cross-listings on the exchanges. This is consistent with the findings of Doidge, Karolyi, and Stulz (2004).<sup>20</sup> Most surprisingly, there is no discernible premium for UK cross-listings in any year of the sample period for any of the three types of listings (AIM, DR, or ordinary shares). The adjusted  $R^2$ 's are higher than those in previous studies likely because of the use of country dummy variables to account for cross-country variation. The firm-level control variables are also important with reliably positive coefficients on sales growth and global industry median Tobin's  $q$ . Log (Sales) is a weaker control with a negative coefficient in the first seven years of the period and positive in more recent years.

The results in Table 8 provide a first opportunity to assess whether the premium for a US exchange listing has declined since the passage of SOX in 2002. When we use the US exchange coefficients from Table 8 and compute the percentage valuation difference relative to the average

<sup>19</sup> Baker, Nofsinger, and Weaver (2002) uncover an insignificant negative abnormal share price reaction to foreign listings in London following a sizable pre-listing run-up in returns (8.7% over the pre-listing year), but mostly in conjunction with increases in analyst coverage and media attention for those firms. Salva (2003) finds a small, but statistically significant (at the 10% level) abnormal return of 0.69% on the day of a foreign listing announcement in London. A recent study by Oxera, a UK-based consultancy, argues, but does not provide any supporting evidence, that "a listing in London may deliver higher valuations and a lower cost of equity" (Oxera Consulting, 2006, p. 5).

<sup>20</sup> One possible explanation for the OTC premium is that the market participants anticipate that these companies will upgrade to an exchange listing. We reestimated our fixed-effects regression in Panel B of Table 9, separating out the 38 OTC listings that upgraded during the period of analysis from those that remained so. The coefficient on the upgraded OTC listings is positive but not significant and that for the remaining OTC listings is unchanged.

**Table 8**

Regression analysis of the valuation of cross-listed firms: 1990 to 2005.

Panel A presents the cross-sectional regression estimates of the valuation differential of cross-listing in the US or in the UK, each year from 1990 to 2005. The sample includes all non-financial, non-US, non-UK firms that are in the Worldscope database and have total assets of at least \$100 million (in 1990 dollars) in a given year. Firms from Bermuda and the Cayman Islands are excluded. Information on cross-listings comes from a variety of sources described in Table 1. The dependent variable in each regression is Tobin's  $q$ , computed as ((total assets–book equity)+market value of equity)/total assets (all variables are in local currency). US Rule 144a, US over-the-counter (OTC), US Exchange, UK Alternative Investment Market (AIM), UK depositary receipt (DR), and UK Ordinary are dummy variables that equal one if a firm has a cross-listing of that type in a given year. Cross-listing dummies of a given type are excluded if there are less than 10 listings in a year. Sales growth is inflation adjusted two-year sales growth (winsorized at 1% and 99% tails), global industry  $q$  is the median global industry Tobin's  $q$ , and sales is in millions of dollars, adjusted for inflation. All regressions include country dummies (not reported). The  $t$ -statistics, in parentheses are adjusted for clustering on countries. They are computed assuming observations are independent across countries, but not within countries. The  $t$ -statistics greater than 1.65, 1.96, and 2.55 are significant at the 10%, 5%, and 1% levels, respectively. Panel B presents results from panel data regressions. The regressions are estimated three ways: (1) Fama-Macbeth, (2) pooled ordinary least squares (OLS) with the standard errors corrected for clustering on firms, and (3) with firm-fixed effects. In Model 3, the cross-listing dummies first equal one in the year before listing instead of in the listing year as in other models. Model 5 is similar to Model 4 except that in Model 5 we include an additional set of US cross-listing dummies that equal one in the years prior to cross-listing (denoted with "Pre-" suffix). \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Constant	2.14 (5.09)	1.62 (4.72)	0.60 (2.41)	0.35 (1.16)	0.26 (0.81)	−0.12 (−0.34)	0.11 (0.28)	−0.01 (−0.04)	−0.42 (−2.29)	−0.43 (−2.16)	−0.55 (−1.36)	−0.71 (−3.70)	−0.36 (−1.51)	−0.22 (−1.74)	−0.18 (−1.00)	−0.02 (−0.19)
US Rule 144a	–	–	0.24 (1.84)	0.22 (1.78)	0.09 (1.22)	0.15 (1.46)	0.10 (0.95)	0.04 (0.37)	0.01 (0.13)	0.07 (0.47)	−0.03 (−0.29)	0.00 (−0.05)	−0.01 (−0.19)	0.00 (0.07)	−0.04 (−0.57)	−0.02 (−0.20)
US OTC	0.14 (1.47)	0.06 (1.12)	0.09 (1.29)	0.14 (2.08)	0.15 (3.02)	0.17 (4.13)	0.18 (3.26)	0.17 (4.06)	0.14 (3.16)	0.18 (5.01)	0.18 (3.10)	0.08 (2.27)	0.04 (1.12)	0.09 (3.07)	0.09 (2.18)	0.12 (2.63)
US Exchange	0.10 (1.88)	0.17 (2.29)	0.13 (1.90)	0.24 (3.32)	0.22 (5.25)	0.23 (5.08)	0.25 (5.02)	0.22 (4.81)	0.25 (5.08)	0.53 (5.51)	0.29 (2.96)	0.14 (2.51)	0.13 (2.76)	0.25 (6.15)	0.17 (3.50)	0.16 (3.75)
UK AIM	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.27 (1.04)
UK DR	–	–	–	–	–	–	−0.15 (−1.48)	0.08 (0.39)	0.07 (0.57)	0.18 (0.59)	0.00 (0.03)	0.09 (0.87)	−0.03 (−0.40)	−0.05 (−0.79)	−0.04 (−0.58)	−0.14 (−2.45)
UK Ordinary	0.14 (1.50)	0.05 (0.49)	−0.05 (−0.66)	−0.03 (−0.49)	−0.13 (−1.74)	−0.12 (−1.28)	−0.19 (−1.67)	−0.14 (−1.72)	−0.05 (−0.73)	−0.01 (−0.07)	−0.06 (−0.70)	−0.01 (−0.08)	0.01 (0.12)	−0.08 (−1.27)	−0.06 (−0.89)	−0.09 (−0.92)
Sales growth	0.10 (1.88)	0.11 (2.67)	0.26 (2.72)	0.62 (3.73)	0.39 (2.66)	0.29 (2.32)	0.47 (3.14)	0.54 (4.87)	0.52 (5.25)	0.79 (4.20)	0.52 (4.88)	0.39 (3.44)	0.32 (5.52)	0.35 (4.58)	0.50 (3.61)	0.35 (4.38)
Industry $q$	0.30 (2.44)	0.54 (8.96)	0.70 (5.62)	0.98 (5.07)	1.08 (6.92)	1.09 (4.73)	0.99 (4.88)	0.92 (5.20)	1.02 (5.45)	1.01 (8.36)	1.09 (7.73)	1.08 (15.24)	0.89 (11.34)	0.78 (8.89)	0.83 (13.59)	0.84 (18.07)
Log (Sales)	−0.09 (−2.28)	−0.05 (−2.06)	−0.01 (−1.10)	−0.03 (−2.44)	−0.03 (−2.58)	−0.01 (−1.38)	−0.01 (−1.35)	0.01 (0.78)	0.02 (1.28)	0.01 (0.63)	0.03 (1.10)	0.04 (2.79)	0.03 (1.73)	0.02 (1.96)	0.02 (1.50)	0.02 (1.59)
Number of Observations	2,764	3,066	3,418	3,807	4,186	4,619	4,811	5,062	5,403	5,497	6,029	6,067	6,572	6,891	7,292	7,302
Adjusted $R^2$	0.3397	0.2733	0.1755	0.2324	0.2076	0.1954	0.1739	0.2329	0.2665	0.2959	0.1676	0.1921	0.2233	0.2484	0.2077	0.2115

## Panel B

	Fama-Macbeth	Firm fixed effects		Pooled OLS	
	(1)	(2)	(3)	(4)	(5)
Constant	0.13 (0.52)	0.73 (11.65)***	0.74 (12.02)***	-0.29 (3.31)***	-0.24 (-2.72)***
US Rule 144a	0.06 (1.89)*	-0.02 (-0.64)	0.01 (0.45)	0.04 (0.79)	0.04 (0.84)
US Rule 144a_Pre					0.13 (2.16)**
US OTC	0.12 (8.83)***	0.05 (2.86)***	0.08 (4.40)***	0.12 (4.10)***	0.13 (4.34)***
US OTC_Pre					0.12 (4.00)***
US Exchange	0.22 (7.72)***	0.08 (4.22)***	0.16 (7.97)***	0.25 (7.54)***	0.28 (7.95)***
US Exchange_Pre					0.12 (2.62)***
UK DR	0.00 (0.03)	-0.21 (-3.15)***	-0.09 (-1.23)	-0.03 (-0.37)	-0.03 (-0.36)
UK Ordinary	-0.05 (-2.12)*	-0.26 (-6.68)***	-0.25 (-6.24)***	-0.09 (-1.97)**	-0.12 (-2.56)***
Sales growth	0.41 (7.66)***	0.31 (33.44)***	0.31 (33.47)***	0.46 (22.58)***	0.45 (22.60)***
Global industry $q$	0.88 (12.73)***	0.94 (57.35)***	0.93 (57.04)***	1.02 (23.60)***	1.02 (23.50)***
Log (Sales)	-0.00 (-0.17)	-0.05 (-10.78)***	-0.05 (-11.19)***	0.01 (2.04)**	0.00 (-0.90)
Country dummies	Yes	No	No	Yes	Yes
Year dummies	No	Yes	Yes	Yes	Yes
Number of observations	82,786	82,786	82,786	82,786	82,786
Number of groups	-	10,946	10,946	-	-
$R^2$	0.2277	0.1016	0.1064	0.1645	0.1670

$q$  of firms that are not cross-listed each year, we find that from 1990 to 2001 US exchange-listed firms are worth an average of 17.5% more than firms that are not listed. From 2002 to 2005, US exchange-listed firms are worth 14.3% more. For example, in 1997 alone, the coefficient in Table 8 is 0.22 and the average  $q$  of firms not cross-listed is 1.30 so that, after controlling for firm and country characteristics, firms listed on US exchanges are worth 16.9% more. A  $t$ -test for the equality of means (unreported) indicates that the difference between 17.5% and 14.3% is not significant ( $p$ -value equals 0.49). If we exclude 1999, which is arguably an anomalous year in terms of valuations, US-listed firms are worth 15.4% more in the 1990–2001 period. This initial test suggests that the US listing premium has not significantly declined after the passage of SOX.

Firms are more likely to list if they have better growth opportunities. This means that firms with higher  $q$  ratios are more likely to list. The endogeneity of this firm choice leads to a self-selection problem that can, in turn, lead to econometric problems that induce an upward bias in our estimate of the valuation premium. This is mainly a concern for US exchange listings because these are the only listings that have a positive and statistically significant premium each year. Previous studies of the valuation of cross-listed firms (e.g., Doidge, Karolyi, and Stulz, 2004) handle this problem by estimating selection models (Heckman, 1979), which specify a separate selection (cross-listing) decision equation in addition to the observation (valuation) equation. In unreported tests, we investigate how our inferences about the valuation premium in Panel A of Table 8 change when we employ a selection model. Our model (like that in Doidge, Karolyi, and Stulz, 2004) employs country variables such as the market-capitalization-to-GDP ratio, log of GNP per capita, and Legal as well as the firm's log of sales. The premium remains positive in each of the 16 years of our sample period and remains statistically significant in all but four years.

The estimates over the entire period from 1990 to 2005 are presented in Panel B (we do not include a dummy variable for AIM listings in these regressions because we can include the dummy only for 2005). The first set of results in Model 1 uses the method of Fama and MacBeth (1973). We average the coefficients from the annual regressions of Panel A and perform inference tests on the time-series means and standard deviations (the  $t$ -statistics are adjusted for first-order serial correlation). The advantage of this procedure is that it incorporates the unknown cross-correlation structure in the residuals. The estimates confirm the reliably positive and significant valuation premiums for US OTC (0.12) and exchange listings (0.22) seen in Panel A, the insignificant coefficients for US Rule 144a private placements and UK DR listings, and a statistically significant discount (–0.05) for UK ordinary listings.

We also show results for two sets of firm fixed-effects regressions (no country fixed effects, but year fixed effects retained). Model 2 confirms the positive valuation premiums for US OTC and exchange listings, but they are much smaller in magnitude at 0.05 and 0.08,

respectively, although the difference between them is still statistically different at the 1% level. We also observe now a reliably large negative premium for UK listings. The advantage of using firm fixed effects is that we control for unobserved time-invariant firm-level heterogeneity (not captured by our control variables), but the finding for UK listings is surprising and raises potential concerns about using fixed effects.<sup>21</sup> Part of the explanation for the weaker findings with firm-level fixed effects could be that we are ignoring potential transitory effects in Tobin's  $q$  valuation ratios around listings and the pre-listing run up. When we define the cross-listing dummy variable to equal one starting one year prior to the listing in Model 3, the size of the US exchange listing premium doubles in size from 0.08 to 0.16, much closer to the findings in the Fama-MacBeth regressions.

Finally, we report two sets of pooled OLS estimation results (with standard errors adjusted for clustering on firms) with country and year fixed effects. In Model 4, the results are almost identical to those of the Fama-MacBeth regressions in Model 1. In Model 5, we include a second set of cross-listing dummies. In addition to the cross-listing dummies that equal one in the listing year and in subsequent years, we include a set of cross-listing dummies that equal one in the years prior to listing (e.g., "US exchange\_Pre"). We want to test whether the valuation premium stems from unobservable firm-specific attributes that existed for firms before they listed or from the listing event itself. In a sense, it handles the unobservable firm heterogeneity like the fixed effects models but also allows the premium to change around the listing. For US OTC and exchange listings, both types of cross-listing variables are significantly different from zero. More importantly, however, only in the case of US exchange listings are the before cross-listing ("US Exchange\_Pre") and after cross-listing ("US Exchange") coefficients significantly different from each other (unreported  $F$ -test).

Table 8 confirms that a US cross-listing premium exists every year from 1990 to 2005 for exchange-listed firms. We also have shown that there is a smaller premium for US OTC listings, but this premium does not exist every year. The existence of a premium for OTC firms can be viewed as evidence that only part of the listing premium can be attributed to the laws and regulations that protect investors in the US. Finally, there is no premium for US Rule 144a listings or Main Market listings on the LSE, either DRs or ordinary listings. Moreover, we find no evidence that the premium for US exchange listed firms

<sup>21</sup> Including firm fixed effects in the regression removes all between-firm variation from the data. To estimate the coefficients on the cross-listing dummies, the regression uses only within-firm variation on the dummies. This creates a problem because the majority of firms in our dataset do not cross-list. The cross-listing dummy is always zero and there is no within-firm variation on the cross-listing dummies for these firms. The same problem arises for firms that listed before 1990 (the beginning of our sample period) because the cross-listing dummy is always one for these firms. The only variation in the cross-listing dummies occurs for firms that listed between 1990 and 2005, when the cross-listed dummy switches from zero to one in the listing year (for related arguments, see Zhou, 2001).

has disappeared since SOX or that a premium has emerged in the UK. The coefficient on AIM for the one year available (2005) is positive and large in magnitude, but it is not significant. There are simply too few firms listing on AIM that are not small firms to make much of the valuation of firms on AIM.<sup>22</sup>

## 5.2. The cross-listing premium before and after 2001

Has there been a decline in the valuation premium for US exchange listings in the aftermath of the passage of the SOX Act in 2002? Our valuation analysis up to this point suggests that the valuation premium for US exchange-listed firms is permanent and is significant in all sample years. We report, however, that, from 1990 to 2001, the average valuation premium is 17.5% compared with 14.3% from 2002 to 2005. Recent studies by Zingales (2007) and Litvak (2007a) examining Tobin's  $q$  and market-to-book valuation ratios also suggest that the premium could be lower since 2002.<sup>23</sup> Zingales concludes that the decline in the Tobin's  $q$  valuation premium for cross-listed firms following the passage of SOX (his subperiods are 1997–2001 for pre-SOX versus 2003–2005 for post-SOX) is concentrated in firms from countries with better legal protections of minority shareholders (as measured by the average control premiums paid in large block transactions in various countries; see Dyck and Zingales, 2004).

We investigate whether the cross-listing premium has declined post-SOX, after controlling for firm and country characteristics in Table 9. We estimate pooled OLS regressions similar to those in Panel B of Table 8 but now with interactions of all firm-level variables with pre-SOX (equals one for 1990–2001, zero otherwise) and post-SOX (equals one for 2002–2005, zero otherwise) dummy variables (the results are robust to defining the pre-SOX period from 1995 to 2001). This approach is equivalent to estimating two separate regressions, one for the pre-SOX period and one for the post-SOX period. The advantage of using the pre- and post-SOX interactions and estimating the coefficients jointly in one regression is that we can test

whether the pre- and post-SOX coefficients are equal.<sup>24</sup> We perform  $F$ -tests of the equality of each of the coefficients across subperiods, but only report in the table the results of the joint test that all coefficients are equal. In Model 1 we estimate the regression with all non-financial firms with our usual data constraints related to Worldscope and \$100 million or more in total assets. In Model 2 we further exclude firms from the UK. In both specifications, the coefficient for the US exchange-listed valuation premium is statistically significant and large in both the pre- and post-SOX periods (averaging around 0.25). In unreported tests of the equality of that coefficient across subperiods, we are unable to reject the null for either model. We also conduct tests that allow us to control for a potential time trend in valuations unrelated to cross-listings. Specifically, we test whether the change in the US exchange listing premium is significantly different from the change in other listing premiums that are not impacted by SOX. We find that these differences-in-difference tests are statistically insignificantly different from zero relative to change in the UK ordinary listing premium (all UK domestic listings are excluded from the benchmark analysis) and relative to the change in the US OTC listing premium. These results suggest that SOX had no effect on the cross-listing premium for US exchange listings, on average. But, it is legitimate to be concerned as to whether our findings result from an averaging effect because we include together firms from countries with better and worse legal protections.

Models 3 and 4 perform the same regressions as in Model 1, but separately now for countries with above-median and below-median scores on the Dyck and Zingales (2004) measure of control premiums for the countries for which it is available. Based on Zingales (2007) and Litvak (2007a), we would expect to see a statistically significant decline in the cross-listing premium for US exchange listings in both groups of countries, but even larger in that of low block premium countries. We do not. In fact, these coefficients are of very similar magnitudes in both subperiods and in both groups of countries. The differences (based on unreported  $F$ -tests) are confirmed to be statistically insignificant.<sup>25</sup>

We could observe no change in the valuation premium around SOX because a potentially positive valuation impact of newly listed firms after 2002 offsets a

<sup>22</sup> Gozzi, Levine, and Schmukler (2008) show that Tobin's  $q$  valuation premiums for their internationalized firms disappear beyond the two years following the internationalization event. However, their internationalization events include other cross-listings besides US exchange cross-listings and hence those for which a valuation premium is not predicted by theory. When we replicate their method for our exchange-listed firms, we find no evidence that the premium disappears.

<sup>23</sup> These two studies are distinct from the returns-based event-study papers of SOX using cross-listed firms by Berger, Li, and Wong (2005), Li (2006), Litvak (2007b), and Smith (2007). The results vary across the various studies in terms of the implications of SOX, but this is not surprising given that they employ different event dates surrounding the passage of SOX, the announcement dates of delistings or other types of events, and they utilize different sets of benchmark firms. An event study evaluates how investors perceived the news events about SOX when they took place, before all the implementation rules of SOX were put in place, whereas our approach takes into account that the market learned about SOX and its implementation through time. The two approaches could lead to different results for many reasons. For instance, the market's initial reaction might not be the market's assessment of SOX later on.

<sup>24</sup> Because these regressions have a constant for both the pre- and post-SOX periods, but not an overall constant, the  $R^2$ 's from these regressions are not meaningful and we do not report them.

<sup>25</sup> Our results differ from those of Zingales (2007) because we use a different approach. Zingales uses yearly country-level averages, which gives equal weight to each country each year, regardless of how many non-listed and cross-listed firms are from that country. A difficulty with this approach is that conclusions are susceptible to outliers due to small sample sizes. For example, in Zingales (see Table 1), the countries with largest pre- to post-SOX changes in the premium have few cross-listed firms in many of the pre-SOX years (and for some countries, post-SOX as well). Our approach uses firm-level data so that our conclusions are based on more than 90 thousand observations, not 40 observations, as in Zingales. Moreover, our approach controls for firm and country characteristics. We are unable to perform a direct comparison with Litvak (2007a), who focuses on valuations only in 2001 and 2002 using a matched-firm sample analysis for her benchmarking approach.

**Table 9**

The cross-listing valuation premium before and after the Sarbanes-Oxley Act (SOX).

This table presents results from panel data regressions that estimate the valuation differential of cross-listing in the US before and after the Sarbanes-Oxley Act. The period before SOX is 1990 to 2001 and the period after SOX is 2002 to 2005. In Model 1, the sample includes all non-financial, non-US firms that are in the Worldscope database and have total assets of at least \$100 million (in 1990 dollars) in a given year. Firms from Bermuda and the Cayman Islands are excluded. In Model 2, UK firms are also excluded. Information on cross-listings comes from a variety of sources described in Table 1. The dependent variable in each regression is Tobin's  $q$ , computed as  $((\text{total assets} - \text{book equity}) + \text{market value of equity}) / \text{total assets}$  (all variables are in local currency). US Rule 144a, US over-the-counter (OTC), and US Exchange are dummy variables that equal one if a firm has a cross-listing of that type in a given year. Pre-SOX equals one during 1990–2001, and zero, otherwise; Post-SOX equals one during 2002–2005, and zero, otherwise. Models 3 and 4 repeat the same regression as in Model 1, except that we report results separately for firms from countries with above median block premiums in control transactions (High PB) and below median block premiums in control transactions (Low PB) based on Dyck and Zingales (2004). Sales growth is inflation-adjusted two-year sales growth (winsorized at 1% and 99% tails), global industry  $q$  is the median global industry Tobin's  $q$ , and sales are in millions of dollars. The regressions are estimated by pooled ordinary least squares and the  $t$ -statistics are adjusted for clustering on firms. They are computed assuming observations are independent across firms but not across time for each firm. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.  $F$ -test ( $p$ -value) evaluates whether the US Exchange coefficients in the pre-SOX and post-SOX periods are equal.

	(1) All firms		(2) Exclude UK firms		(3) High PB countries		(4) Low PB countries	
	Pre-SOX	Post-SOX	Pre-SOX	Post-SOX	Pre-SOX	Post-SOX	Pre-SOX	Post-SOX
Constant	-0.15 -(1.78)*	-0.31 -(3.93)***	-0.11 -(1.24)**	-0.31 -(3.83)***	-0.10 -(0.66)	-0.59 -(4.05)***	0.08 (0.89)	-0.24 -(2.76)***
US Rule 144a	0.07 (1.47)	-0.02 -(0.62)	0.07 (1.32)	-0.03 -(0.60)	0.28 (3.35)***	0.15 (1.97)**	0.20 (2.51)**	-0.06 -(0.94)
US OTC	0.09 (2.89)***	0.13 (4.64)***	0.11 (3.08)***	0.14 (4.80)***	0.17 (3.48)***	0.16 (3.22)***	0.08 (2.08)**	0.13 (3.49)***
US Exchange	0.26 (6.96)***	0.26 (8.21)***	0.24 (6.11)***	0.26 (7.79)***	0.29 (5.36)***	0.23 (4.56)***	0.26 (5.44)***	0.26 (6.34)***
Sales growth	0.51 (19.55)***	0.39 (16.42)***	0.49 (18.07)***	0.40 (16.39)***	0.32 (7.37)***	0.32 (6.20)***	0.59 (17.45)***	0.45 (14.22)***
Global industry $q$	1.03 (25.24)***	0.92 (25.30)***	1.02 (23.72)***	0.92 (23.88)***	0.80 (9.64)***	0.92 (10.21)***	1.06 (22.33)***	0.97 (22.17)***
Log (Sales)	0.00 (0.12)	0.02 (4.84)***	-0.00 -(0.36)	0.02 (4.61)***	-0.02 -(1.96)*	0.01 (1.64)*	0.01 (1.38)	0.04 (6.90)***
$F$ -test ( $p$ -value)	0.00 (0.97)		0.45 (0.50)		1.31 (0.25)		0.00 (0.97)	
Country dummies	Yes		Yes		Yes		Yes	
Number of observations	90,249		82,786		18,611		63,707	

potentially negative valuation impact for listings in existence prior to 2002. When we omit the former in these models, we find no differences (not reported).<sup>26</sup>

## 6. Capital raising activity around US and UK cross-listings

Reese and Weisbach (2002) provide evidence in support of the bonding hypothesis by showing that foreign firms that cross-list on US exchanges increase the number of equity issues after the listing, that the increase is larger for firms from countries with weak protections, and, most interestingly, that the increase arises for equity issues in their home market as well as in the US market, the original target market for the listings. Because we fail to find evidence that UK listings have a governance benefit, we would expect that firms that list

on US exchanges raise more equity after listing, but firms that list on the Main Market in the UK do not. Therefore, in this section, we extend the experiment of Reese and Weisbach (2002) and measure the extent of equity issuance activity of firms listing on US exchanges and firms listing on the Main Market in the UK in the years before and after their listing over the period of analysis from 1990 to 2005. We examine whether they raise equity in the US or UK markets, in their home market, or in other markets. To the best of our knowledge, no study has yet examined the consequences of a foreign listing in the UK for capital raising activity at home or outside the UK. If the governance gain is exclusively attributable to US exchange listings, then we would expect no major changes in equity issuance activity for those firms following their listing in the UK markets.

Information about the capital raising activity for our foreign firms comes from a number of data sources, including Securities Data Company (SDC) and the LSE. SDC contains the date of issue, the market (country) in which the security was issued, and the proceeds from each issue. We compare the issuance dates from SDC with the cross-listing dates drawn from the sources described above to determine whether they took place up to three years before or within three years after the listing (therefore we consider new cross-listings from 1993 to 2002). We

<sup>26</sup> The coefficients on the Rule 144a listings in Models 3 and 4 are now large and statistically significant, which is unlike those in Model 1. This arises because the Dyck and Zingales (2004) block premium measure is not available for all the countries represented in Model 1. There are 18 countries, including China, India, and Poland, with missing block premium data, and they account for 635 Rule 144a firm-year observations out of a total of 1,693 observations. Therefore, the Rule 144a coefficients in Models 3 and 4 should be interpreted carefully.

**Table 10**

Capital raising activity before and after cross-listing.

This table reports capital-raising activity from 1993 to 2002 by firms that cross-listed on US exchanges or on the Main Market in the UK (as depositary receipts (DRs) or ordinary listings) within three years before and after the cross-listing date. It reports the number of cross-listing firms that raise capital by means of public and private issues, the aggregate quantity (in millions of US dollars) as well as the component activity (with percentage of total) taking place in the US markets, the UK markets, the home market in which the firm is domiciled, and other markets. The “Before” (“After”) period presents all capital raising in the three-year period before (after) the cross-listing. The “After” period also includes capital raised during the cross-listing event itself. The sample includes all non-financial, non-US, non-UK firms that are in the Worldscope database with total assets of at least \$100 million (in 1990 dollars) in a given year. Firms from Bermuda and the Cayman Islands are excluded. Capital raising data is obtained from Securities Data Company and is supplemented with data from the London Stock Exchange. The *t*-statistics are computed to test the differences in before/after means. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	US exchange listings			UK main market listings		
	Before	After	<i>t</i> -Statistic	Before	After	<i>t</i> -Statistic
Total number of firms	530	530		119	119	
Number of firms raising equity	61	157		7	30	
Percent of all cross-listed firms	11.51	29.62		5.88	25.21	
Total equity raised vsp:0.5	28,868.6	151,082.3	2.91***	8,217.4	12,844.2	0.11
Total raised at home	14,841.3	79,173.1	2.02**	4,938.4	6,695.2	0.24
Percent of total raised	51.41	52.40		60.10	52.13	
Total raised in US	3,150	17,076.9	2.64***	1,441.9	981.6	−0.80
Percent of total raised	10.91	11.30		17.55	7.64	
Total raised in UK	1,055.8	176.9	−1.59	0	700.7	1.64*
Percent of total raised	3.66	0.12		0.00	5.46	
Total raised in other markets	9,821.5	54,655.4	2.71***	1,837.1	4,466.7	0.47
Percent of total raised	34.02	36.18		22.36	34.78	

include only the firms used in our logit regressions. For UK listings, the SDC data are supplemented with international issuance data directly from the LSE. These data include the issuance date, the issue type, sector, price, the proceeds of the issue, and the underwriter name and its country of origin.<sup>27</sup> Unfortunately, the LSE data begins only in 1998. To ensure that we do not exclude any relevant capital raising activity on the Main Market in the UK, we include both DRs and ordinary listings in our analysis.

Table 10 presents the results. We report the issuance activity by market location including the number of capital raising events and the dollar amount both before and after a cross-listing and separately for US exchange listings and Main Market listings in the UK. Overall, we identify 61 (12%) of the 530 firms with US cross-listings with equity issues before the listing and 157 (30%) with issues after the listing. Among the 119 UK cross-listing firms, 7 (6%) have equity issues before the listing and 30 (25%) afterward. The increase in the number of issues around the listing events is similar in the two cross-listing markets. However, the dollar magnitudes are not. Total equity raised among the US cross-listing firms increases from \$29 billion to \$151 billion over the listing period (a statistically significant difference for the mean listing firm) while that for the UK cross-listing firms increased modestly from \$8 billion to almost \$13 billion.

Another important result in this table is that there is a significant increase in the dollar magnitude of equity issuance around US cross-listings not just in the US markets (which represents a statistically significant increase from \$3 billion to \$17 billion), but also in the home markets (\$15 billion to \$79 billion) and other markets (\$10 billion to \$55 billion). Each of these increases is statistically significant for the typical firm. This result can be interpreted in a way that is consistent with that of [Reese and Weisbach \(2002\)](#). Though they only examine post-listing equity issuances, they find that firms from countries with poor legal protections in the home market raise a higher fraction of capital in their home markets and in other markets than firms from countries with good legal protections. We find no similar changes around UK exchange listings. There is an increase in equity issuances in the home market (from \$5 billion to \$7 billion), in other markets (\$2 billion to \$5 billion), and certainly in the target UK market (up to \$1 billion), but none of these changes is statistically significant.

## 7. Conclusions

In this paper, we investigate the evolution of cross-listings in the US and the UK over time. We find that the number of cross-listed firms in the US and on London's Main Market follows a similar pattern, increasing from 1990 to 1999, with a peak around the turn of the century, and then a steady decline thereafter. The fact is that listing counts have been falling in London as well as in New York. This broader phenomenon makes it difficult to explain the decrease in New York alone using an argument that New York is becoming less competitive, perhaps because

<sup>27</sup> We are grateful to Matthew Leighton in the Market Information and Analysis division of the LSE for his help and for supplying the data. We perform extensive cross-checking of the SDC and LSE information and always supplement SDC in favor of the LSE data when in doubt. We also evaluate how much our Worldscope, sector, and asset-size constraints are binding on the size of the issuance sample of firms and how much they issue.

of SOX and other regulatory changes. It is true that the number of listings on AIM in London has grown dramatically since 2001, but most firms that list on AIM are small firms that would have been unlikely candidates to cross-list on the US exchanges, either before or after SOX.

The argument that the US exchanges have become less competitive only makes sense if some firms that would have listed in New York in the 1990s would no longer do so. We investigate this proposition and find no support for it. The characteristics of listing firms have not significantly changed since the adoption of SOX. Little evidence exists that firms have been making listing decisions differently in recent years from how they made them from 1990 to 2001. If anything has changed in the aftermath of SOX, it is that the non-listed firms have become smaller and are therefore less likely to list on the US exchanges or the Main Market in London. The changing composition of firms that are not listed implies that there were actually more listed firms than one would expect based on the listing decision patterns from 1990 to 2001.

To ascertain further whether the benefits and costs of listing on the US exchanges have changed over time, we conduct the most complete analysis of the relative valuation of US listed firms to date. We use several distinct approaches to measure the cross-listing premium: cross-sectional regressions, Fama-MacBeth (1973) regressions, and pooled regressions with firm fixed effects. With each approach, we find a listing premium for firms that list on US exchanges but no listing premium for firms that list in London. The listing premium is robust: It exists every year, and it is permanent. We find no evidence that the listing premium falls after 2001, even for listed firms from countries with good investor protection.

One might worry that, even though SOX was adopted in 2002, Section 404 did not apply to foreign firms during our sample period until July 2005. Hence, perhaps the whole impact of SOX is not yet apparent in the data. This is a legitimate concern. It would seem, however, that firms considering a listing in the US since the adoption of SOX would have taken fully into account the costs associated with Section 404. Consequently, our results for new listings would seem to be robust to this concern. However, it could well be that the greater ease of deregistration for foreign firms (as a result of a new rule adopted by the SEC in March 2007) could lead to a significant drop in the number of listed firms that is not reflected in our data. It would not be appropriate to attribute these deregistrations to the cost of SOX without careful study because it could be the case that, had deregistration been made easier before SOX, firms with little trading in the US might have chosen to deregister also. All of our evidence is consistent with the theory that there is a distinct governance benefit for firms that list on the US exchanges. This benefit is not shared by firms that list in the US outside the exchanges or in London. There is no evidence in our data that this benefit has weakened over time.

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