



How Representative Are Firms That Are Cross-Listed in the United States? An Analysis of Accounting Quality

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ABSTRACT

We provide evidence on the characteristics of local generally accepted accounting principles (GAAP) earnings for firms cross-listing on U.S. exchanges relative to a matched sample of foreign firms currently not cross-listing in the United States to investigate whether U.S. listing is associated with differences in accounting data reported in local markets. We find that cross-listed firms differ in terms of the time-series properties of earnings and accruals, and the degree of association between accounting data and share prices. Cross-listed firms appear to be less aggressive in terms of earnings management and report accounting data that are more conservative, take account of bad news in a more timely manner, and are more strongly associated with share price. Furthermore, the differences appear to result partially from changes around cross-listing and partially from differences in accounting quality before listing. We do not observe a similar pattern for firms cross-listed on other non-U.S. exchanges or on the U.S. over-the-counter market, suggesting a unique quality to cross-listing on U.S. exchanges.

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1. Introduction

We provide descriptive evidence on the characteristics of accounting data for foreign firms that cross-list in U.S. markets relative to matched samples of foreign firms currently not cross-listing in the United States. In particular, our interest is in investigating whether a firm's decision to cross-list into the relatively demanding U.S. cross-listing environment is associated with systematic differences in the quality of earnings reported in their home market. Although the decision to cross-list is not directly linked to domestic reporting choices, a body of literature summarized in Coffee [2002] suggests that cross-listing may serve a bonding role, causing systematic differences in terms of transparency between firms that opt into cross-listing on U.S. markets and others in their local markets. In particular, cross-listing firms face (1) increased enforcement by the Securities and Exchange Commission (SEC), (2) a more demanding litigation environment, and (3) enhanced disclosure and reconciliations to U.S. generally accepted accounting principles (GAAP), all of which may affect the kinds of firms attracted to U.S. cross-listing and the characteristics of their accounting data.

In our primary analysis, we compare firms currently cross-listed (CL) on U.S. exchanges with a sample of non-cross-listed (NCL) firms that are matched based on country, year, industry, and growth and that satisfy the listing criteria for the exchange on which the CL firm is traded. Where possible, we also control for differences in size, leverage, growth, equity issuances, debt issuances, and capital intensity.¹ Our evidence suggests that CL firms have higher quality accounting information as measured by various measures of income smoothing and earnings management, by various measures of timely loss recognition, and by associations of accounting information with returns and prices.²

In addition to examining the differences between CL and NCL firms, we also consider two potential causes for these differences: changes around cross-listing and pre-listing differences. In terms of pre-listing differences, firms that self-select into U.S. listing are likely to be willing to subject themselves to the scrutiny attached to cross-listing. Doidge, Karolyi, and

¹A potential concern is that it is inherently impossible to adequately match CL firms to NCL firms on all dimensions related to cross-listing because NCL firms chose not to cross-list and, therefore, must be different. However, research such as Doidge, Karolyi, and Stulz [2001] differentiates between motivations based on maximizing firm value and those on maximizing the utility of those in positions of power. For example, two firms may be very similar in terms of underlying economics, but one may choose not to cross-list because managers' incentives are poorly aligned with shareholders and managers fear the reduced flexibility associated with greater transparency. In that case, two firms could have very similar economic incentives to cross-list (growth, equity issuance, etc.), but one would not because of poor incentive alignment.

²We use the term "accounting quality" for parsimony and do not intend to imply optimality. Consistent with the prior literature (e.g., Leuz, Nanda, and Wysocki [Forthcoming], Ball, Kothari, and Robin [2000]), we view earnings to be of higher quality if they are characterized by less evidence of earnings management, more timely recognition of bad news, and a higher association with share price.

Stulz [2001], for example, envision a situation in which managers trade off firmwide gains from access to U.S. capital markets against reduced personal flexibility to expropriate shareholder wealth. They argue that one will observe differences in cross-listing decisions across firms with similar firmwide economic motivations for cross-listing based on differences in managerial incentive alignment. In that scenario, cross-listing firms will tend to be those that have historically been more transparent to the market by, for example, providing more informative accounting data, because the incremental cost to providing additional transparency will tend to be lower.

Second, cross-listing may cause firms to change their local GAAP reporting. In particular, even if the firm has relatively transparent reporting before cross-listing, the added regulatory requirements and litigation exposure associated with cross-listing may cause firms to change local reporting. Reese and Weisbach [2001], for example, show that firms cross-listing on U.S. markets tend to raise more capital in local markets following cross-listing, suggesting that firms cross-list to bond themselves to more transparency even in their home market. Furthermore, having reconciliations and disclosures in the United States that are in the public domain likely reduces the costs of moving local reporting toward greater transparency.

Our results provide evidence of both changes around cross-listing and pre-listing differences. Although it is difficult to draw causality, the overall picture is generally consistent with the idea that CL firms have better managerial incentive alignment and, hence, a stronger predisposition toward transparency preceding listing, and are more willing to bond themselves to greater transparency and to further improvements in reporting after listing.

In an attempt to assess whether the results reflect features unique to cross-listing on U.S. exchanges, we conduct a variety of robustness tests. First, we compare CL firms with non-U.S. firms trading on other types of U.S. markets such as the over-the-counter (OTC) market. Because OTC firms trade in the United States but face a different regulatory environment, they provide a potentially interesting comparison sample. Second, we replicate our primary analysis for a subset of NCL firms with a high probability of cross-listing based on a cross-listing prediction model. Our goal is to focus on the subset of NCL firms that appears to have the strongest economic incentive to cross-list. Finally, we compare a subsample of the NCL firms that cross-list in non-U.S. markets with their CL counterparts. These firms are interesting because they have chosen to cross-list, but not in the U.S. market. Although each of the robustness tests has limitations, we find evidence consistent with our primary analysis in the sense that the comparison sample remains significantly different from the CL sample across our earnings quality measures.

Our results relate to several literatures. First, they relate to the substantial body of accounting research literature, summarized in studies such as Pownall and Schipper [1999], that examines the nature and information content of reconciliations to U.S. GAAP required under Form 20-F. Despite the potentially large differences between U.S. and non-U.S. GAAP, a general finding of that literature is that reconciling items are often relatively small

and do not appear to provide much incremental information to the market. Our results suggest a potential explanation for the Form 20-F findings; CL firms are a fairly unique group in the sense that they report higher quality local GAAP earnings than do other firms in the local market. As a result, it follows that differences between local and U.S. GAAP would likely be lower for CL firms, but they may not be representative of other firms in the local market.

Our results also suggest the importance of considering a firm's listing status in understanding its accounting choices, even in its local market. Our analysis suggests that a U.S. cross-listed firm's local accounting choices are likely different from those of other firms in the local jurisdiction. Although much of the accounting research literature categorizes firms based on country of domicile, our results imply that factors such as listing choice may be as important as domicile. Similarly, they suggest the mitigating effect of incentives relative to requirements in accounting choice. As Ball [2001] discusses, changing accounting standards without changing enforcement and litigation may have little effect on actual behavior. With cross-listing, we observe that the added scrutiny and legal exposure may have substantial implications for accounting choice, even absent changes in local requirements.

Finally, our results relate indirectly to the literature in finance, law, and economics on the potential for cross-listing to serve as a "bonding" device. For example, Coffee [2002] synthesizes the existing research and survey evidence in an attempt to infer why firms cross-list and, hence, what features are likely to characterize exchanges that will be able to compete successfully. He concludes that the evidence is most consistent with the notion that firms cross-list in the United States to bond themselves to improved investor protection and disclosure. Similarly, Doidge, Karolyi, and Stulz [2001] argue that if firms in a given market differ in the extent to which management incentives are well aligned with minority shareholder interests, managers of firms with better aligned incentives will choose greater transparency in general, and U.S. cross-listing in particular, because the managers are less concerned about their ability to expropriate wealth and more concerned about maximizing shareholder value. Again, our results suggest that firms with more transparent reporting are more likely to list on U.S. markets. Furthermore, they tend to improve their reporting in their home markets following cross-listing.

In the next section, we provide a background discussion of the incentives faced by cross-listing firms and their implications for the regulatory debate. Section 3 contains a description of the data, followed by empirical analysis and results in section 4. Section 5 concludes.

2. Background

The United States has a reputation as a particularly challenging regulatory and legal environment for cross-listed firms. Although non-U.S. firms are not required to comply with all aspects of U.S. listing to the same extent

as domestic firms, they face more requirements than are typical in other environments. Most notably, non-U.S. registrants fall under the jurisdiction of the SEC, which is known to be a particularly demanding regulator. In addition, cross-listed firms must comply with additional disclosure requirements in the U.S. market, including a reconciliation of net income and shareholders' equity to U.S. GAAP. Furthermore, the U.S. environment is viewed as particularly litigious. Although there have not been many successful suits against cross-listed firms to date, firms often cite perceived litigation risk as a factor in choosing U.S. listing.

On the other hand, U.S. requirements for cross-listing firms are less onerous than for domestic firms. In particular, the SEC is willing to work with potential cross-listing firms to ease listing difficulties including, for example, allowing exceptions from U.S. GAAP reconciliations in cases in which computing reconciling items are too onerous. Furthermore, firms may file financial statements and footnotes in accordance with local GAAP, with reconciling items for bottom-line net income and shareholders' equity at a fairly summary level. In addition, cross-listing firms face relaxed requirements on other dimensions relative to U.S. firms, as discussed in Coffee [2002]. For example, these requirements relax disclosure regarding compensation and interested director transactions, do not require quarterly reporting unless the firm files quarterly in its local jurisdiction, and provide the firm with six months after year-end to file Form 20-F versus 90 days for U.S. firms.

The consequences of the current level of regulation remain a matter for debate. Although some argue that the added costs may keep some firms from listing (e.g., Cochrane, Shapiro, and Tobin [1996]), others note that they may serve as a screening mechanism, attracting firms that are willing to comply with the more demanding environment (see Coffee [2002] for a summary).

3. Data

We obtain our sample of CL firms for 1990 through 2001 from the Bank of New York Global Equity Investing Depositary Receipt Services (BNY) as of July 2002. We exclude Canadian firms because their local reporting is more similar to U.S. GAAP, and in some cases, they face different regulatory requirements. Our sample of CL firms includes sponsored Level II or III depository receipts, which trade on the New York Stock Exchange (NYSE), American Stock Exchange (AMEX), or Nasdaq and require SEC registration. We gather accounting and market data from Datastream International. To be included in the analysis, CL firms must have data available both before and after cross-listing to enhance comparability across pre- and post-cross-listing periods.

We construct our sample of NCL firm-years by matching them with CL firms-years. For an NCL firm to be considered a match, it must be in the same industry group (based on the FTSEglobal classification system), home country, and year, and meet the listing requirements for the same exchange

and year as the CL firm. In addition, we exclude firms that trade Level I ADRs (OTC) and privately placed and offshore ADRs (SEC Rule 144A/Regulation S), and consider those firms separately in our OTC analysis. We then chose the NCL firm-year that is closest in growth (measured as percentage change in sales) to the CL firm-year. We chose to match on growth because of its potential effect on the accruals component of earnings, and we included controls for size, leverage, capital intensity, and debt and equity issuances. In a previous version we matched on size, with similar results.

Share prices and returns for the CL and NCL firms are from the firms' domestic markets and accounting data are as reported under local GAAP standards. We adjust foreign financial data to U.S. dollars based on year-end exchange rates for balance-sheet data and average annual exchange rates for income statement data to enhance comparability across countries.

Table 1 provides a breakdown of our sample by country and industry for the CL versus NCL comparison for the post-listing period (our main analysis), as well as for the pre-listing period (our supplementary analysis). The sample contains observations from 21 countries, with the United Kingdom, Chile, and Japan most heavily represented. However, a broad range of countries is represented, including both developed and emerging markets as well as code and common law legal systems. Fifty-six percent of sample firms are from code law countries, consistent with the notion in studies such as Reese and Weisbach [2001] that code law firms are more attracted to full U.S. listing because they benefit more from the bonding effect given the relatively weak investor protection in their home markets. The observations are fairly evenly spread among the industries, with cyclical services being the most represented.

4. Empirical Analysis and Results

4.1 CL VERSUS NCL COMPARISON

4.1.1. Descriptive Statistics. For our initial analysis, we compare our CL and NCL firms. Table 2 provides descriptive data. The CL firms are not more profitable than the NCL sample, as measured by operating cash flows scaled by assets.³ In large part, this reflects the fact that we match on growth, which is correlated with profitability.⁴ However, the CL firms typically enjoy higher valuation multiples, consistent with findings in the finance literature (e.g., Doidge, Karolyi, and Stulz [2001]), and perhaps reflecting lower cost of capital, lower risk of expropriation, or higher expected growth. Although

³ We use cash flows as a measure of profitability to reduce the effects of accounting differences, although accounting differences might still affect the denominator. Throughout the paper we define operating cash flows as "cash inflows-operating activities" as defined by Datatream (operating profit plus total depreciation, amortization, special provisions, other adjustments [e.g., gains/losses on sale of PPE], exceptional items, and other funds from operating activities minus changes in working capital and payments from provisions).

⁴ In a previous version, we matched on size instead of growth and found that CL firms were significantly more profitable than were NCL firms.

TABLE 1
Frequencies of Cross-Listing Versus Non-Cross-Listing Firms in the Post- and Pre-Listing Period

Panel A: Country analysis				
Country	Observations Post-Listing ^a	Frequency Post-Listing	Observations Pre-Listing ^a	Frequency Pre-Listing
Australia	25	6.05	19	4.02
Germany	15	3.63	35	7.40
Belgium	1	0.24	8	1.69
Brazil	1	0.24	2	0.42
Chile	50	12.12	19	4.02
Spain	7	1.69	11	2.33
Finland	16	3.87	22	4.65
France	24	5.81	59	12.47
Hong Kong	6	1.45	10	2.11
India	6	1.45	11	2.33
Italy	6	1.45	4	0.85
Japan	45	10.90	47	9.94
Korea	13	3.15	6	1.27
Netherlands	18	4.36	16	3.38
Peru	5	1.21	2	0.42
Russia	2	0.48	1	0.21
South Africa	11	2.66	6	1.27
Sweden	3	0.73	2	0.42
Switzerland	13	3.15	29	6.13
Taiwan	11	2.66	14	2.96
United Kingdom	<u>135</u>	<u>32.70</u>	<u>150</u>	<u>31.71</u>
Total	413	100.00	473	100.00
Panel B: Industry analysis				
Industry	Observations Post-Listing ^a	Frequency Post-Listing	Observations Pre-Listing ^a	Frequency Pre-Listing
Resources	35	8.47	27	5.71
Basic industries	39	9.44	64	13.53
General industries	51	12.35	53	11.21
Cyclical consumer goods	27	6.54	28	5.92
Noncyclical consumer goods	74	17.92	101	21.35
Cyclical services	77	18.65	85	17.97
Noncyclical services	49	11.86	38	8.03
Utilities	29	7.02	26	5.50
Information technology	<u>32</u>	<u>7.75</u>	<u>51</u>	<u>10.78</u>
Total	413	100.00	473	100.00

^aThis column reports the number of cross-listing (CL) firm-year observations. Because the non-cross-listing (NCL) firm-years are matched to the CL firm-years, the number of NCL firm-years is the same as CL firm-years. Firm-years are included only if there is available data for the firm and a matched firm in both the pre- and post-listing periods.

differences in accounting could partially contribute to the difference in multiples, the fact that similar results hold for the cash-flow-to-price multiple suggests accounting alone does not determine the differences in the multiples.⁵

⁵ We winsorize variables at the 5% level to control for the effects of outliers.

TABLE 2
Descriptive Statistics of Cross-Listing Versus Non-Cross-Listing Firms in the Post-Listing Period

Variable ^a	Cross-Listers		Non-Cross-Listers	
Primary variables:	Mean	Median	Mean	Median
<i>CF/A</i>	0.076	0.062	0.088	0.077
<i>B/M</i>	0.499	0.394	0.746***	0.556***
<i>CF/P</i>	0.084	0.060	0.126***	0.086***
<i>LIQ</i>	1.673	1.291	1.469***	1.240
Control variables:				
<i>SIZE</i>	15.154	15.006	13.107***	13.084***
<i>LEV</i>	0.801	0.588	0.622	0.449
<i>GROWTH</i>	0.162	0.065	0.139***	0.064
<i>EQUITY_ISS</i>	0.145	0.069	0.109*	0.070
<i>DEBT_ISS</i>	0.299	0.073	0.323	0.060
<i>ASSET_TURN</i>	1.985	1.428	1.396***	0.993***

^aWe define *CF/A* as net cash flows from operating activities divided by total assets, *B/M* as book value of equity capital and reserves divided by market value of equity, *CF/P* as net cash flow from operating activities divided by market value of equity, *LIQ* as current assets divided by current liabilities, *SIZE* as the natural log of total assets, *LEV* as total liabilities divided by equity capital and reserves, *GROWTH* as percentage change in sales, *EQUITY_ISS* as change in equity capital and reserves adjusted for earnings and dividends, *DEBT_ISS* as the change in total liabilities during the period, and *ASSET_TURN* as sales divided by assets. We winsorize the variables at the 5% level.

*, **, ***Significantly different between groups at the .10, .05, and .01 levels, respectively (one-tailed).

Differences of potential concern are variables that might affect the cross-listing decision. In particular, research such as Pagano, Röell, and Zehner [2000] indicates that cross-listing firms might differ in terms of size, leverage, growth, equity issuance, debt issuance, and capital intensity. Table 2 also compares these factors across the two samples. The CL firms are larger and more capital intensive than are the NCL firms. However, CL firms are generally similar to NCL firms in terms of leverage, equity issuance, and debt issuance. Median growth is similar across the two samples, but the mean is significantly higher for the CL firms. To ensure that these factors do not unduly affect results that follow, we include them as controls in the analyses where feasible.⁶

4.1.2. Earnings Management. Our first set of measures of accounting quality focuses on the differences in earnings management between CL and NCL firms. Evidence here is necessarily circumstantial because we cannot directly observe earnings management or completely disentangle the effects of accounting differences from the underlying economics. However, we attempt to minimize underlying economic differences by choosing a control sample and by controlling for size, leverage, growth, equity issuances, debt issuances, and capital intensity. Results for the measures are generally unchanged if we exclude the control variables.

⁶ Because cross-listing may also be a function of expected future growth and capital needs, we replicated the analysis replacing concurrent growth with future growth, future equity issuances, and future debt issuances. Although including these variables limits the sample size, results are consistent.

We rely on a wide range of measures because, given the difficulty in measuring the construct of earnings management, our proxies are likely to be measured with considerable error. To the extent that our results are consistent across a range of measures, it provides greater assurance that we are capturing the effects of accounting choices, although we can never entirely rule out other factors. We begin by using various measures specifically designed to detect earnings smoothing behavior. We then examine accrual-based measures of earnings management. Finally, we test the frequency of small positive earnings.

We base our measures of earnings smoothing on approaches in studies such as Leuz, Nanda, and Wysocki [Forthcoming] and focus on the variability of earnings. To the extent that earnings are managed, they should be less variable, all else equal. The allegation is that firms in many jurisdictions, for various reasons, tend to use discretion in accounting to smooth the reported earnings stream. Research such as Leuz, Nanda, and Wysocki suggests that earnings smoothing is more pronounced outside of the United States, and particularly in code-law and Asian countries.

Our first measure, variability of ΔNI , is the variance of the residuals from a regression of the absolute value of changes in annual income for ordinary shares (scaled by total assets) on dividend payout and our control variables.⁷ All else equal, a smaller variance of the residual suggests earnings smoothing. As presented in table 3, the variance of the residual is significantly higher for the CL firms than for the NCL firms (using a variance ratio *F*-test), suggesting that CL firms report less smooth earnings than do NCL firms.⁸

Our second measure of earnings smoothing is the ratio of ΔOI and ΔOCF , where ΔOI is the variance of change in operating profit (before tax profit derived from operating activities) and ΔOCF is the variance of the change in net operating cash flows. We compute the variances of ΔOI and ΔOCF by regressing the absolute value of each variable on the control variables. We use the two vectors of residuals to compute the ratio of their respective variances. If firms are using accruals to manage earnings, the variability of the change in operating income should be lower than that of operating cash flows.⁹ This approach mitigates a problem with the preceding measure in that differences in earnings variability may reflect differences in cash-flow volatility unrelated to accounting choices.

⁷ We winsorize our variance measures at the 5% level because variance measures are sensitive to outliers. Results are robust to other winsorization cutoffs.

⁸ In addition to examining the variance of ΔNI , we also test the difference between the two samples in the means of the absolute value of ΔNI , including the controls. We find that the NCL firms have a significantly smaller mean absolute value of ΔNI .

⁹ Datastream provides several definitions of operating income. The one we use does not include extraordinary items and other nonoperating income. However, because of the concern that the criterion for extraordinary differs across countries and that excluding extraordinary items would result in differences based on the location of one-time items on the income statement, we replicate the analysis including extraordinary and nonoperating items. Results are similar.

TABLE 3

Accounting Quality Analysis of Cross-Listing Versus Non-Cross-Listing Firms in the Post-Listing Period

Panel A: Earnings management^a		
Measure	Cross-Listers	Non-Cross-Listers
Variability of ΔNI	0.002	0.001***
Variability of ΔOI and ΔOCF	1.486	0.398 [‡]
Correlation of OA and OCF	-0.453	-0.470
Median of $ABSDA$	0.024	0.038**
Percentage of small positive NI		-1.094***
Panel B: Timely loss recognition		
Measure	Cross-Listers	Non-Cross-Listers
Large negative NI^a		2.248***
Skewness of EPS^b	-18.779 ^{†††}	2.816 ^{†††}
Basu regression $R * DUM$ coefficient ^c	0.194 ^{†††}	0.083 ^{††**}
Panel C: Association of stock prices and returns with accounting data		
Regression R^{2d}	Cross-Listers	Non-Cross-Listers
Price	0.538	0.221***
Basu good news	0.003	0.055**
Basu bad news	0.192	0.077**

^aWe base the analysis on regressions including controls as defined in table 2. We define variability of ΔNI as the residuals from a regression of the absolute value of changes in annual net income for ordinary shares (scaled by total assets) on $DIVP$ (dividend payout) and the control variables, and variability of ΔOI and ΔOCF as the ratio of the variance of change in operating profit (before tax profit derived from operating activities) to the variance of change in net operating cash flows. We compute the variances of ΔOI and ΔOCF based on the absolute value of each variable being regressed on the control variables; the two vectors of residuals are used to compute the ratio of their respective variances. We winsorize ΔNI , ΔOI , and ΔOCF at the 5% level to control for outliers. Correlation of OA and OCF is the partial Spearman correlation between the residuals of operating accruals (calculated as earnings before interest and taxes - OCF) and the residuals of net cash flow from operating activities; we compute both sets of residuals from a regression of each variable on the control variables. Median $ABSDA$ is the median absolute value of discretionary accruals, where discretionary accruals are measured using the Jones model with the additional control variables. For the percentage of small positive (large negative) NI , we estimate a separate logit model for each measure regressing an indicator variable set to 1 for cross-listing and 0 for non-cross-listing firms on a small positive (large negative) NI variable and the control variables. The small positive (large negative) NI variable is an indicator set to 1 for observations for which annual net income for ordinary shares scaled by total assets are between 0 and 0.01 (less than -0.20) and set to 0 otherwise; the coefficient on the indicator variable is reported.

^bWe obtain the significance test from Sheskin [2000].

^cThe regression is $EPS = \alpha + \beta_1 R + \beta_2 DUM + \beta_3 R * DUM + \varepsilon$, where EPS is annual earnings per share deflated by price at beginning of the period, R is the return computed over the fifteen months ending three months after year-end, and DUM is 1 if the return is negative and 0 otherwise. We winsorize the 2 $\frac{1}{2}$ extreme percentiles for each of the variables.

^dThe price regression is $P = \alpha + \beta_1 BVPS + \beta_2 NIPS + \varepsilon$, where P is price as of six months after the fiscal year-end, $BVPS$ is book value of shareholders' equity per share, and $NIPS$ is net income per share. We deflate all measures by the average share price for the country divided by the average price for the particular sample (CL or NCL). The Basu good/bad-news regression is $EPS = \alpha + \beta_4 R + \varepsilon$, where EPS is annual earnings per share deflated by price at beginning of the period and R is the return computed over the 15 months ending 3 months after year-end. Good-news observations are those for which R is nonnegative. Bad-news observations are those for which R is negative. We winsorize the 2 $\frac{1}{2}$ extreme percentiles for each of the variables. We obtain significance tests of R^2 differences from Cramer [1987].

*, **, ***Significantly different between groups at the .10, .05, and .01 levels, respectively (one-tailed).

[†], ^{††}, ^{†††}Significantly different from zero at the .10, .05, and .01 levels, respectively (one-tailed).

[‡]Significantly less than one at the .01 level.

A preliminary indication of the likelihood that differences in profit variability are driven by cash-flow variability can be gleaned by examining differences in the volatility of operating income and cash flows directly (not tabulated). Although the variance of operating income is significantly larger

for the CL firms than for the NCL firms, the variance of cash flows is smaller for the CL firms, indicating that it is differences in accruals rather than cash flows that drives the volatility of income.

Consistent with this, results for the ratio of ΔOI and ΔOCF reported in panel A suggest that NCL firms smooth earnings more aggressively than do CL firms. The ratio is substantially higher for the sample of CL firms than for their domestic counterparts, suggesting that it is not a higher variability of cash flows that drives the higher earnings volatility for the CL firms relative to the NCL firms. We do not test the differences between samples because we do not know of a formal statistical test for differences in the ratios of variances. However, for each sample, we test whether the ratio of variances is significantly less than one. We find that only the NCL firms have a ratio significantly less than one.

In addition to these earnings-smoothing tests, we also examine several accrual-based measures of earnings management. Our first measure of accrual-based earnings management, based on Myers and Skinner [1999] and Leuz, Nanda, and Wysocki [Forthcoming], is the Spearman partial correlation between operating accruals (OA) and operating cash flows (OCF), controlling for size, growth, leverage, capital intensity, and debt and equity issuances. We calculate OA as earnings before interest and taxes less OCF . A more negative cash flow/accrual correlation is indicative of earnings management because it suggests that firms use accruals to smooth variability in cash flows.

Consistent with prior research, the results indicate a large negative relation between cash flows and accruals for both the CL and NCL samples. As expected, the CL firms have a smaller negative correlation than do the NCL firms, although the difference is only significant at the .13 level based on the expectation and variance of the squared correlation as derived in Cramer [1987]. However, if the correlations are computed based on changes rather than on levels, as in Leuz, Nanda, and Wysocki [Forthcoming], or computed without controls, the difference is significant at the .01 level (untabulated).

We base our next measure of accrual-based earnings management on the magnitude of discretionary accruals, using the Jones [1991] model to estimate the nondiscretionary accruals component of total accruals (see Dechow, Sloan, and Sweeney [1995] for a discussion) with our control variables. We define discretionary accruals as the absolute value of the residual of this regression. Results based on the median of the absolute value of the discretionary accruals ($ABSDA$) presented in panel A of table 3 indicate that NCL firms have a greater amount of discretionary accruals than do CL firms and suggest NCL firms manage earnings more than do CL firms. Results based on the mean (as opposed to the median) and on the modified Jones model are similar. Combined with the results for smoothing discussed earlier, these results suggest that NCL firms tend to record more discretionary accruals and that those accruals tend to smooth earnings.

An alternate approach to determine the extent of earnings management is to assess the frequency of small positive earnings (Burgstahler and Dichev

[1997]). A commonly conjectured outcome of earnings management is an unusually high frequency of small positive reported earnings resulting from discretionary accrual management. Research such as Leuz, Nanda, and Wysocki [Forthcoming] provides evidence of substantial variation in the frequency of small positive earnings internationally, consistent with the effects of earnings management. We compare the frequency of small positive earnings (earnings, scaled by total assets, between 0 and 0.01) for our CL and NCL firms. We estimate a logit regression where the dependent variable takes a value of 1 if the observation is a CL firm and 0 otherwise. The test variable equals 1 if the firm reports a small positive net income and 0 otherwise, and our controls for size, leverage, growth, equity issuances, debt issuances, and capital intensity are included as independent variables. The coefficient estimate (reported in table 3) captures the incremental frequency of small positives for CL firms relative to NCL firms.

The coefficient estimate is significantly negative, indicating that there is a smaller proportion of small positives for the CL firms, controlling for other factors, again suggesting less of a tendency for cross-listed firms to manage earnings, all else equal.¹⁰ The general conclusions follow those for the other measures of earnings management. NCL firms have a significantly larger proportion of small positive earnings than do CL firms, suggesting more of a tendency to manage earnings around zero.

4.1.3. Timely Recognition of Losses. We also examine differences in the timeliness of loss recognition between CL and NCL firms. Research such as Ball [2001] suggests that firms differ across environments in terms of timely recognition of losses. If so, we should observe an increased incidence of extreme negative earnings outcomes for cross-listed firms; to examine this effect, we investigate cases in which firms report net income as a proportion of assets below -0.20 . For this analysis we use the same logit model, changing the test variable, as in the test for small positive net income. Results in panel B of table 3 suggest that CL firms have a significantly higher incidence of large losses, consistent with more timely loss recognition.

Another approach for assessing the tendency for timely loss recognition is to consider the skewness of reported earnings. Ball, Kothari, and Robin [2000] document that common law earnings are more left skewed than are code law earnings, which they interpret as evidence of more timely recognition of losses. Thus, to the extent that cross-listed firms recognize losses in a more timely manner, the resulting earnings should be more

¹⁰ Commonly the frequency of small, positive earnings is deflated by the frequency of small negatives. We rely on the frequency of small positives because, given our sample size and the infrequency of small negatives, our ratios tend to be very sensitive to a small change in the number of small negatives. Although this approach does not allow us to tie the increased frequency of small positive earnings to the decreased frequency of small negatives, the prior research posits that differences in the ratio of small positives to small negatives is driven primarily by the numerator, suggesting that firms shift out of a wide range of negative outcomes.

negatively skewed. Panel B of table 3 reports skewness measures for earnings per share. CL firms report negatively skewed earnings; whereas NCL firms report positively skewed earnings. Although we do not know of a direct test to compare skewness across samples, the fact that NCL earnings are significantly and positively skewed and CL earnings are significantly and negatively skewed (based on the test in Sheskin [2000]) suggests that the difference in skewness is likely significant.

A final test we perform to examine the timeliness of loss recognition is also based on Ball, Kothari, and Robin [2000], as well as Basu [1997]. They estimate the earnings/returns regression with earnings per share as the dependent variable and returns, a dummy if return is negative, and the dummy interacted with returns as dependent variables. A positive coefficient on return interacted with the dummy variable indicates conservatism. Consistent with prior research, we find that both CL and NCL firms are conservative, but that CL firms demonstrate a significantly higher level of conservatism as measured by this coefficient.

4.1.4. Accounting Quality: Association of Stock Prices and Returns with Accounting Data. Finally, to examine differences in accounting quality, we examine the relation of stock prices with accounting data. We consider these tests to be supplemental subject to the caveat that the pricing mechanism may have changed around cross-listing. In particular, it may be that even local investors now rely on the U.S. GAAP reconciliations in setting price, which may change the relation between local-GAAP-reported data and share price. Although that change may confound the analysis, we do not believe it should cause the association between share price and domestic GAAP data to increase. In particular, one could argue that if local GAAP reporting has not changed, the association with share price may decrease as investors shift their attention from the local GAAP statements to the U.S. GAAP reconciliations.

We consider two sets of analyses from the literature. First, we investigate the relation among price, earnings, and book value by regressing price on earnings per share and book value per share. Because of concerns over scale issues caused by differences in average share prices across countries, we deflate all measures by the average share price for the country divided by the average price for the particular sample (CL or NCL). Our interest is in whether accounting data for CL firms are more highly associated with share price than for NCL firms. Results in panel C of table 3 indicate that the regression R^2 is 0.538 for the CL firms versus 0.221 for the NCL firms, a difference that is significant at the .001 level based on a Cramer [1987] test. We also examine the coefficients on earnings and book values. The coefficients on both variables are significantly greater in the CL sample than in the NCL sample (results untabulated).

In addition to the price regressions, we perform analyses like those in Ball, Kothari, and Robin [2000] and Basu [1997]. We regress earnings per share on returns separately for good news and bad news firms, with

observations classified as bad news if returns are negative and good news otherwise. Ball, Kothari, and Robin find that the greater timeliness of common law accounting income is entirely due to the reporting of losses. Our results are consistent with theirs. We find that for bad-news firms the R^2 is significantly greater for CL firms than for NCL firms. However, this finding is not the case for good-news firms, again consistent with the results in Ball, Kothari, and Robin, who find that the good-news R^2 is significantly higher for code law companies than for common law companies.

Overall, results across tests of earnings management, timely loss recognition, and price association suggest CL firms report higher quality earnings than do NCL firms.

4.2 CHANGES AROUND CROSS-LISTING

As discussed earlier, pre-existing differences, changes around cross-listing, or both could drive the differences documented between CL and NCL firms. One way to investigate the two explanations is to compare CL and NCL firms before cross-listing and CL firms around cross-listing. If the differences reflect changes around cross-listing, they should be evident in a comparison of CL firms pre- and post-cross-listing; if self-selection drives the differences, they should be apparent in CL and NCL differences before cross-listing.¹¹

We examine differences in the accounting quality for CL firms between the pre-listing and post-listing periods, using the same measures as used in the previous section. The sample of CL firms in the pre- and post-listing periods is summarized in table 1 and the results are reported in table 4. Although we require a firm to appear in both the pre- and post-listing samples to be included, the two samples have different numbers of observations (413 vs. 473) because some firms appear more often in one sample than in the other. With respect to the earnings management measures (see panel A of table 4), all change significantly around cross-listing in a direction consistent with CL firms' decreasing their earnings-management activity around cross-listing, with the exception of the absolute value of accruals measure, which is insignificant.

We also find evidence that firms report losses on a more timely basis after listing. Panel B of table 4 presents evidence that firms report a significantly higher incidence of large losses and are significantly more conservative after cross-listing than before. In addition, earnings are more negatively skewed after cross-listing.

¹¹ A problem with drawing strong conclusions from this approach is that it is difficult to be sure that the pre-listing comparison is not contaminated by firms' changing their behavior shortly before cross-listing. To address this issue, we replicate the pre-listing analysis both excluding firm-years that are within two years before cross-listing and excluding firm-years that are within four years before cross-listing. Although the sample size drops substantially (especially for the four-year analysis), results are consistent. In addition, for the subset of observations for which we have data available, we examined changes over the two years before listing. Differences in our measures of accounting quality are not significant between the two years. However, conclusions should still be drawn with caution.

TABLE 4

Accounting Quality Analysis in the Pre- Versus Post-Listing Period

Panel A: Earnings management^a		
Measure	Post-Listing	Pre-Listing
Variability of ΔNI	0.002	0.0005***
Variability of ΔOI and ΔOCF	1.486	0.529 [†]
Correlation of OA and OCF	-0.453	-0.583***
Median of $ABSDA$	0.024	0.018
Percentage of small positive NI		-0.499**
Panel B: Timely loss recognition		
Measure	Post-Listing	Pre-Listing
Large negative NI ^a		0.844**
Skewness of EPS ^b	-18.779 ^{†††}	-12.812 ^{†††}
Basu regression $R * DUM$ coefficient ^c	0.194 ^{†††}	0.120 ^{†††**}
Panel C: Association of stock prices and returns with accounting data		
Regression R^{2d}	Post-Listing	Pre-Listing
Price	0.538	0.213***
Basu good news	0.003	0.002
Basu bad news	0.192	0.149

^aWe base the analysis on regressions including controls as defined in table 2. We define variability of ΔNI as the residuals from a regression of the absolute value of changes in annual net income for ordinary shares (scaled by total assets) on $DIVP$ (dividend payout) and the control variables, and variability of ΔOI and ΔOCF as the ratio of the variance of change in operating profit (before tax profit derived from operating activities) to the variance of change in net operating cash flows. We compute the variances of ΔOI and ΔOCF based on the absolute value of each variable being regressed on the control variables; the two vectors of residuals are used to compute the ratio of their respective variances. We winsorize ΔNI , ΔOI , and ΔOCF at the 5% level to control for outliers. Correlation of OA and OCF is the partial Spearman correlation between the residuals of operating accruals (calculated as earnings before interest and taxes - OCF) and the residuals of net cash flow from operating activities; we compute both sets of residuals from a regression of each variable on the control variables. Median $ABSDA$ is the median absolute value of discretionary accruals, where discretionary accruals are measured using the Jones model with the additional control variables. For the percentage of small positive (large negative) NI , we estimate a separate logit model for each measure regressing an indicator variable set to 1 for cross-listing and 0 for non-cross-listing firms on a small positive (large negative) NI variable and the control variables. The small positive (large negative) NI variable is an indicator set to 1 for observations for which annual net income for ordinary shares scaled by total assets are between 0 and 0.01 (less than -0.20) and set to 0 otherwise; the coefficient on the indicator variable is reported.

^bWe obtain the significance test from Sheskin [2000].

^cThe regression is $EPS = \alpha + \beta_1 R + \beta_2 DUM + \beta_3 R * DUM + \varepsilon$, where EPS is annual earnings per share deflated by price at beginning of the period, R is the return computed over the fifteen months ending three months after year-end, and DUM is 1 if the return is negative and 0 otherwise. We winsorize the $2^{1/2}$ extreme percentiles for each of the variables.

^dThe price regression is $P = \alpha + \beta_1 BVPS + \beta_2 NIPS + \varepsilon$, where P is price as of six months after the fiscal year-end, $BVPS$ is book value of shareholders' equity per share, and $NIPS$ is net income per share. We deflate all measures by the average share price for the country divided by the average price for the particular sample (CL or NCL). The Basu good/bad-news regression is $EPS = \alpha + \beta_4 R + \varepsilon$, where EPS is annual earnings per share deflated by price at beginning of the period and R is the return computed over the 15 months ending 3 months after year-end. Good-news observations are those for which R is nonnegative. Bad-news observations are those for which R is negative. We winsorize the $2^{1/2}$ extreme percentiles for each of the variables. We obtain significance tests of R^2 differences from Cramer [1987].

* ** *** Significantly different between groups at the .10, .05, and .01 levels, respectively (one-tailed).

[†], ^{††}, ^{†††} Significantly different from zero at the .10, .05, and .01 levels, respectively (one-tailed).

[‡] Significantly less than one at the .01 level.

In terms of the relation between share price and accounting data, the explanatory power of the price-level regression increases around cross-listing, which suggests the differences in explanatory power between CL and NCL firms can be attributable in part to changes around cross-listing. In

addition, the coefficients on both earnings and book value increase significantly around cross-listing (results untabulated). The explanatory power of the Basu [1997] regressions also increases for the bad news firms. In summary, the time-series results around the listing date are consistent with firms' improving the quality of their local GAAP accounting around cross-listing.

4.3 PRE-LISTING DIFFERENCES

It may be that firms that are attracted to cross-listing tend to be those that already have higher quality reporting systems and therefore perceive the cost of added transparency attached to U.S. listing to be less onerous. To examine that possibility, we compare our sample of CL firms with NCL firms in the pre-listing period. We find evidence that there is a difference in terms of earnings management behavior in future CL firms and NCL firms. Results reported in panel A of table 5 indicate that the variability of net income and the variability of operating income to operating cash flows are both greater for the CL firms than for the NCL firms. Additionally, the correlation between operating accruals and operating cash flows is more negative for the NCL firms in the pre-listing period, and the incidence of discretionary accruals is more positive. Finally, the percentage of firms reporting small positive net income is significantly lower for the CL than for the NCL firms.

Evidence on the timely recognition of losses (panel B of table 5) is more mixed. Although CL firms do exhibit a higher frequency of large losses, they do not exhibit more skewness nor do they seem to report more conservatively in the pre-listing period.

Evidence for the association between price and accounting data (panel C of table 5) is consistent with higher quality data for the CL firms in the pre-listing period. Although, the R^2 on the Basu [1997] regression for bad-news firms is higher for the CL firms than for the NCL firms, the difference is not significant.

In general, the evidence indicates that our CL sample of firms differs from our NCL sample in the post-cross-listing period across various dimensions, suggesting higher quality local GAAP reporting. Furthermore, there is some evidence that the differences are due both to changes around cross-listing and to self-selection, although the evidence is stronger for the changes than for the pre-listing period. Although the results are generally consistent across a range of approaches and with various controls, it is possible that we have excluded potentially important factors in our analysis. To examine that possibility, we turn now to other robustness tests.

4.4 OTHER ANALYSES

4.4.1. CL Versus Firms Trading on Other U.S. Markets. We perform several sensitivity analyses on the CL versus NCL results reported in table 3. In particular, one concern is that the CL firms may differ from the NCL firms in other ways because of, for example, other costs and benefits of cross-listing. First, we employ an additional sample, namely a group of firms that

TABLE 5

Accounting Quality Analysis of Cross-Listing Versus Non-Cross-Listing Firms in the Pre-Listing Period

Panel A: Earnings management^a		
Measure	Cross-Listers	Non-Cross-Listers
Variability of ΔNI	0.0005	0.0004***
Variability of ΔOI and ΔOCF	0.529 [‡]	0.496 [‡]
Correlation of OA and OCF	-0.583	-0.633***
Median of $ABSDA$	0.018	0.026***
Percentage of Small Positive NI		-0.723***
Panel B: Timely loss recognition		
Measure	Cross-Listers	Non-Cross-Listers
Large negative NI^a		1.059**
Skewness of EPS^b	-12.812 ^{†††}	-12.914 ^{†††}
Basu regression $R * DUM$ coefficient ^c	0.120 ^{†††}	0.153 ^{†††}
Panel C: Association of stock prices and returns with accounting data		
Regression R^{2d}	Cross-Listers	Non-Cross-Listers
Price	0.213	0.125**
Basu good news	0.002	0.016
Basu bad news	0.149	0.142

^aWe base the analysis on regressions including controls as defined in table 2. We define variability of ΔNI as the residuals from a regression of the absolute value of changes in annual net income for ordinary shares (scaled by total assets) on $DIVP$ (dividend payout) and the control variables, and variability of ΔOI and ΔOCF as the ratio of the variance of change in operating profit (before tax profit derived from operating activities) to the variance of change in net operating cash flows. We compute the variances of ΔOI and ΔOCF based on the absolute value of each variable being regressed on the control variables; the two vectors of residuals are used to compute the ratio of their respective variances. We winsorize ΔNI , ΔOI , and ΔOCF at the 5% level to control for outliers. Correlation of OA and OCF is the partial Spearman correlation between the residuals of operating accruals (calculated as earnings before interest and taxes - OCF) and the residuals of net cash flow from operating activities; we compute both sets of residuals from a regression of each variable on the control variables. Median $ABSDA$ is the median absolute value of discretionary accruals, where discretionary accruals are measured using the Jones model with the additional control variables. For the percentage of small positive (large negative) NI , we estimate a separate logit model for each measure regressing an indicator variable set to 1 for cross-listing and 0 for non-cross-listing firms on a small positive (large negative) NI variable and the control variables. The small positive (large negative) NI variable is an indicator set to 1 for observations for which annual net income for ordinary shares scaled by total assets are between 0 and 0.01 (less than -0.20) and set to 0 otherwise; the coefficient on the indicator variable is reported.

^bWe obtain the significance test from Sheskin [2000].

^cThe regression is $EPS = \alpha + \beta_1 R + \beta_2 DUM + \beta_3 R * DUM + \varepsilon$, where EPS is annual earnings per share deflated by price at beginning of the period, R is the return computed over the fifteen months ending three months after year-end, and DUM is 1 if the return is negative and 0 otherwise. We winsorize the 2^{1/2} extreme percentiles for each of the variables.

^dThe price regression is $P = \alpha + \beta_1 BVPS + \beta_2 NIPS + \varepsilon$, where P is price as of six months after the fiscal year-end, $BVPS$ is book value of shareholders' equity per share, and $NIPS$ is net income per share. We deflate all measures by the average share price for the country divided by the average price for the particular sample (CL or NCL). The Basu good/bad-news regression is $EPS = \alpha + \beta_4 R + \varepsilon$, where EPS is annual earnings per share deflated by price at beginning of the period and R is the return computed over the 15 months ending 3 months after year-end. Good-news observations are those for which R is nonnegative. Bad-news observations are those for which R is negative. We winsorize the 2^{1/2} extreme percentiles for each of the variables. We obtain significance tests of R^2 differences from Cramer [1987].

* ** *** Significantly different between groups at the .10, .05, and .01 levels, respectively (one-tailed).

†, ††, ††† Significantly different from zero at the .10, .05, and .01 levels, respectively (one-tailed).

‡ Significantly less than one at the .01 level.

trade in the United States (referred to as the OTC sample), but not on the NYSE, AMEX, or Nasdaq. Aside from listing on a major exchange, firms can cross-list and raise capital in the United States in various other ways, including Level I ADRs (OTC) and privately placed and offshore ADRs

(SEC Rule 144A/Regulation S). Firms cross-listing in these ways and included on the BNY ADR file are included in our OTC sample. We restrict the OTC analysis (for both OTC and CL firms) to 1990 through 1999 because the SEC approved a new rule during 1999 that required that firms traded on the OTC Bulletin Board to file the same documents as firms on the major exchanges (see Bushee and Leuz [2002] for a summary).

The OTC firms make an interesting control sample because they capture some of the benefits of trading in the United States but are not subject to the same level of regulation. Specifically, before 1999 an OTC firm was not considered a “reporting company” under U.S. securities law and could simply file the same documents as in their home market. The effect on legal exposure of Level I, Rule 144A, and Regulation S listing versus major exchange listing is less clear. All firms trading in the United States (including OTC firms) are subject to antifraud liability under Rule 10b-5. Registering with the SEC also subjects a firm to potential exposure under Section 18 of the Securities Act of 1934, but exposure is limited because a plaintiff must demonstrate reliance on the filed document and not simply on the information contained in the document (sometimes referred to as the “eye-ball” requirement). Thus, if there was a material misstatement in the 20-F that also appears in the annual report (which is not a “filed” document for Section 18 purposes), a shareholder would have to demonstrate that he or she obtained the information from the form 20-F and not simply from the annual report, a requirement that is not present under Rule 10b-5 (Hazen [1996]). As a result, a plaintiff would typically choose to litigate under Rule 10b-5 rather than under Section 18.¹² Therefore, it is not clear to what extent cross-listing increases a firm’s potential legal exposure relative to OTC trading.¹³

Consistent with cross-listing providing more effective bonding, Miller [1999] shows that firms accessing U.S. markets through the OTC market experience a smaller positive stock price response. Coffee [2002] argues that firms may view OTC trading as means of having a presence in the U.S. markets without some of the regulatory exposure and interprets the Miller result as consistent with the notion that the OTC listing provides a more limited bonding role.¹⁴ As a result, we predict that, despite trading on U.S. markets, accounting data for firms trading on the OTC will differ from that for CL firms.

¹² Cross-listing firms choosing to issue securities (Level III ADRs) are also subject to the “strict liability” provisions of Section 11 of the 1933 Act. However, our results are robust to excluding Level III ADRs, suggesting that results are not driven by Section 11 exposure.

¹³ Closely related, Seigel [2002, p. 1] investigates the incidence of SEC action against cross-listed firms and argues that “SEC action against any U.S.-listed foreign firm has been rare and mostly ineffective throughout the history of the federal securities laws.”

¹⁴ Although OTC listing and Rule 144A/Regulation S security issuance offer some of the advantages of U.S. listing, they are not perfect substitutes for trading on exchanges because liquidity and security issuance is more limited.

Our basic comparison between the CL and OTC samples is the same as for the CL and NCL samples.¹⁵ The primary problem with this sample is that we are no longer able to match individual CL firms to OTC firms, because both samples are sufficiently limited that imposing matching constraints would reduce sample size to the point where meaningful comparison would no longer be feasible. In terms of our control variables, although the OTC firms are comparable in terms of growth, equity issuances, and capital intensity, they are more highly levered, issue more debt, and are smaller than the CL firms.¹⁶ To mitigate the effects of these differences, we include our control variables. The spread of the 684 OTC observations across countries and industries is generally consistent with that for the 288 CL observations, with OTC firms representing 34 countries and all of the major industry groupings.¹⁷ However, the OTC sample contains a slightly higher proportion (48%) of common law firms than does the CL sample, consistent with evidence in Reese and Weisbach [2001] that code law companies in general prefer full listing because of the added investor protection.

Results for the OTC firms are similar to those for the NCL sample, suggesting that the act of trading in the United States alone does not drive the earlier results. Descriptively, CL firms are more profitable and trade at higher multiples than do OTC firms (not tabulated). In addition, OTC firms show more evidence of earnings smoothing than do CL firms, as reported in table 6. OTC firms have lower variability of net income and of operating income relative to operating cash flows. In addition, their correlation between operating accruals and operating income is significantly lower. OTC firms also have a significantly higher proportion of small profits than do CL firms, suggesting more of a tendency to use discretion to avoid losses. Only the Jones model accruals measure is not consistent with predictions.

In terms of timely loss recognition, the results again suggest that CL firms recognize losses in a more timely manner than do OTC firms. In particular, OTC firms report fewer instances of large negative earnings. Additionally, CL firms report earnings that are significantly skewed to the left, whereas OTC firms' earnings are skewed to the right. Furthermore, CL firms appear

¹⁵ It would be potentially interesting to examine cases in which OTC firms switch to CL firms during our sample period. However, we do not have historical OTC listing data for our CL switching firms to indicate whether they were previously OTC. Given the relatively small number of switching firms on which we have historical data to start with, it seems unlikely that we would be able to draw a large enough sample of firms switching from the OTC to CL to draw inference.

¹⁶ One way to assess the quality of the match is to estimate the probability of U.S. cross-listing for the OTC and CL samples. As discussed later, we apply the Pagano, Röell, and Zehner [2002] model and find that CL firms have a significantly higher probability of cross-listing than do OTC firms (25% vs. 14%). Inclusion of the control variables may mitigate some of this difference, but conclusions should still be drawn with caution.

¹⁷ Our sample size for CL observations decreases because we exclude observations after 1999 for consistency with the OTC sample.

TABLE 6

Accounting Quality Analysis of Cross-Listing Versus OTC Firms in the Post-Listing Period

Panel A: Earnings management^a		
Measure	Cross-Listers	OTC
Variability of ΔNI	0.0009	0.0007***
Variability of ΔOI and ΔOCF	0.704 [‡]	0.572 [‡]
Correlation of OA and OCF	-0.590	-0.987***
Median of $ABSDA$	0.033	0.026
Percentage of small positive NI		-0.611**
Panel B: Timely loss recognition		
Measure	Cross-Listers	OTC
Large negative NI^a		1.239***
Skewness of EPS^b	-9.385 ^{†††}	25.630 ^{†††}
Basu regression $R * DUM$ coefficient ^c	0.228 ^{†††}	0.213 ^{†††}
Panel C: Association of stock prices and returns with accounting data		
Regression R^{2d}	Cross-Listers	OTC
Price	0.949	0.090***
Basu good news	0.034	0.020
Basu bad news	0.174	0.138

^aWe base the analysis on regressions including controls as defined in table 2. We define variability of ΔNI as the residuals from a regression of the absolute value of changes in annual net income for ordinary shares (scaled by total assets) on $DIVP$ (dividend payout) and the control variables, and variability of ΔOI and ΔOCF as the ratio of the variance of change in operating profit (before tax profit derived from operating activities) to the variance of change in net operating cash flows. We compute the variances of ΔOI and ΔOCF based on the absolute value of each variable being regressed on the control variables; the two vectors of residuals are used to compute the ratio of their respective variances. We winsorize ΔNI , ΔOI , and ΔOCF at the 5% level to control for outliers. Correlation of OA and OCF is the partial Spearman correlation between the residuals of operating accruals (calculated as earnings before interest and taxes - OCF) and the residuals of net cash flow from operating activities; we compute both sets of residuals from a regression of each variable on the control variables. Median $ABSDA$ is the median absolute value of discretionary accruals, where discretionary accruals are measured using the Jones model with the additional control variables. For the percentage of small positive (large negative) NI , we estimate a separate logit model for each measure regressing an indicator variable set to 1 for cross-listing and 0 for non-cross-listing firms on a small positive (large negative) NI variable and the control variables. The small positive (large negative) NI variable is an indicator set to 1 for observations for which annual net income for ordinary shares scaled by total assets are between 0 and 0.01 (less than -0.20) and set to 0 otherwise; the coefficient on the indicator variable is reported.

^bWe obtain the significance test from Sheskin [2000].

^cThe regression is $EPS = \alpha + \beta_1 R + \beta_2 DUM + \beta_3 R * DUM + \varepsilon$, where EPS is annual earnings per share deflated by price at beginning of the period, R is the return computed over the fifteen months ending three months after year-end, and DUM is 1 if the return is negative and 0 otherwise. We winsorize the 2 $\frac{1}{2}$ extreme percentiles for each of the variables.

^dThe price regression is $P = \alpha + \beta_1 BVPS + \beta_2 NIPS + \varepsilon$, where P is price as of six months after the fiscal year-end, $BVPS$ is book value of shareholders' equity per share, and $NIPS$ is net income per share. We deflate all measures by the average share price for the country divided by the average price for the particular sample (CL or NCL). The Basu good/bad-news regression is $EPS = \alpha + \beta_4 R + \varepsilon$, where EPS is annual earnings per share deflated by price at beginning of the period and R is the return computed over the 15 months ending 3 months after year-end. Good-news observations are those for which R is nonnegative. Bad-news observations are those for which R is negative. We winsorize the 2 $\frac{1}{2}$ extreme percentiles for each of the variables. We obtain significance tests of R^2 differences from Cramer [1987].

*, **, ***Significantly different between groups at the .10, .05, and .01 levels, respectively (one-tailed).

†, ††, †††Significantly different from zero at the .10, .05, and .01 levels, respectively (one-tailed).

‡Significantly less than one at the .01 level.

to report more conservatively as measured by the Basu [1997] regression, although the difference is not statistically significant. Finally, the degree of association between stock prices and accounting information is significantly higher for CL firms than for OTC firms, indicating higher value relevance

of reported results for CL firms as compared with OTC firms.¹⁸ In addition, the explanatory power in the bad-news Basu [1997] regressions is higher for CL firms than for OTC firms. Although not definitive, results from the OTC analysis suggest there is more at work here than simply the act of trading in the United States. Subject to the inherent limitations of the data, the result is consistent with the notion in Miller [1999] and Coffee [2002] that the market views a decision to trade on the OTC differently from listing on a U.S. exchange. In particular, consistent with the bonding explanation in Coffee, CL firms appear to report higher quality results in the home market than do OTC firms.

4.4.2. Subset of CL Versus NCL: Cross-Listing on Non-U.S. Markets. We also investigate the subset of our NCL firms that are cross-listed, but not in the United States. Research such as Coffee [2002 p. 17] suggests that firms do not appear to view cross-listing in non-U.S. markets as a close substitute for U.S. cross-listing, which he attributes to differences in regulatory environments. Coffee, for example, states, “For the foreign issuer, the NYSE still offers a critical advantage: its reputation as the leading repository of high disclosure standards and market transparency. Here it clearly outranks its nearest competitor for listings, the LSE.” Because these firms have reasons to cross-list but did not choose the U.S. market, they provide a potentially interesting comparison sample. The comparison is not perfect because, as noted by Pagano, Röell, and Zehner [2002], firms cross-listing onto U.S. markets differ from firms listing on European markets in terms of factors such as industry, growth, and capital structure.¹⁹ Matching on growth and industry and including our controls for growth, leverage, size, capital intensity, and debt and equity issuance should at least partially control for those types of factors, although we cannot entirely eliminate the possibility of omitted factors.

We find evidence that 46% of our NCL firms are cross-listed on other non-U.S. markets, 48% of these on code law markets. To the extent that cross-listing on other markets causes our NCL firms to be more similar to our CL firms (i.e., cross-listing on other markets has similar effects to cross-listing in the United States), it should bias against our finding results. However, except for the small positive net income measure that is not significant, results (not tabulated) are robust to restricting the NCL sample to firms cross-listed on major non-U.S. markets, suggesting that it is not cross-listing per se that drives the results.

¹⁸ The large spread in R^2 s for these price regressions reflects the effect of a few influential observations. If we winsorize all variables at the 2.5 and 97.5 level, the CL R^2 is 0.512 and the OTC is 0.329, still significantly different. All of the price regression results are robust to applying these cutoffs.

¹⁹ Applying the Pagano, Röell, and Zehner [2002] model, the NCL firms that are cross-listed elsewhere have a very similar probability of cross-listing in the United States to the CL firms (24% vs. 25%).

4.4.3. Subset of CL Versus NCL: High Probability of Cross-Listing. The preceding two subsections suggest it is not simply the fact that a firm trades in the United States or cross-lists in general that drives the differences in accounting quality across CL and NCL firms. However, the motivations for trading on the OTC or cross-listing on non-U.S. markets may differ from U.S. listing on dimensions other than regulation that might affect our results. The fact that our conclusions are robust to a variety of measures makes it more difficult to imagine omitted variables that would explain all of the results. Another approach, however, is to explicitly attempt to model the cross-listing decision. Following Pagano, Röell, and Zehner [2002], we include lagged leverage, total assets, return on assets, total asset growth, market-to-book ratio, percentage of foreign sales, industry, and country in the model. We find that cross-listing is correlated with all of these variables except market-to-book ratio. We compute the probability of cross-listing for both our CL sample and our NCL sample. The medians for the two samples are both 13.7%. The mean for the CL (NCL) sample is 25.5% (20.4%).²⁰ Although the mean probability of cross-listing is significantly greater for the CL sample than for the NCL sample, the difference becomes insignificant when the controls (i.e., size, leverage, growth, equity issuances, debt issuances, and capital intensity) are included. Even though our two samples do not exhibit significantly different probabilities of cross-listing in the presence of our controls, we perform an additional analysis based on this model. We select, from all available firms that are not cross-listing in the United States, a sample of firms with the highest probability of cross-listing (top 20%), and compare them with our CL sample. For that sample of firms the probability of cross-listing is comparable to our CL firms (mean and median of 25% and 16% versus 25% and 14% for our CL firms). Conclusions for this sample (not reported) are similar as those reported in the paper.

4.4.4. Subset of CL Versus NCL: Excluding Firms Following U.S. GAAP or IAS. Also, it is possible that our results for the CL firms reflect that some firms adopt U.S. GAAP or international accounting standards (IAS) outright for local reporting. If so, that would not affect our conclusions but might suggest more directly what drives the differences between CL and NCL firms. For our sample, more CL than NCL firms claim to report under U.S. GAAP or modified U.S. GAAP (8.2% vs. 1.0%), although the proportions for IAS are comparable (2.2% vs. 1.9%). However, the great majority of CL firms still indicate that they report under local GAAP. To assess whether the decision to report under U.S. GAAP or IAS drives our results, we replicate the CL versus NCL analysis excluding the U.S. GAAP, modified U.S. GAAP, and IAS firms (there were not enough observations to examine the subsample separately). Results (not reported) are consistent with those reported earlier, indicating that the firms reporting under U.S. GAAP and IAS do not drive the results.

²⁰ The probability of cross-listing for the NCL sample that is (is not) cross-listed elsewhere is 24.0% (15.4%).

5. Conclusions

The preceding analyses suggest that CL firms have higher quality local GAAP accounting information as measured by various measures of income smoothing and earnings management, by various measures of the timeliness of loss recognition, and by associations of accounting information with share prices. In addition, we find evidence suggesting that these differences are due to both changes around cross-listing and pre-listing differences.

We view our analysis as a first step and subject to numerous caveats. First, our conclusions are only as good as our methods. Although we use approaches from the existing literature, constructs such as earnings management are notoriously difficult to measure. In addition, because many factors play a part in cross-listing decisions, we are not able to establish definitively the extent to which regulation and litigation play a role. In particular, although we attempt to control for other factors, we cannot be sure that our controls are adequate. As research such as Doidge, Karolyi, and Stulz [2001] points out, even if firms are drawn to cross-listing by other factors, regulatory costs may be the determining factor in whether they proceed. Our goal is simply to provide a body of descriptive evidence that is generally consistent with existing research in the area in suggesting that firms cross-listing on U.S. markets differ systematically from other firms.

Finally, because there are many dimensions to cross-listing, it is not possible to establish what aspects of U.S. listing drive the empirical results. At a minimum, however, we view our results as complementing existing cross-listing research and documenting some potentially interesting empirical regularities that may merit additional analysis.

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