

# SARBANES-OXLEY AND THE CROSS-LISTING PREMIUM

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*This article tests whether the Sarbanes-Oxley Act (“SOX”) affected the premium that investors are willing to pay for shares of foreign companies cross-listed in the United States. I find that from year-end 2001 (pre-SOX) to year-end 2002 (after SOX adoption), the Tobin’s q and market/book ratios of foreign companies subject to SOX (cross-listed on levels 2 or 3) declined significantly, relative to Tobin’s q and market/book ratios of both (i) matching non-cross-listed foreign companies from the same country, the same industry, and of similar size, and (ii) cross-listed companies from the same country that are not subject to SOX (listed on levels 1 or 4), whose Tobin’s q and market/book ratios declined only slightly and increased in some specifications, compared to matching non-cross-listed companies. Thus, the premium associated with trading in the United States was roughly constant, while the premium associated with being subject to U.S. regulation declined. The biggest losers were companies that were more profitable, riskier, and smaller, companies with a higher level of pre-SOX disclosure, and companies from well-governed countries. These results are consistent with the view that investors expected SOX to have greater costs than benefits for cross-listed firms on average, especially for smaller firms and already well-governed firms.*

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\* Assistant Professor, University of Texas Law School. I want to thank Bernie Black, Vic Khanna, Jonathan Klick, Mat McCubbins, and participants at Michigan Law Review’s Louis & Myrtle Moskowitz Conference on the Impact of Sarbanes-Oxley on Doing Business at the University of Michigan Law School and workshops at the University of California at San Diego Political Science department, University of Texas Law School, and McCombs School of Business for comments; and Andrew Karolyi for help with data sources. Ben Allaire, Brandie Reisman, and Lori Stuntz provided excellent research assistance. Comments are most welcome: klitvak@law.utexas.edu.

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## INTRODUCTION

The Sarbanes-Oxley Act of 2002 (“SOX”)<sup>1</sup> was adopted in haste, leaving businessmen, academics, and legislators to repent at leisure.<sup>2</sup> In the name of investor confidence, SOX regulates lawyers, accountants, auditors, investment bankers, securities analysts, corporate directors and officers, stock exchanges, the American Institute of Certified Public Accountants, the Financial Accounting Standards Board, and a variety of other governmental and non-governmental bodies, organizations, and professions. It applies to all U.S. public companies and to foreign companies cross-listed in the United States on levels 2 and 3 (“level-23 companies”).<sup>3</sup> It does not apply to foreign companies that are traded in the United States on cross-listing levels 1 and 4 (“level-14 companies”).<sup>4</sup>

It is hard to assess whether investors believed SOX was good or bad on average for U.S. firms. Events surrounding the adoption of SOX often corre-

1. Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, 116 Stat. 745 (codified in scattered sections of 15, 18 and 28 U.S.C.).

2. For academic repentance, see, for example, Larry E. Ribstein, *Sarbox: The Road to Nirvana*, 2004 MICH. ST. L. REV. 279; Roberta Romano, *The Sarbanes-Oxley Act and the Making of Quack Corporate Governance*, 114 YALE L.J. 1521 (2005); Stephen M. Bainbridge, *Sarbanes-Oxley: Legislating in Haste, Repenting in Leisure* 7-10 (UCLA Law & Econ. Research, Paper No. 06-14, 2006), available at <http://ssrn.com/abstract=899593>; Larry Ribstein, *Sarbanes-Oxley after Three Years* (Illinois Law & Econ., Working Paper No. LE05-016, 2005), available at <http://ssrn.com/abstract=746884> [hereinafter Ribstein, *SOX after Three Years*]. Other academics have argued that the importance of SOX is overstated. See, e.g., Lawrence A. Cunningham, *The Sarbanes-Oxley Yawn: Heavy Rhetoric, Light Reform (And It Might Just Work)*, 35 CONN. L. REV. 915 (2003). A few have defended it. See Lawrence E. Mitchell, *The Sarbanes-Oxley Act and the Reinvention of Corporate Governance?*, 48 VILL. L. REV. 1189 (2003); Robert A. Prentice & David B. Spence, *Sarbanes-Oxley as Quack Corporate Governance: How Wise is the Received Wisdom?*, 95 GEO. L.J. (forthcoming 2007).

3. A level-2 company has shares listed and traded on the New York Stock Exchange or the NASDAQ national market system. A level-3 company has made a public offering in the United States. Sarbanes Oxley Act § 2(a)(7), 15 U.S.C. § 7201(a)(7), defines “issuer” to include any company with securities registered under Securities Exchange Act § 12, 15 U.S.C. § 781, which level 2 and level 3 companies are required to do. The principal substantive provisions of SOX apply to all “issuers” or sometimes to companies which file periodic reports under Securities Exchange Act § 13, 15 U.S.C. § 78m, which all companies with registered securities must do. See Cleary, Gottlieb, Steen & Hamilton, *Sarbanes-Oxley Act of 2002 Ushers in Sweeping Changes for Public Companies in the United States* (Aug. 5, 2002) (on file with author) (“With a few exceptions, the Act applies to all ‘issuers’ . . . . [T]his includes all SEC-reporting companies, domestic or foreign.”). The SEC retains exemptive authority, but in general has not used this authority to exempt foreign issuers from the principal provisions of SOX.

4. A company with a level-1 listing has shares traded on NASDAQ but not through the NASDAQ national market system. A level-4 company has shares traded in the institutions-only “Rule 144A” market.

sponded to price changes in U.S. markets, but one cannot rule out other causes.<sup>5</sup> Likewise, while the aftermath of SOX was marked by an increasing number of U.S. public companies going private<sup>6</sup> or going “dark,”<sup>7</sup> contemporaneous events might have been partly responsible for these trends.

The effect of SOX on cross-listed firms is easier to assess. First, cross-country data make it easier to rule out competing explanations in studies of delistings and reduced cross-listing rates.<sup>8</sup> Second, statistics about the trends in cross-listing on other countries’ exchanges (especially London, the new cross-listing destination of choice) inform our judgment on whether the flight from U.S. exchanges was connected to SOX.<sup>9</sup>

Third, for cross-listed firms we have a more reliable way of controlling for contemporaneous events through the use of difference-in-differences methodology, following a method I developed in a prior paper.<sup>10</sup> My difference-in-differences solution is based on the differential application of SOX to otherwise similar foreign public companies. Because SOX applies to level-23 foreign companies (“treatment” group), but not to level-14 or unlisted foreign companies (two “control” groups), we have a natural experiment unavailable for U.S. firms.

In a prior paper, I compare a “treatment” set of level-23 companies from thirty-six countries to a “control” set of similar non-cross-listed companies (same country, same industry, similar in size) and to a second “control” set of level-14 companies from the same country. I find that stock prices of level-23 companies declined (increased) significantly, compared to both control groups, during key announcements indicating that SOX would (would not) fully apply to level-23 companies. I also find variation in the

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5. For examples of prior event studies, see Pankaj K. Jain & Zabihollah Rezaee, *The Sarbanes-Oxley Act of 2002 and Accounting Conservatism* (June 2004), <http://ssrn.com/abstract=554643>; Pankaj K. Jain, Jang-Chul Kim, & Zabihollah Rezaee, *Trends and Determinants of Market Liquidity in the Pre- and Post- Sarbanes-Oxley Act Periods* (Sept. 2006), <http://ssrn.com/abstract=488142>; Haidan Li, Morton Picus, & Sonja Olhofft Rego, *Market Reaction to Events Surrounding the Sarbanes-Oxley Act of 2002 and Earnings Management* (Sept. 24, 2006), <http://ssrn.com/abstract=475163>; Ivy Xiyang Zhang, *Economic Consequences of the Sarbanes-Oxley Act of 2002* (June 2005) (unpublished manuscript, on file with author).

6. See Ehud Kamar, Pinar Karaca-Mandic & Eric Talley, *Going-Private Decisions and the Sarbanes-Oxley Act of 2002: A Cross-Country Analysis* (USC CLEO Research, Paper No. C06-5, 2006), available at <http://ssrn.com/abstract=901769>; Ellen Engel, Rachel M. Hayes, & Xue Wang, *The Sarbanes-Oxley Act and Firms’ Going-Private Decisions* (May 6, 2004), <http://ssrn.com/abstract=546626>.

7. See Christian Leuz, Alexander J. Triantis, & Tracy Yue Wang, *Why Do Firms go Dark? Causes and Economic Consequences of Voluntary SEC Deregistrations* (Robert H. Smith Research, Paper No. RHS 06-045, 2006), available at <http://ssrn.com/abstract=592421>. Firms “go dark” when they stop filing with the SEC, but continue to sell over-the-counter.

8. See Peter Hostak, Emre Karaoglu, Thomas Lys, & Yong George Yang, *An Examination of the Impact of the Sarbanes-Oxley Act on the Attractiveness of U.S. Capital Markets to Foreign Firms* (Jan. 8, 2007), <http://ssrn.com/abstract=956020>.

9. See Luigi Zingales, *Is the U.S. Capital Market Losing Its Competitive Edge?* J. ECON. PERSP. (forthcoming 2007); Joseph D. Piotroski & Suraj Srinivasan, *The Sarbanes-Oxley Act and the Flow of International Listings* (Jan. 2007), <http://ssrn.com/abstract=956987>.

10. See Kate Litvak, *The Effect of the Sarbanes-Oxley Act on Foreign Companies Cross-Listed in the U.S.*, J. CORP. FIN. (forthcoming 2007).

reactions of level-23 firms. The negative reaction to SOX is strong for companies with high scores on a disclosure index produced contemporaneously by Standard & Poor's ("S&P") and for firms located in well-governed countries (using as proxies Europe, the median S&P disclosure score for all firms from each country, and each country's GDP per capita). The negative reaction is weaker for faster-growing firms. That is, for high-disclosing companies from well-governed countries, investors expected SOX to be particularly bad. For fast-growing, low-disclosing firms, SOX may have been neutral or even positive, on average, especially if those firms are located in poorly governed countries.<sup>11</sup>

In this paper, I extend my prior research to the question of cross-listing premia. Historically, cross-listed companies traded at a premium to similar non-cross-listed companies.<sup>12</sup> Traditional explanations—that cross-listing minimized costs created by market segmentation—have been undermined by the decline in segmentation brought by improvements in communications technologies. More recent research explains the cross-listing premium as due to legal bonding, where a high-quality company from a country with poor corporate governance credibly signals its quality and commits to good behavior by subjecting itself to the stricter laws, regulations, accounting rules, and listing standards of another country.<sup>13</sup> Such a commitment to high-quality governance may be valuable to firms' controlling investors, who, in exchange for giving up secrecy and opportunities for self-dealing, reduce a firm's costs of capital. The bonding theory predicts, and researchers find, higher cross-listing premia for level-23 companies than for less-regulated level-14 companies.<sup>14</sup>

If part of a level-23 firm's premium is determined by the quality of the U.S. governance regime, then, we can infer investors' reactions to SOX by comparing before- and after-SOX premia. Similar to Doidge and his co-authors,<sup>15</sup> I measure the cross-listing premium as the difference between the Tobin's *q* of firms subject to SOX (cross-listed on levels 2 or 3) and the Tobin's *q* of the two control groups of firms not subject to SOX (non-cross-listed or cross-listed on levels 1 or 4). As a robustness check, I also compare market-to-book ratios of firms subject to SOX and firms not subject to SOX.

I find that both Tobin's *q* and market-to-book ratios of level-23 companies declined significantly during 2002 relative to level-14 companies and

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11. *Id.*

12. G. Andrew Karolyi, *Why Do Companies List Shares Abroad? A Survey of the Evidence and its Managerial Implications*, 7 FIN. MARKETS, INSTITUTIONS AND INSTRUMENTS 1 (1998).

13. See John C. Coffee, Jr., *The Future as History: The Prospects for Global Convergence in Corporate Governance and its Implications*, 93 NW. U. L. REV. 641 (1999); John C. Coffee, Jr., *Racing Towards the Top?: The Impact of Cross-Listings and Stock Market Competition on International Corporate Governance*, 102 COLUM. L. REV. 1757 (2002).

14. See Craig Doidge, *U.S. Cross-Listings and the Private Benefits of Control: Evidence from Dual Class Firms*, 72 J. FIN. ECON. 519 (2004) [hereinafter *Dual Class*]; Craig Doidge, G. Andrew Karolyi, & Rene M. Stulz, *Why are Foreign Firms Listed in the U.S. Worth More?*, 71 J. FIN. ECON. 205 (2004).

15. Doidge et al., *supra* note 14.

relative to non cross-listed companies. The Tobin's q and market-to-book ratios of level-14 companies declined slightly (generally insignificantly) relative to non-cross-listed companies, and increased in some specifications. These results are robust across a variety of empirical specifications. Thus, the premium associated with trading in the United States was roughly constant, while the premium associated with being subject to U.S. regulation declined.

The declines in Tobin's q vary based on company and country characteristics. This variation is generally consistent with the hypothesis that well-governed firms suffered larger losses. The declines are larger for more profitable firms, for firms with a higher level of pre-SOX disclosure, for firms located in countries with higher levels of overall disclosure and higher GDPs per capita, and for firms in European countries. Smaller companies suffered larger declines, consistent with prior theoretical and empirical work reporting a size-based impact of SOX.<sup>16</sup> Riskier firms suffered larger declines as well, consistent with the view that SOX induces firms to reduce risk, possibly below optimal levels. The results for market-to-book ratios are consistent with the Tobin's q results, but they are less often statistically significant.

The remainder of this paper proceeds as follows: Part I summarizes the existing literature on cross-listing premia and develops testable hypotheses linking cross-listing premia to investors' reaction to SOX. Parts II and III discuss my sample and methodology. Part IV presents results. Part V proposes a "comply or explain" policy for level-23 firms that could help evaluate which provisions of SOX are thought by investors to be beneficial and which are thought to be detrimental.

## I. THE RELATIONSHIP BETWEEN SOX AND THE CROSS-LISTING PREMIUM

### A. Implications of the Cross-Listing Premium for Regulatory Quality

The cross-listing literature suggests there are two principal reasons why firms might decide to list on a foreign stock exchange: (i) to obtain greater liquidity for their shares and greater access to investor capital; and (ii) to bond the company to a better overall corporate governance regime (a combination of legal rules, securities regulations, accounting rules, listing standards, and analyst coverage). Recent research emphasizes the importance of the second, bonding explanation.<sup>17</sup>

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16. See Bengt Holmstrom & Steven Kaplan, *The State of U.S. Corporate Governance: What's Right and What's Wrong?*, 15 J. APPLIED CORP. FIN. 8 (2003); Vidhi Chhaochharia & Yaniv Grinstein, *Corporate Governance and Firm Value—The Impact of the 2002 Governance Rules*, J. FIN. (forthcoming 2007); Kamar et al., *supra* note 6; Modupe 'Jide' Wintoki, *Corporate Boards, Regulation and Firm Value: The Impact of the Sarbanes-Oxley Act and the Exchange Listing Requirements*, J. CORP. FIN. (forthcoming 2007).

17. For a comprehensive literature review, see G. Andrew Karolyi, *The World of Cross-Listings and Cross-Listings of the World: Challenging Conventional Wisdom* (Dice Center, Working Paper No. 2004-14, 2004), available at <http://ssrn.com/abstract=577021>. For evidence that cross-listing protects minority shareholders and reduces controllers' opportunism, see *Dual Class*; Alexander Dyck & Luigi

The payoff to companies for cross-listing may come partly through increased ability to issue new shares or to conduct share-financed acquisitions, even without an increase in equilibrium share price. But an important part of the payoff is a higher share price. Prior research finds that both level-23 companies and level-14 companies trade at a premium to apparently similar non-cross-listed companies, with level-23 companies enjoying a higher premium than level-14 companies.<sup>18</sup> Tobin's *q* is a common way to measure this premium<sup>19</sup> and is the principal measure I rely on in this paper. As a robustness check, I also use the market-to-book ratio.

The cross-listing premium varies over time, so it clearly depends on more than just the quality of the listing country's governance regime. Moreover, the premium is partly endogenous—firms that would in any case merit a higher premium are more likely to cross-list. Still, prior research suggests a remaining, plausibly causal effect, in which cross-listed firms trade at higher prices because there are net benefits to cross-listing.

The cross-listing premium is important to study for two largely distinct reasons. First, cross-listing has important costs (compliance with stricter governance and accounting rules; exposure to the threat of shareholder litigation, which is common in the United States and rare elsewhere, and so on). The premium is one of the principal benefits to foreign firms considering cross-listing, and might offset the incremental costs. If the premium declines, the competitiveness of U.S. securities markets presumably declines as well.

Second, if changes in the cross-listing premium can be tied to regulatory changes, they provide a rare opportunity to assess the quality of the regulatory changes as perceived by investors. If SOX truly provided a boost to investor confidence, the premia for level-23 companies should have risen after its adoption, as compared to the premia for level-14 companies. If it created greater regulatory cost than regulatory benefit, the level-23 premia should have fallen, and the wisdom of the regulatory change should perhaps be reconsidered.

My research design addresses only the apparent value of SOX for cross-listed firms. I do not address the value of SOX for U.S. firms. I study cross-listed firms in large part because the comparison of the treatment group of level-23 companies to the control groups of level-14 companies and non-cross-listed companies provides a reasonably direct measure of the impact of SOX that is not available for U.S. firms.

It is possible that SOX had net costs for cross-listed firms (at least those from well-governed countries), but net benefits for U.S. firms. Still, if the net cost of SOX for foreign firms from well-governed countries can be es-

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Zingales, *Private Benefits of Control: An International Comparison*, 59 J. FIN. 537 (2004); and Tatiana Nenova, *The Value of Corporate Voting and Control: A Cross-Country Analysis*, 68 J. FIN. ECON. 325 (2003).

18. Doidge et al., *supra* note 14.

19. *Id.*

tablished, this would support the possibility that the same conclusion may hold for U.S. companies.

### B. *Competing Explanations for Change in the Cross-Listing Premium*

Any effort to connect the adoption of SOX to a change in cross-listing premia must address competing explanations. It is not enough to observe that cross-listing premia declined in 2002, when SOX was adopted. Cross-listing premia might have declined for other reasons. My solution is to compare the premium for level-23 companies to the level-14 premium. This comparison factors out events that affect the general attractiveness of exposure to U.S. financial markets and provides a more focused look at the attractiveness of the extra regulation to which level-23 firms are subject. A central feature of my research design is that I study not only the cross-listing premium, but the difference in premia between level-23 and level-14 companies.<sup>20</sup>

A second possibility is that the decline in the level-23 versus level-14 premium is due not to adoption of SOX, but to the scandals that prompted SOX, which led investors to believe that U.S. governance was not as good as it was previously believed to be. This explanation would predict that the prices of level-23 companies would decline during scandal events, but remain stable or even increase around the time of news announcements related to SOX. My prior research largely rules out this explanation. The prices of level-23 companies declined significantly relative to their non-cross-listed matches during SOX adoption events (and rose significantly during one event which indicated regulatory flexibility). There was no significant price reaction to the mid-2002 announcement of the WorldCom scandal.<sup>21</sup>

Finally, companies that chose to cross-list on levels 2 or 3 might be systematically different from their peers that chose to cross-list on levels 1 or 4, or from those that chose not to cross-list at all. Although I control for a variety of company-level characteristics (such as size, profitability, industry, sales growth, pre-SOX level of unsystematic risk, leverage, the quality of disclosure, and so forth), it is possible that there is an unobserved difference that drives the result. It is possible, for example, that the same unobserved characteristic that caused firms to cross-list on level 2 or 3 in the first place later caused the decline in those firms' premia during the SOX year. This possibility cannot be entirely ruled out. Still, it seems unlikely, given the large number of robustness checks that I perform, and given the complementary findings of my event study paper.

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20. Cf. Committee on Capital Markets Regulation, Interim Report (Nov. 30, 2006), [http://www.capmktreg.org/pdfs/11.30Committee\\_Interim\\_ReportREV2.pdf](http://www.capmktreg.org/pdfs/11.30Committee_Interim_ReportREV2.pdf) (reporting, in a widely publicized study with a distinguished group of academic and non-academic authors—including R. Glenn Hubbard, Luigi Zingales, Reinier Kraakman, Allen Ferrell, Kenneth Scott, John Coffee, and Peter Tufano—evidence that the premium to level-23 companies declined during 2002, but not addressing whether this premium declined relative to the level-14 premium).

21. Litvak, *supra* note 10. My event study paper does not study other scandals, such as the Enron bankruptcy.

### C. Hypothesis Development

A number of legal scholars have argued that the costs of SOX outweigh the benefits.<sup>22</sup> Some have suggested that this is also true for foreign cross-listed companies.<sup>23</sup> I test this prediction, which can be formalized as follows:

**Main Hypothesis 1:** *Cross-listing premia for foreign companies subject to SOX declined during the period of SOX adoption, relative to cross-listing premia of foreign companies not subject to SOX.*

In addition, if the Act's requirements both improve firm governance and increase compliance costs, it is plausible that well-governed firms and firms from countries with high-quality corporate governance and institutional environment will realize smaller benefits than costs, and thus will be hurt more than poorly-governed firms and firms from countries with low-quality corporate governance and institutional environment. I therefore test the following sub-hypotheses:

**Sub-Hypothesis 2a:** *Cross-listed companies that were well governed prior to SOX adoption experienced larger declines in cross-listing premia during the period of SOX adoption.*

**Sub-Hypothesis 2b:** *Cross-listed companies from countries with high-quality corporate governance and institutional environment experienced larger declines in cross-listing premia during the period of SOX adoption.*

Because some Sarbanes-Oxley compliance costs are either fixed or increase less than proportionately with firm size, while benefits seem more likely to be proportional to firm size, small firms might be particularly disadvantaged by SOX. I therefore test the following sub-hypothesis:

**Sub-Hypothesis 3:** *Larger cross-listed companies experienced smaller declines in cross-listing premia during the period of SOX adoption than smaller cross-listed companies.*

Faster growing firms, with greater need to raise external capital, may also benefit more (be harmed less) by SOX than slower growing firms. I therefore test the following sub-hypothesis:

**Sub-Hypothesis 4:** *Faster-growing cross-listed companies experienced smaller declines in cross-listing premia during the period of SOX adoption than slower-growing cross-listed companies.*

Critics argued that SOX increases managerial risk-aversion by penalizing non-traditional business strategies. If firms adopt risk levels in response to their unique needs, riskier firms may be hurt more by SOX because the reduction in risk imposes larger costs on them.

**Sub-Hypothesis 5:** *Riskier cross-listed companies subject to SOX experienced larger declines in cross-listing premia during the period of SOX adoption than less risky companies.*

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22. Romano, *supra* note 2; *SOX After Three Years*.

23. Larry E. Ribstein, *International Implications of Sarbanes-Oxley: Raising the Rent on U.S. Law*, 3 J. CORP. L. STUD. 299 (2003).

## II. THE SAMPLE AND VARIABLES

### A. Sample

Foreign securities can be listed in the United States on four different levels: (1) Level 1 ADRs are sold over-the-counter (“OTC”) and require minimal SEC registration and no additional disclosure; (2) Level 2 ADRs are listed on U.S. securities exchanges, principally the New York Stock Exchange (“NYSE”) or traded on the NASDAQ national market system; they must comply with the registration and reporting requirements of the Securities Exchange Act and related SEC rules; (3) Level 3 ADRs involve a public offering of securities in the United States, typically followed by listing and trading on a U.S. exchange or the NASDAQ national market system; they must comply with the registration and reporting requirements of the Securities Exchange Act and related SEC rules; (4) Level 4 ADRs are for securities with trading limited to large institutional investors in the “PORTAL” market under SEC Rule 144A; they are not subject to SEC regulation. The Sarbanes-Oxley Act applies to foreign companies cross-listed on levels 2 and 3.

To construct a sample of cross-listed companies, I begin with a list of all foreign companies cross-listed in the United States on all levels of listing (OTC, stock exchanges and NASDAQ, and PORTAL) between 2001 and 2005, obtained by combining the Citigroup Universal Issuance Guide with the Citigroup Capital Raising database.<sup>24</sup> Information on Canadian firms that are traded on NYSE and NASDAQ is obtained from the exchanges’ websites.<sup>25</sup> For all companies that had several listing types, I assign the most regulated listing level. That is, if a company is traded on NYSE (level 2) and OTC (level 1), I treat it as a level 2 company.

I match the cross-listed firms onto the Datastream database, which contains share price and financial data. The result is a list of all 1204 foreign companies cross-listed in the United States (on all listing levels) for which trading data is available between January 2001 and May 2005. I then match every cross-listed company to the non-cross-listed company in the same country and the same industry that is the closest in size as measured by market capitalization as of July 2005, for which trading data are available for 2001–2005 on Datastream. Matched companies are similar in governance characteristics: the correlation in S&P disclosure scores between cross-listed companies and their matches is 0.76. I exclude affiliates of foreign companies and branches of the same company that are recognizable by name. The final sample is 1016 cross-listed companies, of which 385 are level-23 and 631 are level-14, plus their matched pairs. Table 1, Panel A provides summary statistics on the countries that cross-listed firms come from.

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24. Citigroup, <http://wwss.citissb.com/adr/www/brokers/index.htm> (last visited Feb. 6, 2007).

25. The shares of Canadian firms are traded directly on U.S. exchanges or on NASDAQ. Shares of most other companies are first converted to ADRs; the ADRs are then traded. The Citigroup databases provide a list of ADRs, but not Canadian shares.

TABLE I  
DESCRIPTIVE STATISTICS

PANEL A: SUMMARY DATA ON MATCHED PAIRS

The second column indicates the number of cross-listed companies in each country with trading data for 2001–2005 available on Datastream. Each cross-listed company is matched with a non-cross-listed company from the same country and industry, and closest available market capitalization as of July 2005. Difference in market capitalization is not capped. The third column contains the number of cross-listed companies with an available match. The fourth column contains the number of level-23 matched pairs. The fifth column contains the median market capitalization of cross-listed companies (all levels) and matched non-cross-listed companies.

1	2	3	4	5
Country	Cross-Listed Companies, All Levels	Matched Pairs, All Levels	Level-23 Matched Pairs	Median Market Cap of Cross-Listed Companies (Matches), \$M
Argentina	18	13	10	435 (223)
Australia	59	52	11	124 (86)
Belgium	3	3	1	5647 (2071)
Brazil	53	44	23	659 (388)
Canada	95	85	85	1185 (428)
Chile	14	13	11	1565 (950)
Croatia	1	0	0	
Czech Republic	1	0	0	
China	24	20	6	324 (170)
Denmark	3	2	1	17,387 (15,906)
Ecuador	1	1	0	
Egypt	8	6	0	671 (357)
Finland	9	7	4	2402 (398)
France	40	40	26	6260 (617)
Germany	39	36	19	7318 (692)
Greece	8	6	2	4479 (52)
Hong Kong	90	88	9	644 (182)
Hungary	10	3	0	2560 (131)
India	66	52	9	643 (278)
Indonesia	4	0	0	
Ireland	12	6	2	887 (933)
Israel	14	10	7	303 (116)
Italy	21	21	9	3394 (384)
Japan	125	113	20	4753 (2526)
Korea	29	25	5	4799 (621)
Luxembourg	2	2	1	1288 (122)

1	2	3	4	5
Country	Cross-Listed Companies, All Levels	Matched Pairs, All Levels	Level-23 Matched Pairs	Median Market Cap of Cross-Listed Companies (Matches), \$M
Malaysia	12	12	0	214 (134)
Mexico	30	26	15	720 (281)
Morocco	1	1	0	1026 (631)
Netherlands	32	11	6	1454 (315)
New Zealand	6	4	2	1061 (1361)
Norway	15	12	4	1141 (617)
Pakistan	3	3	0	513 (73)
Peru	5	4	2	558 (322)
Philippines	14	12	1	460 (52)
Poland	12	7	0	432 (18)
Portugal	7	4	1	2514 (447)
Romania	1	0	0	
Russia	22	21	2	1128 (265)
Singapore	20	19	2	1663 (674)
Slovakia	1	1	0	175 (1501)
South Africa	35	30	7	805 (157)
Spain	11	8	5	27,756 (2,830)
Sri Lanka	1	1	0	529 (183)
Sweden	22	19	11	4589 (852)
Switzerland	18	15	10	17,381 (2,120)
Taiwan	39	36	4	1411 (816)
Thailand	11	10	0	524 (245)
Turkey	15	14	0	683 (346)
United Kingdom	110	94	51	4912 (792)
Venezuela	11	4	1	57 (16)
<b>TOTAL</b>	<b>1203</b>	<b>1016</b>	<b>385</b>	<b>1792 (503)</b>

### B. Variables

To measure company-level governance, I use the measure of disclosure developed by Standard and Poor's in 2001, the year before SOX was adopted. The S&P ratings have been used in the literature before.<sup>26</sup> The total score is composed of three sub-scores—financial transparency and information disclosure, board and management structure and process, and

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26. See Doidge et al., *supra* note 14; Art Durnev & E. Han Kim, *To Steal or Not to Steal: Firm Attributes, Legal Environment, and Valuation*, 60 J. FIN. 1461 (2005).

ownership structure and investor relations.<sup>27</sup> I report the results for the cumulative score; results for sub-scores are consistent (not reported). After matching the S&P sample against my sample, I get 449 overlapping observations, including 155 level-23 companies. An alternative measure of company-level governance, developed by Credit Lyonnais Securities Asia (“CLSA”), produces only 47 level-23 overlaps with my dataset and is therefore not useful for this project.

As a measure of firm-level ownership concentration, I use NOSHEM, a Datastream variable defined as the percentage of a company’s shares held by executives with significant voting power and by employees. I am able to match 888 companies, 335 of them listed on levels 2 or 3. Alternative measures of ownership concentration, developed by Faccio and Lang,<sup>28</sup> and by Claessens and others,<sup>29</sup> produce a small number of overlaps with my dataset and are not usable.

Firm-level data for company size, sales growth, leverage, industry, and EBIT (“earnings before interest and taxes”) are from the Datastream database. I measure company size as assets at year-end of 2001, measured in millions of U.S. dollars. Sales growth is the two-year geometric average of annual growth in sales from 1999 to 2001. I use sales growth as a measure of a firm’s growth opportunities.<sup>30</sup> After missing observations of sales growth are eliminated, the number of SOX-affected matched pairs declines from 385 to 299.

I compute leverage as the book value of debt divided by the value of common equity; after missing observations are dropped, the set of SOX-affected matched pairs shrinks from 385 to 322.

I compute Tobin’s *q* as follows: For the numerator, I use the sum of book value of preferred shares, market value of common shares, and book value of debt. For the denominator, I use book value of assets. After missing observations are eliminated, the set of level-23 pairs shrinks from 385 to 319.

As a measure of profitability, I use net income margin: the ratio of net income before preferred dividends over total sales. After eliminating firms with missing data, I reduce the size of the level-23 set from 385 to 304. I measure unsystematic risk as the standard deviation of a firm’s abnormal returns during 2001, relative to a country-level market index.

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27. For discussion of the S&P methodology, see Sandeep A. Patel & George S. Dallas, *Transparency and Disclosure: Overview of Methodology and Study Results—United States* (October 16, 2002), <http://ssrn.com/abstract=422800>.

28. Mara Faccio & Larry H.P. Lang, *The Ultimate Ownership of Western European Corporations*, 65 J. FIN. ECON. 365 (2002).

29. Stijn Claessens, Simeon Djankov & Larry H.P. Lang, *The Separation of Ownership and Control in East Asian Corporations*, 58 J. FIN. ECON. 81 (2000).

30. Sales growth is commonly used as a proxy for a firm’s growth opportunities. See Rafael La Porta, Florencio Lopez-De-Silanes & Andrei Shleifer, *What Works in Securities Laws?*, 61 J. FIN. 1 (2006); Craig Doidge, G. Andrew Karolyi, & Rene M. Stulz, *Why Do Countries Matter so Much for Corporate Governance?* (ECGI, Working Paper No. 50/2004, 2004), available at <http://ssrn.com/abstract=580883>.

As country-level variables, I use several measures developed by La Porta and his co-authors (antidirector rights, accounting rules), as well as an alternative measure of antidirector rights developed by Spamann.<sup>31</sup> I also use several measures of countries' political economies developed by Mark Roe—budget of the financial regulator, government subsidies and transfers, and labor regulation.<sup>32</sup>

Gross Domestic Product per capita is from the World Bank's World Development Indicators database for 2001.

Table 1, Panel B contains univariate comparisons of independent variables.

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31. Rafael La Porta, Florencio Lopez-de-Silanes & Robert W. Vishny, *Law and Finance*, 106 J. POL. ECON. 1113 (1998); Holger Spamann, *On the Insignificance and/or Endogeneity of La Porta et al.'s "Anti-Director Rights Index" under Consistent Coding* (Harvard Law Sch. John M. Olin Ctr. Discussion Paper No. 7, 2006), available at <http://ssrn.com/abstract=894301>.

32. Mark J. Roe, *Legal Origins, Politics, and Modern Stock Markets*, 120 Harv. L. Rev. 460 (2006).

TABLE I DESCRIPTIVE STATISTICS  
 PANEL B: CORRELATIONS TABLE

	Ln Assets	Profitability	Firm-Level Disclosure	Sales Growth	Insider Ownership	Unsystematic Risk	Country Disclosure	Ln GDP/Capita	IPO/Capita	Labor Regulation	Antidirector Rights, Spamann	Antidirector Rights, LLSV
Ln Assets	1.000											
Profitability	0.035	1.000										
Firm-Level Disclosure	-0.194	-0.038	1.000									
Sales Growth	-0.127	-0.053	0.035	1.000								
Insider Ownership	-0.093	0.088	0.021	0.009	1.000							
Unsystematic Risk	0.122	0.079	-0.212	0.075	-0.010	1.000						
Country Disclosure	-0.214	-0.060	0.951	0.032	0.017	-0.210	1.000					
Ln (GDP per Capita)	-0.037	-0.025	0.541	-0.031	0.034	-0.172	0.546	1.000				
IPO per Capita	-0.325	-0.025	0.123	0.049	0.047	-0.257	0.123	0.315	1.000			
Labor Regulation	0.161	0.001	-0.069	-0.050	0.121	0.100	-0.065	-0.115	-0.583	1.000		
Antidirector, Spamann	0.102	-0.016	0.127	-0.043	-0.059	-0.114	0.137	0.275	0.349	-0.266	1.000	
Antidirector Rights, LLSV	-0.116	0.037	0.117	0.031	-0.072	-0.152	0.113	0.026	0.578	-0.715	0.412	1.000
Accounting	-0.238	-0.062	0.615	0.024	0.001	-0.240	0.632	0.547	0.531	-0.407	0.374	0.419

### III. METHODOLOGY

I measure cross-listing premia in two ways: on a pair level and on an individual company level. The methodology is the same with Tobin's  $q$  and market-to-book as the dependent variable; the discussion below assumes the dependent variable is Tobin's  $q$ .

#### A. After-Minus-Before Differences

I use year-end 2002 as the after-SOX measurement date and year-end 2001 as the before-SOX date. Regulatory events related to SOX and its application to foreign companies begin in January 2002 and continue through October 2002.<sup>33</sup> I am interested in the after-minus-before change in Tobin's  $q$ .

For company-level results, I calculate  $\ln(\text{Tobin's } q)$  at year-end 2001 ("before") and year-end 2002 ("after") for each cross-listed company and each non-cross-listed matching firm, winsorized at 1%/99%, and an after-minus-before change in the winsorized values ( $\delta \ln Q$ ). I also compute two country-level indices: (i) "Index Level-14 Cross-Listed Companies" ( $I_{14}$ ) which equals the median for each country of  $\delta \ln Q$  for level-14 companies, and (ii) "Index Non Cross Listed Companies" ( $I_{ncl}$ ), which equals the median for each country of  $\delta \ln Q$  for non-cross-listed companies.

For each matched pair, I calculate a "pair premium" (PP) at year-end 2001 and year-end 2002. The pair premium is  $\ln(\text{Tobin's } q)$  of a cross-listed company minus the Tobin's  $q$  of its match), which I then winsorize at 1%/99%. I then compute the after-minus-before difference in the pair premium (DDQ). For each country, I also compute a "Matched Pairs Index 14" ( $I_{MP14}$ ) that equals the median of DDQ for level-14 companies.

This pair premium captures the value of exposure to U.S. markets and, for level-23 firms, U.S. regulation, as perceived by investors. It also captures any other sources of differences in Tobin's  $q$  that are not captured by the match on country and industry and the rough match on size. These differences are known to be important—for example, firms that cross-list generally have higher growth prospects than apparently similar firms that do not cross-list.<sup>34</sup>

Tobin's  $q$  values and, even more so, market/book ratios are prone to outliers, typically for firms with high levels of intangible assets or very low book values (often reflecting prior losses). To reduce the effect of outliers, I winsorize all observations at 1%/99%, as noted above. In robustness checks (not reported), I winsorize at different levels, do not take logarithms, and exclude outliers rather than winsorizing. Results for  $\ln(\text{Tobin's } q)$  are similar; results for  $\ln(\text{market/book})$  are similar but somewhat weaker without winsorizing or excluding outliers; results without taking logs are weaker, and regression standard errors may also be biased due to non-normality of the residuals.

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33. See Litvak, *supra* note 10.

34. See, e.g., Doidge et al., *supra* note 14.

More formally, let  $c$  index countries,  $l$  index listing level ( $l = 23, 14$ , or match),  $i$  index the  $n$  cross-listed companies (for convenience, let  $i$  cumulate across all firms in all countries),  $t$  index year, and  $n_{23}$  ( $n_{14}$ ) be the number of level-23 (level-14) firms in the sample. Let  $Q_{c,23,i,t}$  be the Tobin's  $q$  of level-23 cross-listed company  $i$ , from country  $c$ , on level 23, at time  $t$ , and similarly for level-14 and non-cross-listed companies. We are interested in the change in company and pair premia:

Companies:

$$\delta \ln Q_{c,l,i} = \ln(q)_{c,l,i,after} - \ln(q)_{c,l,i,before}$$

Matched Pairs:

$$DDQ_{c,l,i} = \ln(Q_{c,23or14,i,after} - Q_{c,match,i,after}) \\ - \ln(Q_{c,23or14,i,before} - Q_{c,match,i,before})$$

For all level-23 companies, the mean after-minus-before change in  $\ln(\text{Tobin's } q)$  is

$$\delta \ln Q_{23} = \left[ \frac{1}{n_{23}} \sum_{l=23} (\delta \ln Q_{c,l,i}) \right]$$

And similarly for level-14 firms and non-cross-listed firms.

The difference between the change in mean  $\ln(\text{Tobin's } q)$  for cross-listed firms on level 23 and the change for non-cross-listed firms is

$$\Delta \delta \ln Q_{23} = \delta \ln Q_{23} - \delta \ln Q_{match}$$

And similarly for the difference between level-14 firms and non-cross-listed firms.

For matched pairs, the analogous difference in means is

$$DDQ_{23} = \left[ \frac{1}{n_{23}} \sum_{l=23} (DDQ_{c,l,i}) \right]$$

And similarly for level-14 pairs and all pairs.

Computational dissimilarities (based on when we take logs) aside, the "companies" and "pairs" differences in means differ only because the comparison set of non-cross-listed companies for the "companies difference"  $\Delta \delta \ln Q_{23}$  includes *all* non-cross-listed companies in the sample, not only the matches for the level-23 companies.

Finally, for companies, I compute the difference between (the difference in mean  $\ln(\text{Tobin's } q)$  for level-23 firms versus matching firms) and (the analogous difference for level-14 firms versus-matching firms):

$$T \delta \ln Q_{23-14} = \Delta \delta \ln Q_{23} - \Delta \delta \ln Q_{14}$$

For matched pairs, I similarly compute the difference between (the mean after-minus-before difference in pair premia for level-23 pairs) and (the mean after-minus-before difference in pair premia for level-14 pairs), as

$$TDQ_{23-14} = (DDQ_{23} - DDQ_{14})$$

The difference between (level-23 differences versus non-cross-listed firms) and (level-14 differences versus cross-listed firms) should hopefully control for other factors that affect the attractiveness of U.S. equity markets generally.

Computational dissimilarities aside, the “companies” and “pairs” differences in differences-in-means are again quite similar. The principal distinction is that in the companies specification, each group is not first compared to its firm-specific matches. The estimates will differ primarily if the mean change in Tobin’s  $q$  for the level-23 matches differs from the mean change in Tobin’s  $q$  for the level-14 matches.

The  $\Delta \delta \ln Q$  variable for company-level results (DDQ for matched pairs) can be understood as a difference-in-difference estimate.<sup>35</sup> For pairs, for example, the pair premium (difference in Tobin’s  $q$  between a cross-listed firm and its match) is the first difference, and the before-to-after difference in pair premia is the second difference. The  $T\delta \ln Q$  variable for company results ( $TDQ$  variable for matched pairs) can be understood as a triple difference estimate.

#### B. Regression Analysis: Cross-Sectional Variation

I also conduct regression estimates of the firm-level or pair-level after-minus-before change in Tobin’s  $q$ , and the factors that predict cross-sectional variation in firm (pair) changes. Consider first regressions with the sample limited to level-23 companies or pairs. For level-23 companies, the regression equation analogous to triple differences is

$$\{\delta \ln Q_{c,l,i} = \alpha + \eta_1 * I_{14} + \eta_2 * I_{ncl} + \mathcal{E}_{c,l,i} \mid l = 23\}$$

The coefficient  $\alpha$  on the constant term gives the estimated before-to-after change in Tobin’s  $q$  for level-23 companies. The  $I_{14}$  and  $I_{ncl}$  indices control for country-level changes in mean Tobin’s  $q$  for level-14 companies and non-cross-listed companies. All regressions also include country random effects to control for country-level factors that affect Tobin’s  $q$  but are not captured by these indices. In robustness checks, I also use country fixed effects, with similar results (not reported). I present random effects specifications because this allows me to report the coefficients on country-level variables; these variables are dropped with country fixed effects.

For level-23 pairs, the analogous regression equation is simply

$$\{DD_{c,l,i} = \alpha + \eta * I_{MP14} + \mathcal{E}_{c,l,i} \mid l = 23\}$$

The coefficient  $\alpha$  on the constant term gives the estimated before-to-after change in  $\ln(\text{pair difference in Tobin’s } q)$  for level-23 pairs. The  $I_{MP14}$  index

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35. See, e.g., Marianne Bertrand, Esther Duflo & Sendhil Mullainathan, *How Much Should We Trust Differences-in-Differences Estimates?*, 119 Q. J. ECON. 249 (2004).

controls for country-level changes in the differences in Tobin's q between level-14 firms and their matches.

An alternative approach is to include all cross-listed companies in the regression, and add a dummy variable ( $dum_{23} = 1$  for level-23 companies, 0 otherwise) to capture the return to level-23 companies, and similarly for matched pairs. For companies, the regression equation becomes

$$\delta \ln Q_{c,l,i} = \alpha + \chi * dum_{23} + \eta_1 * I_{14} + \eta_2 * I_{ncl} + \varepsilon_{c,l,i}$$

For matched pairs, the analogous regression is

$$DD_{c,l,i} = \alpha + \chi * dum_{23} + \eta * I_{MP14} + \varepsilon_{c,l,i}$$

In both regressions, the coefficient  $\chi$  on the level-23 dummy gives the estimated change in  $\ln(\text{Tobin's } q)$ , controlling for changes in Tobin's q for level-14 and non-cross-listed firms.

These regression equations can be extended to assess the importance of firm-level characteristics (for example, size, sales growth, firm-level disclosure) and country-level characteristics (for example, GDP, country-level disclosure quality, or creditor rights) in predicting cross-sectional variation in the after-minus-before change in Tobin's q. Let  $X_j$  be a vector of firm and country characteristics, indexed by  $j$ . Consider first a regression limited to level-23 companies or pairs. We can estimate, for companies

$$[\delta \ln Q_{c,l,i} = \alpha + \sum_j (\beta_j * X_j) + \eta_1 * I_{14} + \eta_2 * I_{ncl} + \varepsilon_{c,l,i} \quad | \quad l = 23]$$

And for matched pairs

$$[DD_{c,l,i} = \alpha + \sum_j (\beta_j * X_j) + \eta * I_{MP14} + \varepsilon_{c,l,i} \quad | \quad l = 23]$$

In both equations, the  $\beta_j$  provide estimates of the effect of the  $X_j$  on the after-minus-before change in Tobin's q.

For regressions including all cross-listed companies (all pairs), the regression equations are

$$\begin{aligned} \delta \ln Q_{c,l,i} = & \alpha + \chi * dum_{23} + \sum_j (\beta_j * X_j) + \eta_1 * I_{14} + \eta_2 * I_{ncl} \\ & + \sum_j \omega_j * dum_{23} * X_j + \mathcal{E}_{c,l,i} \end{aligned}$$

$$\begin{aligned} DD_{c,l,i} = & \alpha + \chi * dum_{23} + \sum_j (\beta_j * X_j) + \eta * I_{MP14} \\ & + \sum_j \omega_j * dum_{23} * X_j + \mathcal{E}_{c,l,i} \end{aligned}$$

The coefficients  $\omega_j$  on the interaction terms give the predicted effect of the firm-level or country-level variable on the difference in after-minus-before Tobin's q (or market/book ratio) between level-23 and level-14 companies (pairs).

#### IV. RESULTS

Table 2 presents basic results for the changes in cross-listing premia before and after SOX adoption. The pre-SOX period is defined as the year-end 2001 and post-SOX period as the year-end 2002. As a robustness check, I narrow down the before-and-after period to the interval between April and October of 2002, when most of the important SOX-related information was released, with similar results.<sup>36</sup>

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36. For details on relevant dates of information releases, see Litvak, *supra* note 10,.

TABLE 2  
AFTER SOX (YEAR-END 2002) MINUS BEFORE SOX (YEAR-END 2001)  
CHANGES IN LN(TOBIAN'S Q) AND LN(MARKET/BOOK RATIO)

**All panels:** Symbols \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels. Significant results (at 10% level or better) are in **boldface**.

**Panel A:** Mean after (2002) minus before (2001) changes in ln(Tobin's q) for cross-listed companies separated by listing level (Column 2) and for all non-cross-listed companies (Column 3). The double difference is reported in Column 4, and its statistical significance is reported in Columns 5 and 6. Double differences are winsorized at 1%/99%.

PANEL A: RESULTS FOR SINGLE COMPANIES, LN(TOBIAN'S Q)

		Xlisted Firms by Level	All Non-Xlisted Firms	Xlisted – Non-Xlisted Change	T-Stat (Xlisted – Non-Xlisted)	Wilcoxon (Xlisted v Non-Xlisted)	No. of Xlisted (Non-Xlisted) Firms
	1	2	3	4	5	6	7
1	All	-0.107	-0.099	-0.008	0.44	<b>1.77*</b>	806 (729)
2	Level-23	-0.171	-0.099	-0.072	<b>-2.75**</b>	<b>-2.75**</b>	315
3	Level-14	-0.067	-0.099	0.032	1.56	<b>3.60***</b>	491
4	T-Stat (23 minus 14)			<b>-4.49***</b>			
5	Wilcoxon (23 minus 14)			<b>-4.61***</b>			

**Panel B:** Mean after-minus-before change in the difference between ln(Tobin's q of cross-listed firm minus Tobin's q of non-cross-listed match), for all matched pairs (row 1), level-23 pairs (row 2) and level-14 pairs (row 3). Each pair consists of one cross-listed company and a match from the same country, same industry, and similar in size. The double difference is reported in Column 4 and its statistical significance is in Columns 5 and 6. Double differences are winsorized at 1%/99%.

PANEL B: RESULTS FOR MATCHED PAIRS, LN(TOBIAN'S Q)

		Pair Premium Before SOX	Pair Premium After SOX	After Minus Before Change	T-Statistic (After – Before)	Wilcoxon (After – Before)	No. of Matched Pairs
	1	2	3	4	5	6	7
1	All	-0.0106	-0.0158	-0.0052	0.28	1.50	574
2	Level-23	-0.0035	-0.0234	-0.0199	0.88	0.96	221
3	Level-14	-0.0160	-0.221	-0.006	-0.35	1.16	353
4	T-Stat (23 – 14)			0.92			
5	Wilcoxon (23 – 14)			0.15			

**Panel C:** Similar to Panel A except it uses  $\ln(\text{market-to-book ratio})$  instead of  $\ln(\text{Tobin's } q)$ .

PANEL C: RESULTS FOR SINGLE COMPANIES, LN  
(MARKET-TO-BOOK RATIO)

		Xlisted Firms by Level	All Non-Xlisted Firms	Xlisted – Non-Xlisted Change	T-Stat (Xlisted – Non-Xlisted)	Wilcoxon (Xlisted v Non-Xlisted)	No. of Xlisted (Non-Xlisted) Firms
	1	2	3	4	5	6	7
1	All	-0.148	-0.0965	-0.0515	-1.91*	-2.47**	729 (685)
2	Level-23	-0.237	-0.0965	-0.1405	-3.74***	-4.74***	267
3	Level-14	-0.096	-0.0965	0.0005	0.27	0.259	462
4	T-Stat (23 – 14)			-3.80***			
5	Wilcoxon (23 – 14)			-3.82***			

**Panel D:** Similar to Panel B except it uses market-to-book ratio instead of Tobin's  $q$ .

PANEL D: RESULTS FOR MATCHED PAIRS, LN  
(MARKET-TO-BOOK RATIO)

		Pair Premium Before SOX	Pair Premium After SOX	After Minus Before Change	T-Statistic (After – Before)	Wilcoxon (After – Before)	No. of Matched Pairs
	1	2	3	4	5	6	7
1	All	0.104	0.0569	-0.047	-1.69*	-2.34**	516
2	Level-23	0.163	0.119	-0.044	-1.77*	-2.17**	187
3	Level-14	0.054	0.0459	-0.008	-0.73	-1.27	329
4	T-Stat (23 – 14)			-1.08			
5	Wilcoxon (23 – 14)			-0.99			

Panel A contains the results of a single-company approach. Column 2 contains mean after-minus-before SOX changes in Tobin's  $q$  for cross-listed companies, separately for those subject to SOX (Row 2) and those not subject to SOX (Row 3). Next, I determine whether Tobin's  $q$  of cross-listed companies subject to SOX also declined as compared to non-cross-listed companies. The after-minus-before SOX changes in Tobin's  $q$  of non-cross-listed companies are reported in Column 3; Column 4 reports double differences. During 2002, the average Tobin's  $q$  of all groups of foreign companies declined, but it declined most strongly in companies subject to SOX. Level-23 companies lost on average 17% of their Tobin's  $q$ , which is 7.2 % more than the loss of non-

cross-listed companies from the same country. Level-14 companies lost on average 6.7 percent of their Tobin's *q*. The difference between the loss of level-23 companies and the loss of non-cross-listed companies is statistically significant, as reported in Columns 5 and 6. Likewise, the difference between the declines of level-23 companies and level-14 companies is significant (Column 2, Rows 4 and 5). That is, SOX-affected firms lost more value than either category of SOX-unaffected firms. The difference between the loss of level-14 companies and the loss of non-cross-listed companies is significant, but with the opposite sign. That is, the premia of SOX-affected cross-listed firms declined significantly, while the premia of other cross-listed firms increased. This supports the view that investors reacted negatively to the contents of SOX and separated cross-listed companies subject to SOX from cross-listed companies not subject to SOX.

Panel B looks at matched pairs rather than individual companies. There is a drop in sample size, due to the need for data on Tobin's *q* for two firms at two dates. Pair premium is calculated as  $\ln(\text{Tobin's } q \text{ of a cross-listed company} - \text{Tobin's } q \text{ of its non-cross-listed match})$ , separately for the before-SOX period (Column 2) and the after-SOX period (Column 3). As Rows 4 and 5 show, both before and after SOX, level-23 pairs had higher pair premia than level-14 pairs, but the difference is not significant.

Panels C and D parallel Panels A and B, but they use market-to-book ratios as an alternative measure of cross-listing premia, with similar results. As Panel C shows, mean market-to-book ratios of level-23 companies declined significantly during 2002 (by 23.7%), while mean market-to-book ratios of level-14 companies and non-cross-listed companies declined only slightly (9.6% and 9.7%, respectively). As Columns 5 and 6 report, the difference is significant for level-23 companies, but not for level-14 companies. The difference between these two groups is significant. That is, premia of SOX-affected cross-listed firms declined compared to both control groups, but premia of SOX-unaffected cross-listed firms did not change significantly.

Likewise, as Panel D shows, mean premium of level-23 pairs was 16.3% before SOX (Column 2) and declined by 4.4% after SOX (Column 4). At the same time, pair premia of level-14 pairs declined only slightly, by 0.8 percent (Column 4). The decline is statistically significant for level-23 pairs, but not for level-14 pairs (Columns 5 and 6).

In short, foreign companies cross-listed in the United States, but not exposed to SOX, exhibited changes in market-to-book ratios similar to those of foreign companies not cross-listed in the United States. The decline of level-23 firms appears to be driven by the exposure to SOX itself, not by general trends common to all companies traded in the United States.

The four panels of Table 2 provide four different measures of changes in cross-listing premia, and the results are similar. Three panels support the view that cross-listing premia of companies subject to SOX declined after the adoption of SOX, as compared to the changes in premia of non-cross-listed companies or cross-listed companies not subject to SOX. One panel (Panel B) contains insignificant results.

Table 3 presents basic regression results. Panel A reports after-minus-before changes for single companies, with Tobin's  $q$  (Columns 1 and 2) and market-to-book ratios (Columns 3 and 4) as measures of premia. I control for contemporaneous events by using two hand-collected indices: a median after-minus-before SOX change in  $\ln(\text{Tobin's } q)$  for companies cross-listed on level 1 or 4 (this controls for exposure to U.S. markets without exposure to SOX), and a median after-minus-before SOX change in  $\ln(\text{Tobin's } q)$  for non cross-listed companies (this controls for contemporaneous home-country events). I also control for company size and home country GDP per capita.

In Columns 1 and 3, the sample is all foreign companies, listed on all levels. The coefficient of interest is that on the "Dummy-23" variable. This coefficient is negative and significant at a 1% level for both Tobin's  $q$  and market-to-book specifications. In Columns 2 and 4, I limit the sample to level-23 companies only; the coefficient of interest is on the constant term. This coefficient is negative and significant in both specifications. That is, foreign companies subject to SOX experienced significant declines in cross-listing premia as compared to foreign companies cross-listed in the United States but not subject to SOX.

TABLE 3  
 BASIC REGRESSIONS FOR LN(TOBIAN'S Q)  
 AND LN(MARKET-TO-BOOK)

**Panel A: Single Companies.** In Columns (1) and (2), the dependent variable is the firm-level after (2002) minus before (2001) change in  $\ln(\text{Tobin's } q)$  for cross-listed companies. In Columns (3) and (4), the dependent variable is the after-minus-before difference in  $\ln(\text{market-to-book ratio})$ . The independent variables are the following: "Dummy-23" is a dummy variable equal to 1 if the company is listed on level 2 or 3;  $\ln(\text{assets})$ ;  $\ln(\text{GDP per capita})$ ; "Level-14 Index" is the country-level median of the after-minus-before difference in the dependent variable for cross-listed level-14 companies; "Non-Cross-Listed Index" is the country-level median of the after-minus-before difference in the dependent variable for non cross-listed companies, and a constant term. In Columns 1 and 3, the sample is all cross-listed companies on all levels; the coefficient of interest is on Dummy-23. In Columns 2 and 4, the sample is limited to level-23 companies; the coefficient of interest is on the constant term. All regressions use country random effects with robust standard errors, country clusters. *T*-statistics are reported under regression coefficients. Both double differences are winsorized at 1%/99%. Symbols \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface**.

	1	2	3	4
Sample	All Cross-Listed Companies	Level-23 Companies	All Cross-Listed Companies	Level-23 Companies
Dependent Variable: After-minus-before change in	$\ln(\text{Tobin's } q)$		$\ln(\text{market/book})$	
Dummy-23	<b>-0.114</b> <b>(3.32)***</b>		<b>-0.148</b> <b>(3.63)***</b>	
Firm Size ( $\ln$ assets)	0.016	<b>0.077</b>	-0.017	0.038
	0.93	<b>(3.20)***</b>	-0.85	1.30
$\ln(\text{GDP/Capita})$	-0.011	<b>-0.084</b>	-0.014	-0.058
	-1.09	<b>(2.17)***</b>	-0.82	1.10
Level-14 and Non-Cross-Listed Indices	yes	yes	yes	yes
Constant	-0.016	<b>-0.110</b>	<b>-0.037</b>	<b>-0.268</b>
	1.04	<b>(2.38)**</b>	<b>(2.11)**</b>	<b>(5.62)***</b>
No. of Observations	771	310	673	241
R-squared	0.10	0.10	0.10	0.02

**Panel B: Matched Pairs.** In Columns 1 and 2, the dependent variable is the double difference of  $\ln(\text{Tobin's } q)$  for matched pairs: after-minus-before difference in  $\ln(\text{Tobin's } q)$  for cross-listed firm minus  $\ln(\text{Tobin's } q)$  for non-cross-listed match). In Columns 3 and 4, the dependent variable is similarly defined as double difference in  $\ln(\text{market-to-book})$ . The independent variables are Dummy-23;  $\ln(\text{assets of cross-listed firm})$ ;  $\ln(\text{GDP per capita})$ ; an index for the country-level median of the double difference for level-14 pairs (“Matched Pairs Index 14”), and a constant term. In Columns 1 and 3, the sample is all matched pairs on all levels; the coefficient of interest is on Dummy-23. In Columns 2 and 4, the sample is limited to level-23 matched pairs; the coefficient of interest is on the constant term. All regressions use country random effects with robust standard errors, country clusters. *T*-statistics are reported under regression coefficients. Double differences are winsorized at 1%/99%. Symbols \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface**.

	1	2	3	4
Sample	All Matched Pairs	Level-23 Pairs	All Matched Pairs	Level-23 Pairs
<b>Dependent variable: after-minus-before difference in <math>\ln(\text{pair difference in indicated variable})</math></b>	<b>Tobin's q</b>		<b>market/book</b>	
Dummy-23	-0.198 (1.69)*		-0.119 0.99	
$\ln(\text{assets of cross-listed firm})$	0.095 1.38	<b>0.405</b> <b>(3.03)***</b>	-0.054 -0.89	0.132 1.44
$\ln(\text{GDP/Capita})$	0.002 0.07	<b>-0.154</b> <b>(2.02)**</b>	<b>-0.125</b> <b>(-2.39)**</b>	-0.186 1.43
Matched Pairs Index 14	yes	yes	yes	yes
Constant	-0.057 0.94	<b>-0.253</b> <b>(3.09)***</b>	<b>-1.064</b> <b>(7.93)***</b>	<b>-1.057</b> <b>(12.02)***</b>
No. of Observations	226	82	240	90
R-squared	0.05	0.20	0.09	0.12

Panel B presents the results of the same tests for matched pairs, rather than single companies. The results are similar in magnitude to those reported in Panel A, but weaker statistically, likely because of the smaller sample size. The Level-23 dummy is now significant only at a 10% level for Tobin's  $q$  specification and is not significant for market-to-book specification. The constant terms in Columns 2 and 4, however, are consistently strong and negative. In this table, I control for contemporaneous events in two ways: (1) by using matched pairs as a dependent variable, and (2) by using a hand-collected index of median changes in Tobin's  $q$  among level-14 matched pairs. Other controls are similar to Panel A.

The overall result is a strong decline in cross-listing premia of foreign companies subject to SOX, controlling for reactions of otherwise similar

foreign companies not subject to SOX—both cross-listed and non-cross-listed. This is consistent with the view that investors of foreign cross-listed companies believed SOX to be a net negative.

The next question is which country- or company-level characteristics predict changes in cross-listing premia.

Table 4 reports country-level results both for Tobin's  $q$  and for market-to-book ratios. For each country, it compares the average change in  $\ln(\text{Tobin's } q)$  or  $\ln(\text{market/book})$  for level-23 firms with the average change for non-cross-listed firms.

TABLE 4  
COUNTRY-LEVEL RESULTS FOR SINGLE COMPANIES  
(LEVEL-23 VERSUS NON-CROSS-LISTED)

Table 4 lists the following data: mean after (2002) minus before (2001) change in  $\ln(\text{Tobin's } q)$  for level-23 firms (Column 2) and for non-cross-listed firms (Column 3); the difference between changes in level-23 and non-cross-listed firms (Column 4), and statistical significance of the double difference (Columns 5 and 6). Columns 7–9 do the same for market-to-book ratios. Double differences are winsorized at 1%/99%. Symbols \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels, respectively. Significant or marginally significant results (at 10% level or better) are in **boldface**.

Country	ln(Tobin's Q)				ln(Market-to-Book Ratio)			
	Level-23 Xlisted After-Minus-Before Change	Non-Xlisted After-Minus-Before Change	T-Stat Level-23-Xlisted-versus-non-Xlisted	Wilcoxon Level-23-Xlisted-versus-non-Xlisted	Level-23 Xlisted After-Minus-Before Change	Non-Xlisted After-Minus-Before Change	T-Stat Level-23-Xlisted-versus-non-Xlisted	Wilcoxon Level-23-Xlisted-versus-non-Xlisted
1	2	3	4	5	6	7	8	9
Argentina	0.314	-0.017	<b>2.081*</b>	1.521	-0.179	-0.340	1.390	1.352
Australia	0.057	-0.143	1.176	1.352	0.014	0.036	-0.095	-0.338
Brazil	-0.037	0.089	<b>-2.518**</b>	<b>-2.677**</b>	-0.085	0.012	-1.351	-1.303
Canada	-0.188	-0.048	<b>-2.474**</b>	<b>-2.488**</b>	-0.217	-0.052	<b>-1.938*</b>	<b>-2.079**</b>
Chile	-0.124	-0.105	-1.088	-1.067	-0.445	-0.047	<b>-2.895**</b>	<b>-2.803**</b>
China	-0.140	-0.207	1.065	0.734	-0.037	-0.229	1.339	0.734
Denmark	-0.593	-0.286	.	-1.000	-0.634	-0.345	.	-1.000
Finland	-0.223	-0.099	-0.804	-0.365	-0.396	-0.017	-2.340	<b>-1.826*</b>
France	-0.401	-0.165	<b>-3.338***</b>	<b>-2.889***</b>	-0.404	-0.152	-1.399	-1.503
Germany	-0.267	-0.237	-0.534	-0.682	-0.289	-0.324	0.439	0.392
Greece	-0.309	-0.288	-0.200	-0.447	-0.628	-0.641	0.181	0.447
Hong Kong	-0.215	-0.106	-0.964	-0.980	-0.396	-0.166	-0.866	-0.845
India	-0.032	0.067	-0.975	-1.014	-0.430	0.232	<b>-3.094**</b>	<b>-2.366**</b>

Country	ln(Tobin's Q)				ln(Market-to-Book Ratio)			
	Level-23 Xlisted After- Minus- Before Change	Non- Xlisted After- Minus- Before Change	T-Stat Level- 23- Xlisted- versus- non- Xlisted	Wilcoxon Level-23- Xlisted versus- non- Xlisted	Level- 23 Xlisted After- Minus- Before Change	Non- Xlisted After- Minus- Before Change	T-Stat Level-23- Xlisted- versus- non- Xlisted	Wilcoxon Level-23- Xlisted versus- non- Xlisted
1	2	3	4	5	6	7	8	9
Israel	-0.212	-0.449	<b>3.100**</b>	<b>1.753*</b>	-0.378	-0.496	0.471	0.365
Italy	-0.131	-0.117	-0.344	-0.415	-0.303	-0.032	-1.785	<b>-1.690*</b>
Japan	-0.107	-0.043	-1.651	-1.603	-0.144	-0.115	-0.605	-0.517
Korea	-0.073	-0.214	<b>2.219*</b>	<b>2.023**</b>	-0.095	0.043	-0.854	-0.674
Mexico	-0.038	-0.084	0.868	0.852	-0.013	-0.143	1.046	<b>1.988**</b>
Norway	-0.038	-0.242	2.265	<b>1.826*</b>	0.071	-0.305	1.548	1.069
Netherlands	-0.314	-0.100	-1.105	-0.944	-0.381	-0.331	-0.213	0.000
Peru	-0.303	0.181	.	-1.000	-0.606	0.205	-5.262	-1.342
Portugal	-0.122	0.033	.	-1.000	-0.638	0.000	.	-1.000
Russia	0.118	-0.173	<b>18.830**</b>	1.342	0.222	-0.178	<b>12.196*</b>	1.342
South Africa	0.573	-0.041	<b>3.382**</b>	<b>1.761*</b>	0.525	-0.092	1.984	1.483
Singapore	-0.677	-0.104	-3.472	-1.342	-0.886	0.019	-1.747	-1.342
Spain	-0.063	-0.047	-0.583	-0.674	-0.284	0.035	<b>-3.745**</b>	<b>-1.826*</b>
Sweden	-0.275	-0.184	-0.610	-0.178	-0.421	-0.122	-1.178	-1.244
Switzerland	-0.260	-0.178	-0.760	-0.420	-0.374	-0.212	-1.087	-1.014
Taiwan	-0.539	-0.172	<b>-4.653**</b>	<b>-1.826*</b>	-0.677	-0.122	<b>-5.002**</b>	<b>-1.826*</b>
United Kingdom	-0.298	-0.211	-1.593	-0.400	-0.278	-0.152	-1.042	-1.359

Most country-level changes are not statistically significant, likely because of the small number of observations in each country. There are no obvious strong trends. Companies from some developed countries experienced significant declines in cross-listing premia (Canada, France, Italy, Spain, Taiwan), while companies from other developed countries experienced increases (Israel, Korea, Norway).<sup>37</sup>

In Table 5, I aggregate countries into larger geographic regions and look at changes in cross-listing premia separately in Europe, Asia, and Latin America. Most of the negative effect is concentrated in level-23 companies of Europe and Asia.

37. While some authors count Italy among countries with poor corporate governance, see Paolo F. Volpin, *Governance With Poor Investor Protection: Evidence from Top Executive Turnover*, 64 J. FIN. ECON. 61 (2002), Italy might be among the well-governed if we compare it to countries outside Europe. For example, on the basis of my sample, the country median S&P disclosure score is 59 for Italy, but only 29 for Brazil, 30 for Argentina, 32 for the Philippines, 45 for Malaysia, and 49 for Korea. Among the high-governed countries are the United Kingdom (S&P median score in my sample is 72) and Ireland (75).

TABLE 5  
REGIONAL RESULTS

**Both panels:** Changes in  $\ln(\text{Tobin's } q)$ , by geographic region. Columns 2–4 present single-company results. Columns 5–7 present matched-pairs results. Variables are defined in Table 2. Double differences are winsorized at 1%/99%. Symbols \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels. Significant or marginally significant results (at 10% level or better) are in **boldface**.

PANEL A:  
TOBIN'S Q, SINGLE-COMPANY AND MATCHED-PAIRS TEST OF AFTER (2002) MINUS BEFORE (2001)  
CHANGES IN MEAN  $\ln(\text{TOBIN'S } Q)$ , BY REGION.

1	2	3	4	5	6	7	8
	Single-Companies			Matched-Pairs			
	Europe			Europe			
	X-Listed After- Minus-Before Change Minus Non-Xlisted After-Minus Before Change	T-Stat Xlist vs non-Xlist	Wilcoxon Xlist vs non-Xlist	After SOX Pair Difference Minus Before SOX Pair Difference	T-Stat After - Before Pair Difference	Wilcoxon After - Before Pair Difference	No. Xlisted Companies (Pairs)
Level-23	-0.088	<b>-2.20**</b>	<b>-1.63**</b>	-0.042	-0.83	-0.99	127 (90)
Level-14	0.156	<b>3.92***</b>	<b>6.19***</b>	0.034	<b>1.86*</b>	1.35	124 (80)
T-Stat (23 - 14)	<b>-6.38***</b>			<b>-1.80*</b>			
Wilcoxon (23 - 14)	<b>-5.79***</b>			<b>-1.68*</b>			
		Asia			Asia		
Level-23	-0.101	<b>-1.98**</b>	<b>-2.66***</b>	0.0469	0.38	0.86	54 (41)
Level-14	-0.024	-0.94	-0.54	-0.0471	-1.48	<b>-2.80***</b>	286 (214)
T-Stat (23 - 14)	<b>-2.01**</b>			0.95			
Wilcoxon (23 - 14)	<b>-2.35**</b>			1.59			
		Latin America			Latin America		
Level-23	-0.018	-0.39	-1.31	0.034	0.90	0.19	57 (49)
Level-14	-0.024	-0.41	-0.11	-0.063	-1.06	-0.48	38 (32)
T-Stat (23 - 14)	0.09			1.42			
Wilcoxon (23 - 14)	0.78			0.53			

PANEL B:  
MARKET-TO-BOOK RATIOS, SINGLE-COMPANY AND MATCHED-PAIRS TEST OF CHANGES  
IN LN(MARKET-TO-BOOK RATIOS), BY REGION.

1	2	3	4	5	6	7	8
	Single-Company Results			Matched-Pair Results			
	Europe			Europe			
	X-Listed After- Minus-Before Change Minus Non-Xlisted After-Minus Before Change	T-Stat Xlist- versus-non- Xlist	Wilcoxon Xlist- versus-non- Xlist	After SOX Pair Difference Minus Before SOX Pair Difference	T-Stat After Minus Before Pair Difference	Wilcoxon After Minus Before Pair Difference	No. Xlisted Companies (Pairs)
Level-23	-0.158	-2.43***	-3.41***	-0.021	-1.148	-1.543	94 (67)
Level-14	0.028	0.27	0.98	-0.052	-1.386	-1.043	111 (67)
T-Stat (23 - 14)	-2.66***			0.10			
Wilcoxon (23 - 14)	-3.26***			0.53			
	Asia			Asia			
Level-23	-0.206	-2.93***	-3.20***	-0.145	-1.11	-0.60	52 (39)
Level-14	-0.042	-0.72	-1.33	-0.030	-1.27	-1.60	276 (208)
T-Stat (23 - 14)	-2.55**			-0.84			
Wilcoxon (23 - 14)	-2.35**			-0.12			
	Latin America			Latin America			
Level-23	-0.094	-1.23	-1.38	0.081	0.163	1.428	55 (45)
Level-14	0.178	0.11	2.04**	0.129	0.894	0.841	36 (32)
T-Stat (23 - 14)	-2.92***			0.75			
Wilcoxon (23 - 14)	-2.55**			1.18			

Tables 6–10 present cross-sectional results. In these tables, I ask which company- or country-level characteristics predict post-SOX changes in cross-listing premia. Tables 6–8 look at Tobin’s q changes in individual companies, Table 9 looks at Tobin’s q changes in matched pairs, and Table 10 looks at market-to-book changes in both individual companies and matched pairs. All regressions use country random effects with robust standard errors, country clusters. Country fixed effects produce similar results (not reported).

Table 6 studies company-level predictors of after-SOX changes in Tobin's  $q$ . Panel A uses all cross-listed companies and interactions between variables of interest with the dummy for level-23 listing. Strong predictors are the S&P measure of disclosure (negative), firm asset size (positive), pre-SOX profitability (negative), and the degree of a firm's ownership concentration (negative, marginally significant). A firm's unsystematic risk is a negative predictor, marginally significant and not always robust.

Panel B limits the sample to level-23 companies. Again, the S&P measure of disclosure is a strong negative predictor of after-SOX changes in Tobin's  $q$ ; firm asset size is a positive predictor; and profitability is a negative predictor (not always robust). Pre-SOX unsystematic risk is now a strong and consistently negative predictor.

TABLE 6  
CROSS-SECTIONAL RESULTS: COMPANY-LEVEL VARIABLES

**Both Panels:** the dependent variable is the after (2002) minus before (2001) difference in  $\ln(\text{Tobin's } q)$  for cross-listed companies. Differences in  $\ln(\text{Tobin's } q)$  are winsorized at 1%/99%. Non-dummy independent variables are standardized to mean = 0;  $\sigma = 1$ . All regressions use country random effects with robust standard errors, country clusters.  $T$ -statistics are reported under regression coefficients. Symbols \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface**.

In **Panel A**, the independent variables are: Dummy23; Level-14 Index; Non-Cross-Listed Index (all defined in Table 3); additional variables listed in the table, and interactions between these variables and Dummy-23. Panel A includes all cross-listed companies. **Panel B** is limited to level-23 companies. All variables are the same, except that Dummy-23 and interactions are replaced with non-interacted variables.

Dep. Variable	Single Companies: After-Minus-Before Difference in ln(Tobin's q)									
	Panel A: All Companies with Dummy-23 Interactions					Panel B: Sample Limited to Level-23 Companies				
Dummy-23	-0.136 (3.38)***	-0.114 (3.61)***	-0.095 (2.61)***	-0.114 (2.87)***	-0.119 (3.29)***	-0.141 (3.38)***	-0.146 (3.25)***	-0.143 (3.43)***		
Dummy-23 * Disclosure (S&P Measure)	-0.066 (3.43)***					-0.062 (2.84)**			-0.037 (2.75)***	-0.036 (2.48)**
Dummy-23 * Firm Size (Ln Assets)		0.071 (2.39)**					0.087 (2.28)**	0.084 (2.33)**	0.08 (3.30)***	0.099 (3.10)***
Dummy-23 * Sales Growth			-0.004 -0.28						-0.027 (1.80)*	
Dummy-23 * Profitability				-0.254 -0.98			-0.717 (2.61)**	-0.685 (2.66)**	-0.408 -1.59	-0.879 (3.43)***
Dummy-23 * Ownership Concentration					-0.03 (1.87)*	-0.027 (1.65)*	-0.011		-0.007 -0.35	-0.007 -0.28
Dummy23 * Unsystematic Risk							-0.057	-0.069 (1.75)*		-0.114 (3.32)***
Level-14 and Non-Cross-Listed Indices	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Interacted Variable(s), in Non-Interacted Form; Constant	yes	yes	yes	yes	yes	yes	yes	yes	-0.1 (2.57)**	-0.107 (2.37)**
Observations	658	805	739	762	728	608	688	762	227	296
R-squared	0.12	0.12	0.10	0.10	0.10	0.13	0.15	0.15	0.11	0.12

These results are consistent with the view that investors perceived SOX as a net negative for cross-listed companies overall and that the biggest losers were well-governed companies and smaller companies. These findings also support the view that SOX may have penalized corporate risk-taking.

In Table 7, I move to country-level predictors. As in Table 6, Panel A uses all cross-listed companies and interactions between variables of interest with the dummy for level-23 listing. Panel B limits the sample to level-23 companies.

I construct a new country-level measure of disclosure, equal to the country median (for my sample) of company-level measures of disclosure provided by S&P. In both panels, this country-level measure of disclosure emerges as the strongest negative predictor of post-SOX changes in Tobin's  $q$ .

Country  $\ln(\text{GDP per capita})$  also negatively predicts reaction to SOX; however, this result does not survive when country-level disclosure is also included. Spamann's measure of anti-director rights is another negative predictor, but it is statistically significant only in one specification. I do not find significance for other country-level economic variables (number of IPOs per capita) and legal variables (LLSV measure of antidirector rights and the quality of the accounting system). I also check whether political economy variables developed by Mark Roe<sup>38</sup> predict changes in a company's Tobin's  $q$  around SOX. None of those variables emerges as a significant predictor, either alone or in combination with other variables (only results for Labor Regulation are reported).

TABLE 7  
CROSS-SECTIONAL RESULTS: COUNTRY-LEVEL VARIABLES

**Both Panels:** the dependent variable is the after (2002) minus before (2001) difference in  $\ln(\text{Tobin's } q)$  for cross-listed companies. Differences in  $\ln(\text{Tobin's } q)$  are winsorized at 1%/99%. Other controls include  $\ln(\text{assets})$ ; profitability, and sales growth. Non-dummy independent variables are standardized to mean = 0;  $\sigma = 1$ . All regressions use country random effects with robust standard errors, country clusters.  $T$ -statistics are reported under regression coefficients. Symbols \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface**.

In **Panel A**, the independent variables are: Dummy23; Index Level-14 Cross-Listed Companies; Index Non-Cross-Listed Companies (all defined in Table 3); additional variables listed in the table, and interactions between these variables and Dummy-23. Panel A includes all cross-listed companies. **Panel B** is limited to level-23 companies. All variables are the same, except that Dummy-23 and interactions are replaced with non-interacted variables.

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38. See Roe, *supra* note 32.

Dependent Variable	Single Companies: After-Minus-Before Difference in ln(Tobin's q)																
	Panel A: All Companies with Dummy-23 Interactions								Panel B: Sample Limited to Level-23 Companies								
	-0.104 (3.27)***	-0.078 (2.34)**	-0.086 (2.25)**	-0.155 (4.00)***	-0.083 (2.24)**	-0.108 (1.72)*	-0.211 (1.84)*	-0.208 (1.84)*									
Dummy-23																	
Dummy-23 * Country	-0.08 (2.79)***																
Country Disclosure (S&P)																	
Dummy-23 * Ln(GDP/capita)		-0.089 (2.52)**															
Ln(GDP/capita)																	
Dummy-23 * IPOs/capita																	
IPOs/capita																	
Dummy-23 * Labor Reg																	
Labor Reg																	
Dummy-23 * Antidirector Spanmann																	
Antidirector Spanmann																	
Dummy-23 * Accounting																	
Accounting																	
Dummy-23 * Antidirector LLSV																	
Antidirector LLSV																	
Level-14 and Non-Xlisted Indices; Other Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Interacted Variable(s), in Non-Interacted Form, Constant	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	596	702	662	694	693	542	540	512	512	540	512	512	512	206	286	270	282
R-squared	0.15	0.12	0.11	0.11	0.11	0.16	0.16	0.17	0.17	0.16	0.16	0.17	0.17	0.20	0.11	0.07	0.08

In Table 8, I combine company- and country-level characteristics. Panel A presents the results for all cross-listed companies, with variables of interest interacted with the level-23 dummy. Panel B limits the sample to level-23 companies. I use the original S&P firm-level measure of disclosure, rather than the country-level measure used in Table 7. The results are similar, but not identical, to those reported in Tables 6 and 7. The quality of a firm's pre-SOX disclosure loses its significance. Firm size remains a strong positive predictor. Firm profitability and unsystematic risk, along with home country GDP per capita, are all strong negative predictors. Spamann's measure of antidirector rights is a negative predictor as well, but only marginally significant.

TABLE 8  
CROSS-SECTIONAL RESULTS: COMBINED COMPANY-LEVEL AND  
COUNTRY-LEVEL VARIABLES

In **Panel A**, the dependent variable is the after (2002) minus before (2001) difference in  $\ln(\text{Tobin's } q)$  for cross-listed companies. The independent variables are Dummy23; Level-14 Index; Non-Cross-Listed Index (all defined in Table 3); additional variables listed in the table, and interactions between these variables and Dummy-23. Panel A includes all cross-listed companies. **Panel B** is limited to level-23 companies; independent variables are the same, except that Dummy-23 and its interactions are omitted. Differences in  $\ln(\text{Tobin's } q)$  are winsorized at 1%/99%. Non-dummy independent variables are standardized to mean = 0;  $\sigma = 1$ . All regressions use country random effects with robust standard errors, country clusters. *T*-statistics are reported under regression coefficients. Symbols \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface**.

Dependent Variable		Single Companies with Dummy-23 Interactions					Single Companies: After-Minus-Before Difference in ln(Tobin's q)						
Panel A: All Companies		Panel B: Sample Limited to Level-23 Companies											
Dummy-23	-0.151 (3.41)***	-0.163 (3.70)***	-0.125 (3.15)	-0.160 (3.95)***									
Dummy-23 * Firm Disclosure (S&P Measure)	-0.011 0.49	-0.002 0.08		-0.002 0.09		Firm Disclosure (S&P Measure)	0.004 0.27	0.010 0.63				0.011 0.59	
Dummy-23 * Firm Size (Ln Assets)	0.102 (2.17)**	0.114 (2.06)**	0.075 (1.78)*	0.118 (1.97)*		Firm Size (Ln Assets)	0.132 (2.67)**	0.131 (2.34)**	0.086 (2.27)**	0.135 (2.42)**		0.135 (2.42)**	
Dummy-23 * Ln(GDP)	-0.780 (2.93)**	-0.076 (2.14)**	-0.112 (2.13)**	-0.080 (2.09)**		Ln(GDP)	-0.040 (1.79)*	-0.031 (0.94)	-0.099 (2.02)**	-0.033 (1.11)		-0.033 (1.11)	
Dummy-23 * Profitability	-1.013 (3.02)***	-0.838 (3.62)***	-0.838 (3.29)***	-1.065 (3.29)***		Profitability	-1.098 (2.85)**	-1.23 (5.08)***	-0.944 (4.46)**	-1.308 (5.87)***		-1.308 (5.87)***	
Dummy-23 * Antidirector Rights (Spamann)	-0.060 (2.07)**	-0.026 (0.84)	-0.026 (1.81)*	-0.050 (1.81)*		Antidirector Rights (Spamann)	-0.073 (1.92)*	-0.041 (1.46)	-0.041 (1.46)	-0.069 (1.89)*		-0.069 (1.89)*	
Dummy-23 * Sales Growth				-0.023 0.75		Sales Growth				-0.018 (2.26)**		-0.018 (2.26)**	
Dummy-23 * Unsystematic Risk			-0.081 (1.90)*	-0.035 0.86		Unsystematic Risk			-0.138 (3.79)***	-0.079 (2.92)**		-0.079 (2.92)**	
IPO/Capita		0.015 0.27	0.004 0.11	0.018 0.32		IPO/Capita		0.023 0.39	-0.013 0.35	0.029 0.54		0.029 0.54	
Level-14 and Non-Cross-Listed Indices	yes	yes	yes	yes		Level-14 and Non-Cross-Listed Indices	yes	yes	yes	yes		yes	
Interacted Variable(s) in Non Interacted Form; Constant	yes	yes	yes	yes		Constant	-0.180 (3.48)***	-0.175 (3.21)***	0.173 (3.64)***	-0.166 (3.14)***		-0.166 (3.14)***	
Observations	583	521	639	512		Observations	206	186	270	184		184	
R-squared	0.15	0.16	0.16	0.17		R-squared	0.16	0.20	0.16	0.22		0.22	

Table 9 presents the results of matched-pairs analysis of changes in Tobin's  $q$ . As discussed before, sample size declines significantly in matched pairs specification, which makes the results less reliable. Nevertheless, the results are similar to those obtained in the single-company approach. Level-23 matched pairs experienced significant declines in Tobin's  $q$ , as compared to level-14 matched pairs. Among company-level variables, firm size remains a positive predictor and pre-SOX unsystematic risk is a negative predictor. On a country level, Spamann's measure of anti-director rights is a significant negative predictor (albeit not in Panel B, where the sample size is small), and GDP per capita is a negative predictor as well. Disclosure, which was significant in Tables 6 and 7, is not significant in Tables 8 and 9; this might be due to the high correlation between disclosure and GDP per capita ( $r = 0.55$ ).

TABLE 9  
MATCHED-PAIR RESULTS: COMPANY-LEVEL AND  
COUNTRY-LEVEL VARIABLES

Same as Table 8, except it uses matched pairs instead of individual companies. **Both Panels:** the dependent variable is after-minus-before difference in  $\ln(\text{Tobin's } q \text{ for cross-listed firm minus Tobin's } q \text{ for non-cross-listed match})$ . Double differences are winsorized at 1%/99%. Non-dummy independent variables are standardized to mean = 0;  $\sigma = 1$ . All regressions use country random effects with robust standard errors, country clusters.  $T$ -statistics are reported under regression coefficients. Symbols \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface**.

In **Panel A**, the independent variables are: Dummy-23; an index for the country-level median of the double difference for level-14 pairs ("Matched Pairs Index 14"); additional variables listed in the table, and interactions between these variables and Dummy-23. Panel A includes all cross-listed companies. **Panel B** is limited to level-23 companies. All variables are the same, except that Dummy-23 and interactions are replaced with non-interacted variables.

Dependent Variable	Matched Pairs: After-Minus-Before Difference in ln(Tobin's q for Cross-Listed Firm Minus Tobin's q for Non-Cross-Listed Match)									
	Panel A: All Matched Pairs with Dummy-23 Interactions					Panel B: Sample Limited to Pairs Where Xlisted Company is Listed on Level-23				
Dummy-23	-0.049	0.008	-0.072	-0.586						
Dummy-23 * Firm Disclosure (S&P Measure)	0.08	0.01	0.58	(0.41)						
Dummy-23 * Firm Size (Ln Assets)	-0.084	-0.006	0.062	0.34	Firm Disclosure (S&P Measure)	-0.181	-0.077			-0.001
Dummy-23 * Ln(GDP)	0.57	0.03	0.34	0.34	Firm Size (Ln Assets)	1.19	0.47			0.00
Dummy-23 * Profitability	0.356	0.471	0.502	0.609	Ln(GDP)	0.176	0.252	0.391	0.400	0.400
Dummy-23 * Antidirector Rights (Spamann)	(2.22)**	(2.66)**	(2.75)**	(3.34)**	Profitability	1.17	1.33	(2.32)**	(2.32)**	(2.32)**
Dummy-23 * Sales Growth	-0.259	-0.300	-0.328	-0.403	Antidirector Rights (Spamann)	-0.080	-0.177	-0.237	-0.278	-0.278
Dummy-23 * Unsystematic Risk	(3.22)***	(3.92)***	(4.56)***	(7.51)***	Sales Growth	0.80	(2.05)**	(2.82)**	(3.76)***	(3.76)***
IPO/Capita	5.967	9.175	5.299	-11.615	Unsystematic Risk	13.18	8.712	5.207	-11.002	-11.002
Matched Pairs Index 14	0.29	0.37	(3.14)**	(0.24)	IPO/Capita	0.62	0.35	(3.19)**	0.46	0.46
Interacted Variable(s) in Non Interacted Form; Constant	-0.207	(1.99)**	-0.136	-0.197	Matched Pairs Index 14		-0.093	-0.062	-0.080	-0.080
No. of Observations	186	170	194	168	Constant		0.95	1.24	1.56	1.56
R-squared	0.12	0.14	0.19	0.17	R-squared					

Finally, in Table 10, I measure cross-listing premia based on market-to-book ratio, rather than Tobin's  $q$ . Columns 2–5 report the results for single companies; Columns 7–10 report the results for matched pairs. Panels A and C include all cross-listed firms; Panels B and D limit the sample to firms (pairs) listed on levels 2 or 3. The results are similar to the results for Tobin's  $q$ . Level-23 firms and pairs experienced significant overall declines in market-to-book ratios, as compared to level-14 firms and pairs. Among firm-level variables, firm size is a strong positive predictor of changes in market-to-book ratios, and profitability is a negative predictor. Higher un-systematic risk of a firm predicts a reduction in cross-listing premia in some specifications. Disclosure is not significant (not reported).

TABLE 10  
CROSS-SECTIONAL RESULTS: COMBINED COMPANY-LEVEL AND  
COUNTRY-LEVEL VARIABLES, MARKET-TO-BOOK

In **Panel A**, the dependent variable is the after (2002) minus before (2001) difference in  $\ln(\text{market-to-book})$  for cross-listed companies. The independent variables are Dummy-23; Index Level-14 Cross-Listed Companies; Index Non-Cross-Listed Companies (all defined in Table 3); additional variables listed in the table, and interactions between these variables and Dummy-23. Panel A includes all cross-listed companies. **Panel B** is the same as Panel A, but limited to level-23 companies; independent variables are the same, except that Dummy-23 and its interactions are omitted. Panel C and Panel D are similar to Panels A and B, but use matched pairs instead of single companies. Non-dummy independent variables are standardized to mean = 0;  $\sigma = 1$ . Double differences are winsorized at 1%/99%. All regressions use country random effects with robust standard errors, country clusters. T-statistics are reported under regression coefficients. Symbols \*, \*\*, \*\*\* indicate significance at 10%, 5%, and 1% levels. Significant results (at 5% level or better) are in **boldface**.

Dependent Variable	Single Companies: After-Minus-Before Difference in ln(Market-to-Book)		Panel B: Sample Limited to Level-23 Companies		Matched Pairs: After-Minus-Before Difference in ln(Tobin's q for Cross-Listed Firm Minus Tobin's q for Non-Cross-Listed Match)	Panel C: All Pairs with Dummy-23 Interactions		Panel D: Sample Limited to Level-23 Pairs	
	Panel A: All Firms with Dummy-23 Interactions								
Dummy-23	-0.232 (4.84)**	-0.231 (4.38)**			Dummy-23	-0.429 (2.51)**	-0.530 (3.10)**		
Dummy-23 * Firm Size (Ln Assets)	0.098 (2.34)**	0.100 (2.42)**	0.083 (2.35)**	0.086 (2.28)**	Firm Size (Ln Assets)	0.367 (2.38)**	0.400 (2.39)**	0.267 1.61	0.341 (1.73)*
Dummy-23 * Ln(GDP)		0.049 0.64		-0.051 0.66	Ln(GDP)		-0.052 0.48		-0.143 0.89
Dummy-23 * Profitability	-1.291 (2.84)**	-1.278 (2.76)**	-1.347 (3.01)**	-1.375 (3.05)**	Profitability	-5.927 (1.84)*	-6.659 (2.06)**	-7.043 (2.24)**	-3.138 0.76
Dummy-23 * Antidirector Rights (Spamann)		0.006 0.10		-0.007 0.22	Antidirector Rights (Spamann)		-0.091 0.85		-0.134 1.16
Dummy-23 * Unsystematic Risk	-0.036 0.59	-0.031 0.46	-0.136 (2.18)**	-0.126 (1.85)*	Unsystematic Risk	0.066 0.34	0.013 0.07	-0.159 0.82	-0.023 0.18
Level-14 and Non-Cross-Listed Indices	yes	yes	yes	yes	Matched Pairs Index 14	yes	yes	yes	yes
Interacted Variable(s) in Non Interacted Firm; Constant	yes	yes	yes	yes	Constant	-1.018 (6.27)**	-0.897 (5.04)**	-1.526 (8.72)**	-0.733 (2.47)**
No. of Observations	668	590	230	218	Observations	241	219	86	88
R-squared	0.14	0.14	0.05	0.05	R-squared	0.11	0.14	0.11	0.14

## V. A PROPOSAL FOR DETERMINING THE EFFICACY OF SOX

This article and my prior event study suggest that the adoption of SOX had larger costs than benefits for at least some cross-listed firms, especially firms that were already likely to be well-governed. These overall findings do not tell us which provisions of SOX are associated with the negative reaction of investors of cross-listed firms. Perhaps SOX contains “good” provisions (for which benefits exceed costs) as well as “bad” ones. It is also possible that benefits exceeded costs for some firms, even if not on average. Which provisions are “good” or “bad” could also depend on a firm's home country environment and on other firm characteristics.

I therefore propose the following policy experiment, which will both preserve the financial incentives for foreign firms to cross-list on level 2 or 3, and help us assess which provisions of SOX are likely to be helpful or harmful—at least for cross-listed firms. The SEC could exempt cross-listed firms from SOX compliance and instead allow them to adopt a “comply or explain” approach, of a sort familiar from the corporate governance codes of many countries, including the Combined Code in the United Kingdom.<sup>39</sup>

The comply-or-explain approach could potentially stem the current flight of foreign issuers to overseas markets, and allow cross-listed firms to recover the share price losses they appear to have suffered when SOX was adopted. These firms' decisions on when to comply could also inform policy judgments about whether and how to relax particular provisions of SOX for U.S. firms. Event studies of share price reactions to foreign firms' decisions to explain rather than comply could shed light on whether the choice not to comply was good for shareholders. Evidence on investor reaction could then form the basis for extending the comply-or-explain flexibility to U.S. issuers, perhaps starting with smaller issuers, who are considered to bear a greater burden relative to their size from SOX compliance costs.

The overall comply-or-explain approach moves in the direction of proposals by Roberta Romano,<sup>40</sup> and by Stephen Choi and Andrew Guzman,<sup>41</sup> for regulatory competition in securities regulation for public firms. This

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39. U.K. firms which are listed on the London Stock Exchange must either comply with the provisions of the Combined Code on Corporate Governance or explain their reasons for not complying. See Financial Reporting Council, *The Combined Code on Corporate Governance* (2006), <http://www.frc.org.uk/documents/pagemanager/frc/Combined%20code%202006%20OCTOBER.pdf>. The Combined Code does not apply to foreign firms that cross-list in London. For the relevant listing rules, see Financial Services Authority, Listing Rule 9.8.2 (2006), <http://fsahandbook.info/FSA/html/handbook/LR/9/8> (stating that company disclosures must comply with the company's home country rules).

40. Romano, *supra* note 2; Roberta Romano, *The Need for Competition in International Securities Regulation*, 2 THEORETICAL INQUIRIES L. 387 (2001).

41. Stephen J. Choi, *Assessing Regulatory Responses to Securities Market Globalization*, 2 THEORETICAL INQUIRIES L. 613 (July 2001); Stephen J. Choi & Andrew Guzman, *Portable Reciprocity: Rethinking the International Reach of Securities Regulation*, 71 S. CAL. L. REV. 903 (1998).

approach is also consistent with criticism of the extra-territorial reach of U.S. securities law, which was increased by SOX.<sup>42</sup>

Other scholars have criticized Romano's regulatory competition proposal.<sup>43</sup> I do not enter that debate here. However, the step-by-step approach suggested here, in which regulators first adopt a comply-or-explain regime for foreign cross-listed firms and then use decisions by these firms and investor responses to assess whether to extend that regime to domestic firms, could provide the empirical evidence needed to decide between the competing theories. In all likelihood, a move toward regulatory competition for U.S. firms would be rule-specific rather than general. Some aspects of SOX might remain mandatory for U.S. firms; others could be relaxed.

The incremental nature of this proposal also reflects the limits on what we know about the net benefits or costs of SOX. This article focuses on the change in cross-listing premia for level-23 firms from year-end 2001 to year-end 2002, and finds a decline contemporaneous with adoption of SOX. However, cross-listing premia vary substantially over a longer-time horizon.<sup>44</sup> Thus, the 2002 decline in cross-listing premia could also reflect factors unrelated to SOX.<sup>45</sup> Moreover, investors' views of the overall benefits or costs of SOX could be different today than they were at the end of 2002. Doidge and his coauthors report evidence that the cross-listing premium accorded to level-23 companies, compared to level-14 companies, increased during 2003-2005.<sup>46</sup> One possible explanation for this rebound is that investors learned more about the net benefits and costs of SOX.

#### CONCLUSION

I report evidence of a decline in the cross-listing premium enjoyed by foreign companies listed on levels 2 and 3 relative to cross-listed companies listed on levels 1 and 4. The findings reported here are generally consistent with my earlier research on price changes during SOX legislative events. These findings are also consistent with the view that investors in foreign cross-listed companies expected SOX to have a net negative effect on the value of level-23 cross-listed firms.

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42. See, e.g., Stephen J. Choi & Andrew T. Guzman, *The Dangerous Extraterritoriality of American Securities Law*, 17 NW. J. INT'L L. & BUS. 207, 221 (1997).

43. See, e.g., James D. Cox, *Regulatory Duopoly in U.S. Securities Markets*, 99 COLUM. L. REV. 1200 (1999); Merritt B. Fox, *The Issuer Choice Debate*, 2 THEORETICAL INQUIRIES L. 563 (2001); Merritt B. Fox, *Retaining Mandatory Securities Disclosure: Why Issuer Choice Is Not Investor Empowerment*, 85 VA. L. REV. 1335 (1999).

44. See Craig Doidge, Andrew Karolyi, and Rene Stulz, *The Valuation Premium for Non-U.S. Stocks Listed in U.S. markets: 1997-2005* (Rotman Sch. of Mgmt. Working Paper, 2007) (unpublished manuscript, on file with author).

45. For evidence on other factors affecting cross-listing premia during 1980-1996, see Arturo Bris, Salvatore Cantale, & George P. Nishiotis, *A Breakdown of the Valuation Effects of International Cross-Listing* (Yale ICF, Working Paper No. 05-30, 2005), available at <http://ssrn.com/abstract=868485>.

46. Doidge et al., *supra* note 44.

The methodology used in this paper does not allow me to assess causation, but the use of double and triple differences presents evidence in favor of a causal connection between adoption of SOX and my results, absent another explanation for why the share prices of level-23 firms should have declined relative to level-14 firms and relative to non-cross-listed firms during this period.

In all single-company specifications, cross-listing premia of foreign companies subject to SOX declined significantly, as compared to matched non-cross-listed companies from the same country, the same industry, and similar in size, and as compared to non-cross-listed companies from the same country. At the same time, cross-listing premia for foreign companies not subject to SOX declined substantially less (and, in some specifications, insignificantly increased). This suggests that the mere exposure to U.S. capital markets does not explain the declines in cross-listing premia suffered by cross-listed firms subject to SOX. Matched pair results are consistent in sign and magnitude, though less significant statistically.

I also assess the factors that predict cross-sectional variation in the change in cross listing premia during 2002. Companies that were already high-disclosing (or from high-disclosing countries) suffered the largest adverse effect. Cross-listing premia declined more for profitable and riskier firms, and declined less for larger firms. These results suggest that the relative benefits and costs of SOX may depend on companies' pre-SOX governance and other country-level and firm-level characteristics.

This article and my prior event study have similar but not identical results. Both find a significant negative investor reaction to SOX for level-23 cross-listed companies. Both find that well-governed firms and firms from countries with high-quality laws and institutions reacted more negatively. Country- and company-level measures of pre-SOX disclosure, home countries' GDP per capita, and several measures of home countries' investor protection laws are significant predictors of reaction to SOX in both papers. There are a few differences. This paper finds that larger firms reacted less negatively; the event study does not find an effect based on size. The event study finds a positive effect based on sales growth; this paper does not.

It is hard to tell which results are more likely to be "correct." This paper looks over a longer time period and therefore deals with the possibility of a short-term investor overreaction; this approach, however, introduces noise and possible confounding events. The event study paper looks at the market reaction during narrow event windows, often only one- or two-days; thus, it cannot address the short-term overreaction problem, but it provides a more rigorous control for contemporaneous events unrelated to SOX.