WP 2003-04
February 2003

Working Paper

Department of Applied Economics and Management
Cornell University, Ithaca, New York 14853-7801 USA

The World Price of Earnings Opacity

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The World Price of Earnings Opacity*

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First version: July 2001
This revision: December 2002

JEL Classification: *G15, G30, M41*

Keywords: *earnings opacity; earnings aggressiveness; loss avoidance; earnings smoothing; cost of equity; trading volume*

Data Availability: *The data used in this study are publicly available from the sources indicated in the text.*

* An earlier version of this paper was titled "The World Price of Earnings Management."

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The first author thanks Queen's University for research support when he was a Resident Scholar there in the summer of 2001. We are grateful for the discussions on earnings opacity with Rajesh Aggarwal, George Allayanis, Daniel Beneish, Walt Blacconiere, Alex Butler, Art Durnev, Mara Faccio, Andreas Hackethal, Randy Heron, Paul Hribar, Ben Jacobsen, Christian Leuz, Jamie Pratt, Scott Richardson, Avanidhar Subrahmanyam, Dan Thornton, Jim Wahlen and Kelley Welch, and for comments from an anonymous referee, the editor, and workshop participants at Alabama, Amsterdam, Cornell, Houston, Indiana, Kansas, Ljubljana, Maryland, Michigan, New York University, Queen's, Padua, Western Ontario, Wilfrid Laurier, the 2002 Georgia Tech International Finance Conference, the 2002 Canadian Academic Accounting Association Meetings, the 2002 European Finance Association Meetings, the 2002 SFM Conference in Taiwan and the 2002 CIFRA Conference in Chile. We thank Joon Ho Hwang and Sue Zheng for being such careful research assistants.

THE WORLD PRICE OF EARNINGS OPACITY

Abstract

We analyze the financial statements of 58,653 firm-years from 34 countries for the period 1985-1998 to construct a panel data set measuring three dimensions of reported accounting earnings for each country – earnings aggressiveness, loss avoidance, and earnings smoothing. We hypothesize that these three dimensions are associated with uninformative or opaque earnings, and so we combine these three measures to obtain an overall earnings opacity time-series measure per country. We then explore whether our three measures of earnings opacity affects two characteristics of an equity market in a country – the return the shareholders demand and how much they trade. While not all results are consistent for our three individual earnings opacity measures, our panel data tests document that, after controlling for other influences, an increase in overall earnings opacity in a country is linked to an economically significant increase in the cost of equity and an economically significant decrease in trading in the stock market of that country.

I. INTRODUCTION

The recent decline in equity values in the United States has been attributed to investor concerns over corporate governance and accounting.[1] This decline is consistent with investors perceiving a decreased informativeness in U.S. accounting numbers, and demanding higher rates of return to compensate for this additional component of informational risk.[2] The purpose of our paper is to investigate whether informational risk associated with accounting earnings impacts equity markets around the world. We do this using a joint test. We first measure distributional properties of accounting earnings that suggest poor correspondence between observable accounting earnings and unobservable economic earnings – which we dub earnings opacity – in a country every year, and we then determine whether our measures of earnings opacity in a country are associated with the return shareholders demand for holding equity in that country and are associated with shareholder trading of equity in that country.[3]

We define the earnings opacity of a country as the extent to which the distribution of reported earnings of firms in that country fails to provide information about the distribution of the true, but unobservable, economic earnings of firms in that country. As reported earnings of a particular firm in a country equals unobservable economic earnings plus a noise term, earnings opacity of a country is simply the average lack of informativeness of reported earnings in that country.[4]

Reported earnings in a country could be opaque because of a complex interaction among, at least, three factors: managerial motivation, accounting standards, and the enforcement of accounting standards (e.g.,

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[1] A direct consequence of this attribution is the Sarbanes-Oxley Act of 2002, which was signed into law on July 30, 2002. One of the main objectives of this law is "to protect investors by improving the accuracy and reliability of corporate disclosures."

[2] Information risk refers to a variety of risks that investors may face as a result of possessing inadequate or imprecise information on which to base their investment decisions.

[3] In a previous version of this paper, we had also investigated the effect of earnings opacity in a country on U.S. equity holdings in that country. Because of lack of data, our tests were cross-sectional and not panel data tests. As the number of countries were roughly of the same order of magnitude as the number of control variables, these cross-sectional tests had embarrassingly few degrees of freedom. We dropped this section.

[4] Our definition respects the goals of financial reporting laid out in various statements of the Financial Accounting Standards Board (FASB). One such statement reads, "The primary focus of financial reporting is information about an enterprises's performance provided by measures of earnings and its components." (FASB 1978, SFAC No 1, paragraph 43).

audit quality). It could be that earnings are opaque because managers are motivated to manipulate earnings, and they can do this either because accounting standards allow substantial flexibility, or accounting standards do not exist to specify accounting principles related to some areas of business activity, or accounting standards, though rigorous, are weakly enforced. It could also be that earnings are opaque, not because managers manipulate earnings, but simply because accounting standards do not call for accounting treatments that transparently reflect underlying business activity, and management is not willing or able to overcome these deficiencies by voluntarily providing more informative earnings reports.

Earnings opacity is inherently difficult to measure, particularly across countries, because it is not possible to pinpoint management's motives, and it is difficult to compare accounting standards and the enforcement of these accounting standards. In addition, it is not possible to capture all factors that might influence earnings opacity, or to model how they interact to produce more or less opaque earnings. So, instead of studying the inputs that determine earnings opacity, we analyze the outcome: the distributional properties of reported accounting numbers across countries and across time that suggest earnings opacity. Specifically, we use measures that are intended to capture three attributes of earnings numbers that could lead to earnings opacity: earnings aggressiveness, loss avoidance, and earnings smoothing. We focus on these three dimensions because the literature has suggested that these three dimensions may weaken the link between accounting performance and the true economic performance of a firm. We limit our analysis to industrial firms, so that differences in the underlying earnings process across different industry groups, and differences in the proportion of firms in various industry groups across countries and across time, do not affect the dimensions of reported earnings we examine. Finally, given the above mentioned difficulties in measuring earnings opacity, all our tests are inherently joint tests of two hypotheses: one, our three measures, or a composite of all three, are associated with uninformative or opaque earnings and, two, earnings opacity creates an informational risk that affects the cost of equity and trading in the stock market.

We construct a panel data set for each of these three measures of the three dimensions of earnings opacity – earnings aggressiveness, loss avoidance, and earnings smoothing – and then combine them to obtain

an overall earnings opacity time-series measure per country. We find that our estimates of average earnings opacity per country are significantly associated with variables that might impact the overall quality of a financial reporting regime of a country, namely the CIFAR disclosure index and the number of auditors per 100,000 population.

The second part of our paper goes on to investigate whether earnings opacity affects equity markets. We first examine the effect of our measures of earnings opacity on the return shareholders demand for holding equity (cost of equity.) We measure the effect on the cost of equity employing two distinct approaches used in a companion paper (Bhattacharya and Daouk (2002)). We discuss the details of these approaches, and their merits and demerits, in the next section of the paper.

The first approach is to extract the cost of equity from the dividend discount model. This dividend yield approach has been used by Bekaert and Harvey (2000), and we use a simplified version of their model. After controlling for other influences, we find in our panel data tests that the earnings aggressiveness dimension and overall earnings opacity have significant adverse effects on the cost of equity. An increase in our measure of overall earnings opacity from the 25th percentile rank to the 75th percentile rank is associated with a 2.8 percent increase in the cost of equity measured using dividend yields.

The second approach uses an international asset pricing factor model. It is a simplified version of Bekaert and Harvey (1995). Their empirical specification allows for partial integration of a country to the world equity markets. After controlling for other influences, we find in our panel data tests that the loss avoidance dimension and overall earnings opacity have a significant effect on the cost of equity. An increase in our measure of overall earnings opacity from the 25th percentile rank to the 75th percentile rank is associated with a 3.2 percent increase in the cost of equity measured using this model.

Our last set of panel data tests examines the effect of earnings opacity on the level of trading. The details of the data set used to measure trade are discussed in the next section. After controlling for other influences, we find that earnings aggressiveness, earnings smoothing, and overall earnings opacity have significant adverse effects on trade. An increase in our measure of overall earnings opacity from the 25th

percentile rank to the 75th percentile rank is associated with a 8.8 percent decrease in annual trade.

To summarize, we find that, after controlling for other influences, an increase in our measure of overall earnings opacity in a country is linked to an increase in the cost of equity and a decrease in trading in the stock market of that country. Both these effects are economically as well as statistically significant. However, our tests also reveal some inconsistencies in the relationship between our individual measures of earnings opacity and our cost of equity and trade measures. As all our tests are joint tests, this suggests that caution must be exercised in interpreting the correlation between our three individual measures of three dimensions of reported earnings and true earnings opacity, as well as the correlation between these three measures and the cost of equity and trade.

The rest of the paper is organized as follows. Section II provides the conceptual development underlying our empirical analyses. Section III discusses the methodological issues in the measurement of the earnings opacity variables as well as the stock market variables – cost of equity and trade. In section IV we discuss the data and give some summary statistics. Section V, which is the main section of this paper, tests the null hypothesis that earnings opacity in a country does not affect the stock market of that country. We conclude by discussing the implications and limitations of our analysis in Section VI.

II. CONCEPTUAL DEVELOPMENT

Bushman and Smith (2001), who call for more research using cross-country designs to explore the links between financial accounting information and corporate governance, identify three channels by which earnings opacity may affect financial markets. First, better accounting information helps investors distinguish better between good and bad investments, which decreases estimation risk, which decreases the firm's cost of equity. Second, better accounting information helps investors distinguish better between good and bad managers, which decreases agency costs, which decreases the firm's cost of equity. Third, earnings opacity, by weakening the link between reported accounting earnings and unobservable economic earnings, increases asymmetric information. An increase in asymmetric information leads to an increase in the adverse selection

problem a liquidity provider faces when trading with insiders. The liquidity providers in such a market would protect themselves by increasing their sell price and decreasing their buy price.[5] This increases the transaction cost, which induces a shareholder to require an even higher return on equity for compensation,[6] and also leads to shareholders to trade less often or not trade at all.[7]

Our research investigates whether the three properties of reported accounting earnings we examine result in more opaque earnings, leading to increased information risk that is associated with increased cost of equity and decreased trading. Four assumptions underlie our above hypothesis. First, our measures actually measure what they claim to measure, that is, our measures of the three properties of reported accounting earnings are positively associated with how opaque or uninformative investors perceive reported accounting earnings to be. Second, markets are efficient in the sense that investors can detect the level of earnings opacity, but they cannot "see through" it. Third, the informational asymmetry created by earnings opacity is not completely resolved through other some other communication mechanism, like alternate disclosures directed at large, affiliated stakeholders. Fourth, the informational risk caused by earnings opacity is an important factor relative to the other factors that affect equity markets, and so it is priced. None of these assumptions may hold. The above assumptions are tested in the second part of this paper.

A cross-country comparison of earnings opacity has many advantages over a cross-firm comparison of earnings opacity. First, because of considerable differences in accounting standards and audit quality across the globe, we can obtain an enviable dispersion in earnings opacity around the world. Second, as Bushman and Smith (2001) state, the cross-country differences in earnings opacity can be linked meaningfully to the cross-country differences in economic efficiency and institutional factors. A cross-country design also has some disadvantages. Two potential disadvantages – a more severe omitted variables

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[5] See Glosten and Milgrom (1985) and Kyle (1985) for formal models.

[6] See Amihud and Mendelson (1986) for a formal model on why this should happen for riskless assets. Jacoby, Fowler, and Gottesman (2000) extend this to risky assets. Brennan and Subrahmanyam (1996) provide convincing empirical evidence.

[7] See Bhattacharya and Spiegel (1991) for an analysis of the critical level of asymmetric information needed for a market breakdown.

problem and a more severe endogeneity problem – are tackled later in the paper.

Ours is not the first paper to exploit the advantages of cross-country comparisons. Our paper is a part of the growing international accounting literature that examines the value-relevance of accounting measures (Alford et al. (1993), Harris et al. (1994), Joos and Lang (1994), Ali and Hwang (2000), Land and Lang (2002)). This value-relevance literature examines associations between economic income, measured using equity returns, and accounting data such as earnings. This literature reveals which countries experience greater associations between accounting data and equity returns, but it does not examine the potential consequences of variation in earnings informativeness on equity markets. Recent literature has examined the effect of earnings informativeness on analyst forecasts (Ashbaugh and Pincus (2001), Chang et al. (2000)), but this literature also does not examine equity market consequences of variation in earnings informativeness. Finally, examinations of earnings timeliness and conservatism (Ball et al. (2000)), or the effect of institutional factors on earnings management (Leuz et al. (2002).), explore the potential causes of variation in earnings informativeness around the world, but again do not address the effects of this variation on equity markets. Our contribution to the above literature is that ours is the first paper, as far as we know, that measures earnings opacity at a country level every year to form a panel data set, and then uses panel data tests to check whether earnings opacity adversely affects the equity markets of that country. Our paper should be viewed as complementary to the paper by Leuz et al.(2002), who measure earnings management at a cross-sectional level across 31 countries, and then explore whether institutional factors are linked to the cross-sectional differences in earnings management. Our paper should also be viewed as complementary to a recent survey conducted by PricewaterhouseCoopers (2001), that constructs a broad measure of opacity in a particular country, and links it to capital inflows and the country risk premium in sovereign bonds of that country.

III. VARIABLE SELECTION AND MEASUREMENT ISSUES

Earnings Opacity Measures

Earnings aggressiveness measure

Our first measure of earnings opacity is earnings aggressiveness. Ball, Kothari and Robin (2000) argue that the opposite of aggressiveness, accounting conservatism, which is the more timely incorporation of economic losses versus economic gains into accounting earnings, arises to reduce information asymmetry. Specifically, they argue that three factors are expected to lead to accounting conservatism. First, accountants are aware that managers would like to report economic gains and suppress information about economic losses. Hence, accountants find negative information more credible, and are more likely to incorporate it into accounting income. Second, lenders are important users of financial statements, and lenders are more impacted by economic losses than by economic gains. Third, the timely incorporation of economic losses provides an important corporate governance role, providing quick feedback about bad investment decisions and strategies that managers may not wish to disclose. The first and third of these factors suggest that accounting conservatism is related to informativeness, since conservative accounting is expected to provide information that management may have incentives to withhold otherwise.

It is possible that earnings aggressiveness does not necessarily lead to earnings opacity. It could be argued that conservative accounting prevents good news from being transmitted quickly, thus adding noise. However, given that one might reasonably expect managerial incentives to overstate rather than understate earnings on average, our belief is that aggressive earnings are more opaque earnings, because such accounting reports are more likely to reflect biased and optimistic reporting on the part of management, adding noise to reported earnings and, hence, increasing earnings opacity. To understand these managerial motives, see, for example, Rangan (1998), Teoh et al. (1998), Shivakumar (2000), Healy (1985), Barth et al. (1999). Ultimately, whether earnings aggressiveness leads to earnings opacity or not is an empirical issue.

We follow Givoly and Hayn (2000) and Ahmed et al. (2002) and use accruals to measure earnings aggressiveness.[8] As earnings aggressiveness is the tendency to delay the recognition of losses and speed the recognition of gains, it implies that, if cash flow realizations are held equal, we would expect accruals to increase as earnings aggressiveness increases. For example, lower of cost or market rules, accounting procedures with a conservative bias, result in negative accruals. Aggressive accounting would be characterized by fewer such negative accruals which capture economic losses, and more positive accruals which capture economic gains, increasing the overall level of accruals.[9] Though it is true that unrealized gains and unrealized losses would eventually be recognized in accounting earnings in any clean surplus accounting system, the more conservative accounting system is expected to result in more negative accruals at any given point in time, because a greater proportion of economic losses relative to economic gains will be reflected in accounting earnings at any point in time. This motivates us to measure earnings aggressiveness of a country at a point in time as the median for country i, year t, of accruals divided by lagged total assets. We use the median observation of scaled accruals to minimize the influence of extreme observations. The higher is the median observation of scaled accruals of country i in year t, the higher is the earnings aggressiveness. The effect of earnings aggressiveness on the distribution of accounting earnings vis-a-vis economic earnings is depicted in the Earnings Aggressiveness graph of Figure 1.[10]

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[8] Givoly and Hayn (2000) and Ahmed et al. (2002) both focus on the accumulation of negative accruals through time as an indication of earnings conservatism. We do not measure accumulated accruals through time because we want a time-series measure of conservatism. However, we note that our use of the distribution of accruals across firms in a particular country accomplishes in part the same objective that the cumulation of accruals through time accomplishes. Namely, it reduces some of the random fluctuations in accruals (in their case, across time; in our case, across companies) and allows us to estimate how pervasive conservatism (or aggressiveness) is across a broad range of companies. The premise is that relatively high accruals *across firms in a country* is unlikely to be explained by the timing of the cash flows for firms in that country, (e.g. firms' life cycles or growth rates), and is likely to be related to how accruals are measured and reported in that country.

[9] For example, aggressive revenue recognition may result in an increase in accounts receivable, thus increasing accruals.

[10] Ball, Kothari and Robin (2000), following Basu (1997), have used an alternative way to measure conservatism, which is to check whether negative economic income, as reflected in negative security returns, is more quickly incorporated in accounting earnings than positive economic income. However, this metric is inappropriate for our research design, because we are interested in examining the effects of earnings opacity on equity market variables, and using equity market variables to measure earnings opacity would introduce circularity. Ball, Robin and Wu (2000) also adopt an alternative metric from Basu (1997), which is based on the time-series properties of accounting earnings. Unfortunately, this time-series approach would use all available time-series data to generate one measure of accounting conservatism per country, and thus cannot be used to generate a panel data set. Hence, the level of accruals is used as our proxy for earnings aggressiveness. We do, however, acknowledge that accruals is a noisy measure of earnings aggressiveness; it measures accounting aggressiveness with error, and it measures other facets of accounting earnings as well.

Consistent with much of the past literature (e.g., Healy (1985), Jones (1991), Dechow et al. (1995), Leuz et al. (2002)), we compute scaled accruals from balance sheet and income statement information, and then compute scaled cash flows as scaled operating income minus scaled accruals. We do not use information from the cash flow statement because of differences in the presentation of cash flow information across countries and time. In fact, many of our sample countries do not require the preparation or presentation of a statement of cash flows.[11] We define scaled accruals as

$$ACC_{kt} = (\Delta CA_{kt} - \Delta CL_{kt} - \Delta CASH_{kt} + \Delta STD_{kt} - DEP_{kt} + \Delta TP_{kt}) / TA_{kt-1} \quad (1)$$

where

ACC_{kt} = Scaled accruals for firm k, year t
ΔCA_{kt} = Change in total current assets for firm k, year t
ΔCL_{kt} = Change in total current liabilities for firm k, year t
$\Delta CASH_{kt}$ = Change in cash for firm k, year t
ΔSTD_{kt} = Change in current portion of long-term debt included in total current liabilities for firm k, year t
DEP_{kt} = Depreciation and amortization expense for firm k, year t
ΔTP_{kt} = Change in income taxes payable for firm k, year t
TA_{kt-1} = Total assets for firm k, year t-1.

Loss avoidance measure

Our second measure of earnings opacity is loss avoidance behavior. Burgstahler and Dichev (1997) present persuasive evidence that U.S. firms engage in earnings management to avoid reporting negative earnings. DeGeorge et al. (1999) provide evidence that suggests that the following hierarchy exists among three earnings thresholds: 1) avoiding negative earnings, 2) reporting increases in quarterly earnings, and 3) meeting analysts' earnings forecasts. As Burgstahler and Dichev (1997) and DeGeorge et al. (1999) discuss, these results indicate that incentives to report positive earnings (i.e., beat a benchmark of zero earnings) exist

[11] We repeat all our tests with three modifications to the above definitions of accruals and cash flow. One modification dropped the subtraction of depreciation and amortization from the definition of accruals. This specification focuses on just working capital accruals. A second modification replaced operating income with net income in the definition of cash flow, and dropped the add back of the change in taxes payable from the definition of accruals. This specification includes taxes in the definition of income and accruals. Finally, we included the change in total reserves and the change in deferred taxes and dropped the add back of the change in taxes payable from our definition of accruals, and replaced operating income with net income in the definition of cash flows. This follows the definition of accruals and cash flows used in Ali and Hwang (2000), and it includes the changes in deferred taxes and the reserve accounts that exist in some countries in our definition of accruals. Under all three modifications, the results of this paper are qualitatively unchanged.

for some sample firms. Such loss avoidance behavior obscures the relationship between earnings and economic performance, thus increasing earnings opacity.

We define firms with small positive earnings (small negative earnings) as firms with net income scaled by lagged total assets between 0 and 1% (between 0 and -1%). We find the ratio of the number of firms with small positive earnings minus the number of firms with small negative earnings divided by their sum. The higher is this ratio in country i, year t, the higher is the loss avoidance. The effect of loss avoidance on the distribution of accounting earnings vis-a-vis economic earnings is depicted in the Loss Avoidance graph of Figure 1.

Earnings Smoothing Measure

Our third measure of earnings opacity is earnings smoothing. Some accounting standards (for example, cases of high book/tax conformity) or some managerial motives (see, for example, Trueman and Titman (1988) and Fudenberg and Tirole (1995)) may lead to smooth earnings over time. If accounting earnings are artificially smooth, they fail to depict the true swings in underlying firm performance, thus decreasing the informativeness of reported earnings and, hence, increasing earnings opacity. This is consistent with the view of earnings smoothing taken in Leuz et al. (2002). An alternative view, as expressed in Zarowin (2002), is that earnings smoothing can be used by management as a means to convey information, potentially decreasing earnings opacity. While we believe that earnings smoothing at the country level is indicative of accounting that obscures information about economic volatility, whether or not earnings smoothing leads to earnings opacity and adverse capital market consequences is again an empirical issue.

Following Leuz et al. (2002), we find the cross-sectional correlation between the change in accruals and the change in cash flows, both scaled by lagged total assets, in country i, year t. Cash flows are obtained by subtracting accruals (which were obtained in (1)) from operating earnings. Because some degree of earnings smoothing is a natural outcome of any accrual accounting process, this measure is expected to be negative on average. However, the more negative this correlation, the more likely it is that earnings smoothing is obscuring the variability in underlying economic performance, and the greater is the earnings

opacity. The effect of earnings smoothing on the distribution of accounting earnings vis-a-vis economic earnings is depicted in the Earnings Smoothing graph of Figure 1.

Overall Earnings Opacity Measure

We rank all the raw time-series earnings aggressiveness median observations, across countries and years, into deciles, with higher ranks associated with greater earnings aggressiveness; we rank all the raw time-series loss avoidance ratios, across countries and years, into deciles, with higher ranks associated with greater loss avoidance; we rank all the raw time-series earnings smoothing correlations, across countries and years, into deciles, with higher ranks associated with greater earnings smoothing. Hence, each dimension of earnings opacity in a country each year is assigned a rank between 1 and 10, depending on which decile of the earnings opacity dimension distribution across *all* country-years that particular country that year appears in. For example, a rank of 3 for Australia in 1986 in the earnings smoothing dimension means that Australia in 1986 was in the third decile of all earnings smoothing measures across all countries and across all years. We then average the earnings aggressiveness rank, the loss avoidance rank, and the earnings smoothing rank in each country-year to obtain a time-series of overall earnings opacity for each country.

While there is no strong conceptual basis for aggregation into an overall earnings opacity measure, we perform the aggregation for two reasons. First, to the extent that each of our three earnings opacity dimensions measure the same underlying phenomenon with (uncorrelated) measurement error, our aggregate measure will suffer less from measurement error than each of the individual measures. Second, to the extent that each of our three earnings opacity dimensions measures a unique dimension of earnings opacity, then, intuitively, each separate dimension adds to the overall difficulty investors have in gleaning information from reported accounting earnings. We report all our results for each separate dimension of earnings opacity as well as for our aggregate measure.

To construct raw or rank cross-sectional measures of each individual dimension of earnings opacity per country, we average across all available years for each country the raw or the rank measure, respectively,

of each dimension of earnings opacity. To construct rank cross-sectional measures of overall earnings opacity per country, we average across all available years the overall earnings opacity rank for each country.

Limitations of our earnings opacity measures

There are limitations of our measures of earnings opacity. First, we want to know how expected earnings opacity affects investor behavior, but expected earnings opacity is unobservable. We use lagged earnings opacity measures from year t-1 in all our tests to proxy for investor expectations about earnings opacity in year t, which implicitly assumes that investors observe earnings opacity after the fact, and their expectation of earnings opacity this year are based on their observation of last year's earnings opacity.

Second, it is possible that our measures of the distributional characteristics of reported earnings are impacted by factors that do not affect earnings opacity. For example, industry membership and growth may systematically impact the distributional characteristics of accruals, cash flows and earnings, and these effects may be clear and predictable to investors, resulting in no effect on their perception of earnings opacity. As previously mentioned, we control for industry by limiting the sample to industrial firms. We control for growth by including the real GDP growth rates in all our empirical tests. These, however, may be over-controls if the variation in the distributional characteristics of reported earnings caused by industry membership and growth do indeed affect earnings opacity.

Third, while we have argued that earnings aggressiveness, loss avoidance and earnings smoothing increase earnings opacity, counter arguments also exist, and these we have mentioned above. Clear evidence linking our measures to informativeness in accounting numbers does not exist. Hence, and we repeat this, all our tests – like the classic tests of the informational content of earnings numbers in the accounting literature – are tests of two joint hypotheses. The two hypotheses in this paper are: our measures are correlated positively with earnings opacity, and earnings opacity affects cost of equity and trading in stock markets. Insignificant results could be due to a lack of a link between earnings opacity and cost of equity and trading, or it could be due to a wrong measure of earnings opacity.

Stock Market Measures

Cost of Equity Measures

The cost of equity in a country is defined as the return shareholders require for holding shares in that country. This is an expectations variable, which we measure using ex-post data. We employ two approaches used in a companion paper (Bhattacharya and Daouk (2002)).

The first approach is to compute the cost of equity by backing it out from the classical constant growth dividend discount model. Appendix A in Bekaert and Harvey (2000) explores in great detail the relationship between dividend yields and the cost of equity for many models. Assuming that the best forecast for future growth rates in dividends is the most current dividend growth rate, which implies that we assume that dividend growth rates follow a random walk, it follows that the estimated cost of equity = current dividend yield X (1+current growth rate of dividends) + current growth rate of dividends.

The advantages of using dividend yields to measure cost of equity are many. Dividend yields are observable, stable, and stationary. A sharp change in cost of equity should lead to a sharp change in dividend yields. The disadvantage of using dividend yields is that changes in dividend yields may come about because of repurchases of stock, and may come about because of changes in growth opportunities. The first factor is not much of a problem in emerging markets because repurchases are minor. We try to control for the second factor – growth opportunities – by including GDP growth rates as control variables.

If the earnings opacity variables have no incremental effect on the cost of equity, then those variables will be orthogonal to the above estimate of the cost of equity. We control for other influences on the cost of equity.

The second approach to estimating the cost of equity explicitly accounts for risk. The international version of the capital asset pricing model does not hold up well in the data (see Harvey (1991) or Ferson and Harvey (1993)). The consensus seems to be that a country's beta with respect to the world market portfolio has some merit to explain expected returns for developed countries; the variance of return of the country's stock market does better in explaining expected returns for emerging markets (see Harvey (1995)).

We adopt a simplified version of Bekaert and Harvey (1995) as our international asset pricing model. Their empirical specification allows for partial integration of a country to the world equity markets. Their model is very appealing because it permits a country to evolve from a developing segmented market (where risk is measured by the country's variance) to a developed country which is integrated to world equity markets (where risk is measured by the sensitivity of a country's equity returns to movements in the world market portfolio). The special case of complete integration, where the world factor is the only factor, is nested in their model. This international asset pricing model is expressed as follows:

$$\left(r_{i,t} - r_{f,t}\right) = \alpha_0 + \phi_{i,t}\lambda_{\text{cov}}h_{i,w,t} + \left(1 - \phi_{i,t}\right)\lambda_{\text{var}}h_{i,t} + e_{i,t} \tag{2}$$

where

$r_{i,t}$ is the dollar monthly return of the stock market index of country i at time t,

$r_{f,t}$ is the monthly return of the one month U.S. T-Bill at time t,

α_0 is a constant that would be estimated,

$\phi_{i,t}$ is a measure of the level of integration of country i at time t, $0 \le \phi_{i,t} \le 1$,

λ_{cov} is the price of the covariance risk that would be estimated,

$h_{i,w,t}$ is the conditional covariance of the monthly return of the stock market index of country i with the monthly return of the world index at time t,

λ_{var} is the price of own country variance risk that would be estimated (which we are restricting to be the same across all countries),

$h_{i,t}$ is the conditional variance of the monthly return of the stock market index of country i at time t, and

$e_{i,t}$ is the residual error term.

The independent variables in model (2) – conditional covariance $h_{i,w,t}$ and conditional variance $h_{i,t}$ – are separately estimated pair-wise for each country i and world pair from the multivariate ARCH model specified below:

$$
\begin{aligned}
r_{i,t} &= c_1 + \varepsilon_{i,t}, \\
r_{w,t} &= c_2 + \varepsilon_{w,t}, \\
h_{i,t} &= b_1 + a_1\left(\tfrac{1}{2}\varepsilon^2_{i,t-1} + \tfrac{1}{3}\varepsilon^2_{i,t-2} + \tfrac{1}{6}\varepsilon^2_{i,t-3}\right), \\
h_{w,t} &= b_2 + a_2\left(\tfrac{1}{2}\varepsilon^2_{w,t-1} + \tfrac{1}{3}\varepsilon^2_{w,t-2} + \tfrac{1}{6}\varepsilon^2_{w,t-3}\right), \\
h_{i,w,t} &= b_3 + a_3\left(\tfrac{1}{2}\varepsilon_{i,t-1}\varepsilon_{w,t-1} + \tfrac{1}{3}\varepsilon_{i,t-2}\varepsilon_{w,t-2} + \tfrac{1}{6}\varepsilon_{i,t-3}\varepsilon_{w,t-3}\right), \\
\varepsilon_{i,t}, \varepsilon_{w,t} &\sim N\left(\begin{bmatrix}0\\0\end{bmatrix}, \begin{bmatrix} h_{i,t} & h_{i,w,t} \\ h_{i,w,t} & h_{w,t}\end{bmatrix}\right).
\end{aligned}
\tag{3}
$$

where

$r_{w,t}$ is the dollar monthly return of the stock market index of the world at time t,

$\epsilon_{i,t-j}$ is the innovation in monthly return of the stock market index of country i at time t-j, $j \in \{0,1,2,3\}$,

$\epsilon_{w,t-j}$ is the innovation in monthly return of the stock market index of the world at time t-j, $j \in \{0,1,2,3\}$,and

$h_{w,t}$ is the conditional variance of the monthly return of the stock market index of the world at time t.

Model (3) was first introduced by Bollerslev, Engle, and Wooldrige (1988). As in Engle, Lilien, and Robins (1987), the weights of the lagged residual vectors are taken to be 1/2, 1/3, and 1/6, respectively. The constants a_2 , b_2 , and c_2 are constrained to be identical for all country-world pairs. Maximum likelihood is used to estimate model (3).

The other independent variable in model (2) – $\phi_{i,t}$ – measures the level of integration of country i at time t. We define it as follows:

$$
\phi_{i,t} = \frac{\exp\left(\alpha_1\left(\dfrac{exports_{i,t} + imports_{i,t}}{gdp_{i,t}}\right)\right)}{1 + \exp\left(\alpha_1\left(\dfrac{exports_{i,t} + imports_{i,t}}{gdp_{i,t}}\right)\right)} \tag{4}
$$

The definition of $\phi_{i,t}$ in (4) implies that it is a function of the ratio of the sum of exports and imports to gross domestic product. It is designed to take on values between zero and one. When its value is zero, the country is not integrated with world equity markets, and its equity is exposed only to local risk (own variance). When its value is one, the country is fully integrated with world equity markets, and its equity is exposed only to global risk (covariance with world factor). Bekaert and Harvey (1997) find that increases in this ratio are empirically associated with increased importance of the world factor relative to local risk factors.

We use a two-step procedure (first remove the effect of risk, and then test the effect on residuals) instead of using a one-step procedure (include all independent variables in model (2) directly.) We do so because of technical convergence problems in the one-step non-linear estimation procedure. If the earnings opacity variables have no incremental effect on the cost of equity, then those variables will be orthogonal to the residuals from the model in (2). We control for other influences on this residual. The advantage of using a well-specified asset pricing factor model like (2) to measure cost of equity is that we explicitly account for risk. This comes at a price. Recall that all the independent variables in model (2) are estimates from other models. This introduces estimation error, which may introduce bias, and it reduces power.

Trade Measure

A good metric to capture the amount of trade in a market is turnover, which is defined as the ratio of volume of dollar trade per month to dollar market capitalization at the end of the month. To mitigate the effect of outliers, which occur because the denominator is small in some countries, we take the natural logarithm of this ratio.

IV. DATA AND DESCRIPTIVE STATISTICS

Earnings Opacity Measures

The data used in constructing the earnings opacity variables come from the Worldscope database for the years 1985 through 1998. We restrict the sample to industrial firms (SIC codes 2000-3999 and SIC codes 5000-5999) to increase the homogeneity of our sample across countries and across time. Since the underlying

earnings process being represented by accounting earnings is similar for industrial firms, this restriction reduces the probability that the cross-country differences and time-differences we observe in our earnings opacity measures are caused by the difference in or changes in industrial composition in our sample. This sample restriction is also consistent with much of the accounting literature (e.g., Alford et al. (1993), and Ali and Hwang (2000)).[12] Because all our tests are panel data tests, we include countries which have data for more than three years, and have more than 20 firms per year. This yields 58,653 firm-year observations from 34 countries spanning the years 1986 through 1998. (We lose 1985 because the calculation of accruals and cash flows requires data from year t-1.)

The names of the countries for which we have data are given in Column 1 in the Appendix, the sample period for each country is given in Column 2, and the number of firm-years per country is given in Column 3. For each firm-year, we use the following variables from Worldscope: cash, total current assets, total current liabilities, income taxes payable, current portion of long-term debt included in total current liabilities, depreciation and amortization expense, operating income, net income, and total assets. Some firms do not have information on income taxes payable or on the current portion of long-term debt included in total current liabilities. Similar to Leuz et al. (2002), if these variables are missing, we assume them to be zero. We include observations with fiscal years ending between July 1 of year t and June 30 of year t+1 in the calculation of our earnings opacity variables for year t. So, for example, observations with fiscal years ending between July 1, 1995 and June 30, 1996 are considered year 1995 observations.

Descriptive information on each of the raw earnings opacity variables for each sample country is provided in columns 2 through 4 of Table 1. Each column gives the average across the available years for each country for each measure. Column 2 provides the average accruals divided by lagged total assets for our sample countries. As expected, average accruals are negative, averaging about 2% of lagged total assets.

[12] We also ran all our tests using a broader sample consisting of all non-financial firms (i.e., we excluded only SIC codes in the 6000s) in a previous version of this paper. Such a sample has been constructed by Leuz et al. (2002) and Land and Lang (2002). Inferences from this expanded sample are qualitatively similar to our reported results.

Interestingly, 3 of the 34 countries in our sample – Greece, India and Turkey – have positive accruals. The loss avoidance measure is presented in column 3. Avoidance of small negative bottom-line earnings is observed in 32 of our 34 countries, implying that this is a global phenomenon. Finally, the earnings smoothing measure – the average cross-sectional correlation between the change in cash flows and the change in accruals – is presented in column 4. As expected, the correlation is strongly negative in every country in our sample.

Other Financial Reporting Measures

We first analyze the relation between our cross-sectional measures of earnings opacity and alternative cross-country measures related to financial reporting quality that have been documented in the past literature. As discussed previously, we expect earnings opacity to be a complex function of at least three factors: accounting standards, enforcement of accounting standards, and managerial motivation. We identify four measures from the prior literature that might be related to earnings opacity through these three factors.

The first measure is the number of auditors per 100,000 population. The number of auditors per 100,000 population comes from Saudagaran and Diga (1997), Table 6, page 51. The original source is communication with the International Federation of Accountants (IFAC) Secretariat on August 13, 1996. This variable is intended to capture the enforcement of accounting standards, with enforcement rising and earnings opacity declining as the proportion of auditors in the population rises. Column 5 in Table 1 gives this variable. As our raw measures for earnings aggressiveness and loss avoidance increase and our raw measure for earnings smoothing decreases as earnings opacity increases, auditors per 100,000 population is expected to have a negative relationship with our measures of earnings aggressiveness and loss avoidance, and a positive relationship with our measure of earnings smoothing.

We also use two measures that capture aspects of the accounting standards themselves. The first such measure is a disclosure level variable that comes from Saudagaran and Diga (1997), Table 2, page 46. The original source is the Center for International Financial Analysis and Research (CIFAR (1995)). It represents a disclosure score based on the inclusion of 90 items as required disclosures in annual reports for each

country. Higher scores correspond to greater required disclosure. We expect that greater disclosure requirements in accounting standards will enhance the informativeness of earnings by reducing the manager's ability to manipulate earnings, thus decreasing earnings opacity. Column 6 in Table 1 gives this variable. As disclosure and earnings opacity are expected to be negatively correlated, we expect this variable to have a negative relationship with our measures of earnings aggressiveness and loss avoidance, and a positive relationship with our measure of earnings smoothing.

The second measure of accounting standards is the extent of compliance with International Accounting Standards (IAS). These data come from Choi, Frost and Meek (1999), exhibit 8.6, page 264. The original source is the International Accounting Standards Committee (IASC *Insight*, October, 1997). We assign a score of 0 to all countries that independently produce accounting standards and do not use international accounting standards as the basis for those standards (this corresponds to categories F and G in Choi, Frost and Meek (1999)). We assign a score of 1 to all countries that use international accounting standards as the basis for their separately developed accounting standards, but promulgate some standards that offer more or less choice than international accounting standards (this corresponds to category E in Choi, Frost and Meek (1999)). Finally, we assign a score of 2 to all countries that adopt international accounting standards with few, if any, modifications beyond additional explanatory material (this corresponds to categories A through D in Choi, Frost and Meek (1999)). Column 7 in Table 1 gives this variable. The relationship of this variable to our earnings opacity measures depends on whether international accounting standards produce more or less informative earnings than local standards.

The final measure is the legal origin of the country. Ball, Kothari and Robin (2000) argue that common law countries have a demand for more transparent earnings. Further, Leuz et. al. (2002) argue that legal protection of outside investors, which is greater in common law countries, decreases incentives for earnings management. Column 8 in Table 1 gives this variable, where common law countries are coded 1, whereas the rest are coded 0. These data come from the CIA World Factbook, 2001. The above arguments and the above coding suggest a negative relationship between legal origin and our measures of earnings

aggressiveness and loss avoidance, and a positive relationship with our measure of earnings smoothing.

Table 2 presents a correlation matrix between our earnings opacity variables and each of the above four variables. Loss avoidance decreases as the number of auditors per 100,000 population increases, while earnings aggressiveness and earnings smoothing have insignificant, but correctly signed, relationships with the number of auditors. Earnings aggressiveness and loss avoidance decrease as disclosure level increases; however there seems to be no link between earnings smoothing and the disclosure variable. While this last result may seem surprising since lower disclosure may be necessary for earnings smoothing to be possible, it is likely that the demand for smooth accounting numbers and disclosure are related, thus obscuring the supply-side effect. Interestingly, there seems to be little link between legal origin and our earnings opacity variables, and little link between the extent of use of international accounting standards and our earnings opacity variables. This suggests that the use of international accounting standards does not help in making earnings numbers more transparent. This conclusion is similar in spirit to the conclusion of Ball, Robin and Wu (2000). However, since the extent of the use of international accounting standards is a difficult variable to measure accurately, our finding of no link between international accounting standards and earnings opacity could simply be due to measurement error.

Table 2 also presents the correlation between each of our three earnings opacity variables. They range in absolute value from 0.15 to 0.45, indicating that though there is some relationship between our three earnings opacity variables, there is a distinct component to each measure. These correlations have signs consistent with our measures of earnings aggressiveness and loss avoidance being positively related to earnings opacity and our measure of earnings smoothing being negatively related to earnings opacity, with one exception. There is a significant positive relation between earnings aggressiveness and earnings smoothing. This suggests that more conservative accruals (i.e., more negative accruals) results in smoother earnings (i.e, more negative correlation between changes in accruals and changes in cash flows), and is consistent with growth producing both more negative accruals and a stronger negative correlation between changes in cash flows and changes in accruals. To the extent that there is a mechanical relationship between

our measures of earnings aggressiveness and earnings smoothing that does not relate to earnings opacity, both of these measures capture earnings opacity with error, biasing our coefficient estimates towards zero.

Table 3 provides the rankings of earnings opacity across the countries in our sample for each of the three dimensions of earnings opacity we identify, and for overall earnings opacity. The United States has the least amount of earnings opacity, followed by Norway. Greece, South Korea and Indonesia show the most severe earnings opacity in our sample.

Stock Market Measures

Data on monthly equity indices of 20 developed countries were obtained from Morgan Stanley Capital International (MSCI). Data on monthly equity indices of 14 emerging markets were obtained from International Financial Corporation (IFC). The fourth column in the Appendix gives the sample period that was available for these 34 monthly stock market indices in the 1986-1998 period. These indices are value-weighted, and are calculated with dividend reinvestment. As noted by Harvey (1991), the returns computed on the basis of these indices are highly correlated with popular country indices. The MSCI value-weighted World Index was used as a proxy for the world market portfolio.

We computed monthly returns of each country's stock market and the world market portfolio from these indices. These returns are used in our international asset pricing factor model. The ninth column in Table 1 gives the mean return scaled by the standard deviation of returns per country in the 1986-1998 sample period (some countries do not have data for the full period.)

We obtained monthly data on the dividend yield for 32 of the 34 countries from the vendor Datastream. The dividend yield was on the Datastream constructed indices. The seventh column in the Appendix gives the sample period that was available for these 32 monthly dividend yield time-series.

The measure of trading that we adopted was turnover, which is defined as the ratio of the volume of trade in the stock market to the market capitalization of the stock market. We took the natural logarithm of this ratio. We could obtain monthly data on the volume of trade and market capitalization for 30 of the 34 countries from the vendor Datastream. The fifth and sixth column in the Appendix gives the sample period

that was available for these 30 monthly market capitalization and volume time-series. The tenth column in Table 1 gives the mean of this variable per country in the 1986-1998 sample period (some countries do not have data for the full period.)

Bekaert and Harvey (1997) divide the sum of exports and imports by the country's gross domestic product to obtain a variable that captures the level of integration of a country with the rest of the world. This is because the level of globalization does affect the cost of equity (see Stulz (1999a)). We follow the same method. Monthly data on exports and imports for the 34 countries were obtained from the International Financial Statistics provided by the International Monetary Fund. For some countries the frequency of GDP was quarterly, and for some it was yearly. To obtain monthly GDP, we divided by 3 in the former case, and by 12 in the latter case. The eighth, ninth, and tenth column in the Appendix gives the sample period that was available for these 34 GDP, exports, and imports time-series.

As purchasing power parity is not observed in the data, standard international asset pricing models like Ferson and Harvey (1993) and Dumas and Solnik (1995) have a foreign exchange factor (FX factor). We include this control in our international asset pricing factor model as well. Monthly data on foreign exchange rates are obtained from the International Financial Statistics. The eleventh column in the Appendix gives the sample period that was available for these 34 monthly foreign exchange rate time-series.

As discussed before, our measures of earnings opacity may be biased against countries which exhibit fast economic growth. To control for this, we use real GDP growth as another independent variable in our panel data tests. GDP growth data comes from the World Bank. The average GDP growth exhibited during 1985-1998 in each of our 34 countries is documented in the eleventh column in Table 1.

Bhattacharya and Daouk (2002) document that the enforcement of insider trading laws reduces the cost of equity of a country. We obtain the insider trading enforcement date from Bhattacharya and Daouk (2002), Table 1. These are given in the twelfth column in Table 1. We control for the confounding effects of insider trading enforcement in all our tests.

When a country opens up its capital markets to foreigners, the cost of equity is reduced through two

routes (Stulz (1999b). It reduces required return because risk-sharing improves, and it reduces required return because corporate governance improves. Bekaert and Harvey (2000) and Henry (2000) empirically confirm that such liberalization reduces the cost of equity. We obtain official liberalization dates from Table I in Bekaert and Harvey (2000). These are given in the thirteenth column in Table 1. We control for the confounding effects of liberalization in all our tests.

V. DOES EARNINGS OPACITY AFFECT STOCK MARKETS?

We explore the effect of earnings opacity on two dimensions of an equity market in a country – the return the shareholders demand and how much shareholders trade. As can be seen from the descriptive statistics in Table 1, there is significant variation in these two variables among equity markets across the world. An attempt to answer whether earnings opacity across countries causes some of this variation has to address two challenges: missing explanatory variables and endogeneity.

The missing explanatory variables problem is serious. The differences in equity markets across the world come about because of a number of differences in country characteristics, not just because of earnings opacity. It could be further argued that some of these country characteristics, like its economic, political and legal infrastructure, have a bigger influence on the stock market of the country than how opaque earnings are in that country.[13] It could be even further argued that it is impossible to control all these factors in cross-sectional tests.

The endogeneity problem is even more serious. It is possible that changes in institutional factors within a country intended to facilitate capital formation simultaneously impact the properties of reported accounting numbers and equity market measures such as the cost of equity capital and trading volume. As an example, a substantial commitment of government resources to securities regulation could result in less opaque accounting earnings as firms try to avoid increased regulatory scrutiny, as well as improved equity

[13] La Porta et al. (1997, 1998), Levine (1997), Demirguc-Kunt and Maksimovic (1998) are just a few of the papers in the burgeoning law and finance area.

market performance due to improved corporate governance practices. In such circumstances, our tests could reveal a spurious association between earnings opacity and equity market measures, as all are impacted by a third variable. This limits our ability to draw clear causal inferences from our empirical analyses.

The above are valid criticisms. However, we believe that two crucial features of our research design substantially mitigate the concern that our empirical analyses are impacted severely by these two problems. First, all our tests are panel data tests corrected for country fixed-effects, country-specific heteroskedasticity and country-specific autocorrelation.[14] Therefore, though it may be true that many country-specific factors impact the stock market and earnings opacity, as long as these country-specific factors remain stable during our period of study, their inclusion or non-inclusion has no effect on the coefficient estimates in panel data tests with the above corrections.

These panel data tests with fixed country effects also minimize the endogeneity problem. Himmelberg, Hubbard and Palia (1999) argue that a similar endogeneity problem arises in studies that attempt to relate managerial ownership and firm performance. Specifically, they note that since firm performance and the level of managerial ownership both depend on observable and unobservable firm characteristics, ordinary least squares cannot be used to produce an unbiased estimate of the relation between ownership and performance. They also note that an instrumental variables solution to the problem is difficult to implement because it is difficult to find identifying instruments. If, however, the unobserved source of the endogeneity is constant over time, Himmelberg et al. (1999) note that panel data with fixed effects (in their case, firm-level fixed effects; in our case, country-level fixed effects) effectively eliminates the potential bias caused by endogeneity. They also note that if the primary source of measurement error is across rather than within, in our case, countries, then the bias caused by measurement error is reduced by our estimator. Hence, if the

[14] Correcting for country-fixed effects means that we allow for the possibility that the dependent variable is impacted by a country-specific factor that is not captured by the independent variables. In practice, this is done by allowing each country to have a different intercept term in the regression. Correcting for country-specific heteroskedasticity means that we explicitly account for the fact that different countries exhibit different levels of variance in their variables. We therefore allow our regression to place more emphasis on information inferred from lower variance countries as opposed to higher variance countries. Correcting for country-specific autocorrelation means that we explicitly account for the fact that different countries exhibit different levels of autocorrelation in their financial or economic time-series variables. This temporal correlation of today's observations with past observations can distort the inference of the effect of independent variables on the dependent variable. We correct for that by allowing the contemporaneous error term in our regression to depend on past error terms separately for each country.

features that could create a endogeneity problem with earnings opacity and equity market measures are relatively constant through time (an explicit assumption over the decade of analysis in Leuz et al. (2002)), then our panel data tests with fixed country effects control for this endogeneity bias.[15]

Alternatively, it is possible that the missing country-specific variables or the institutional features creating simultaneity between the observed properties of accounting numbers and equity market measures such as cost of equity and trading volume do change over the period of our analyses. If so, then a second feature of our research design reduces the potential endogeneity bias caused by changing institutional features. As previously discussed, our empirical specification uses our earnings opacity measures lagged by one year. This specification, in addition to providing us a measure of expected earnings opacity, has a side advantage: it mitigates endogeneity. In order for our test statistics to suffer from endogeneity bias, we have to assume that the institutional factors that could impact both earnings opacity and equity market measures change over time and that reported earnings numbers reflect these changes at time t-1, while the equity market impact is observed at time t. Since accounting changes are slower to occur than are equity market changes, this does not seem a very plausible assumption. It seems far more likely that the accounting measure response to institutional changes would lag the market response.[16]

Cost of Equity

Using Dividend Yields

As discussed before, we can back out the cost of equity from the dividend discount model. If we further assume that dividend growth rates follow a random walk, the estimated cost of equity = current dividend yield X (1+current growth rate of dividends) + current growth rate of dividends.

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[15] Zhou (2001) notes that if the most important sources of variation is across rather than within, in our case countries, then the fixed effects design results in low power tests, and further argues that this plagues the analysis of Himmelberg et al.(1999) in the pay-performance setting. We accept the potential reduction in power in our setting because we feel that it is more than compensated for by the control for omitted variables and endogeneity we gain.

[16] We reran all our tests using contemporaneous measures of earnings opacity rather than its lagged values. The relationship between earnings opacity and trade was unchanged, as was the relationship between earnings opacity and the cost of equity measured through dividend yield. The relationship between earnings opacity and the cost of equity measured by the simplified Bekaert and Harvey (1995) model, however, became insignificant.

Using this estimate of the cost of equity as the dependent variable, we run four panel time-series regressions with country-fixed effects. Model 1 uses the "earnings aggressiveness" rank measure as the independent variable, model 2 uses the "loss avoidance" rank measure as the independent variable, model 3 uses the "earnings smoothing" rank measure as the independent variable, whereas model 4 uses the "overall earnings opacity" rank measure as the independent variable. We correct for country-specific heteroskedasticity and country-specific autocorrelation in each case. As liberalization and insider trading enforcement have been empirically shown to affect the cost of equity, and as these institutional variables did change during our period of study (see columns 12 and 13 in Table 1), we use an indicator for liberalization and an indicator for insider trading enforcement as control variables in each case. As discussed before, we also control for GDP growth rates. Note that institutional variables that did not change need not be included as controls, because in a panel time-series regression with fixed-effects, they will have no effect. The panel regressions use data for the 32 countries for which we have dividend yield data from January 1986 to December 1998 (some countries do not have data for the full time period).

Table 4 presents the results from this panel time-series regression. The coefficient of the overall earnings opacity measure (model 4) is positive and statistically significant at the five percent level. A detailed look at models 1, 2 and 3 reveals that this significance is coming from the earnings aggressiveness variable, although the coefficients on the other earnings opacity variables have the right sign. This is consistent with our joint hypotheses that our earnings aggressiveness measure and our overall measure are correlated with earnings opacity, and earnings opacity adversely affects the cost of equity. The association is also economically significant. An increase in overall earnings opacity from the 25th percentile rank to the 75th percentile rank is associated with a 2.8 percent increase in the cost of equity.[17] The coefficient on the insider trading enforcement variable has the right sign and is statistically significant, implying that insider trading enforcement causes the cost of equity to drop as seen in Bhattacharya and Daouk (2002). The liberalization

[17] This is calculated as 0.001244 (per month) X 12 months X (6.538 (rank of 75th percentile) - 4.692 (rank of 25th percentile))

indicator has the correct negative sign, but is not significantly different from zero at conventional levels. GDP growth rates are positively related to this measure of the cost of equity.

Using an International Asset Pricing Model

We estimate equation (2) using non-linear least squares. The regressions use data for our 34 countries from December 1986 to December 1998 (some countries do not have data for the full time period). The results are given in Panel A of Table 5.

Panel A of Table 5 reveals that though covariance risk seems to have a positive price (λ_{cov} is positive), the estimates are statistically significant only at the eleven percent level. It also reveals that though own country variance risk has a positive price (λ_{var} is positive), the estimates are statistically significant only at the twelve percent level. These results contrast with the results of Bhattacharya and Daouk (2002), who use the same estimation technique and obtain statistical significance, but that is because their estimation was carried out for a longer 1969-1998 sample period.

Using the residuals from (2) as the dependent variable, we run four panel time-series regressions with country-fixed effects. Models 1, 2, 3 and 4 are as previously defined. We correct for country-specific heteroskedasticity and country-specific autocorrelation in each case. We control for liberalization, insider trading enforcement, and GDP growth as before. We control for two other sources of risk that have been documented in the literature – foreign exchange risk (Ferson and Harvey (1993), Dumas and Solnik (1995))[18] as well as liquidity risk (Brennan and Subrahmanyam (1996))[19] – and which change in our sample period.

Panel B of Table 5 presents the results from this panel time-series regression. The coefficient of the overall earnings opacity measure (model 4) is positive and statistically significant at the eight percent level.

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[18] As purchasing power parity is not observed in the data, standard models control for a foreign exchange factor (FX factor). This is why we include it. However, because of convergence problems, our estimation is a two-step procedure. Therefore, unlike the standard models, in the first step we strip out the effects of the local variance factor and the world factor, and in the second step, to isolate the effect of earnings opacity, we strip out the effects of other factors like the FX factor. The FX factor that we use is the conditional covariance of the return of the stock market index of the country with the return a U.S. investor would get if she held the foreign currency. This conditional covariance is obtained by using the multivariate ARCH model we previously discussed in equation (3) – just replace the world portfolio (w) by the foreign exchange portfolio (ifx).

[19] The proxy for liquidity risk is turnover. Turnover is the ratio of volume of trade to market capitalization. We take the natural logarithm of this ratio for reasons mentioned before.

A detailed look at models 1, 2 and 3 reveals that this significance is coming from the loss avoidance variable, in contrast with the results from the dividend yield model where the significance was primarily driven by the earnings aggressiveness variable. This is consistent with our joint hypotheses that our loss avoidance measure and our overall measure are correlated with earnings opacity, and earnings opacity adversely affects the cost of equity. Insider trading enforcement and GDP growth are insignificantly related to the cost of equity in this specification, though both variables have the same sign as in the dividend yield specification. The liberalization indicator again has a negative sign, and is statistically significant in this specification. An increase in overall earnings opacity from the 25th percentile rank to the 75th percentile rank is associated with a 3.2 percent increase in the cost of equity.[20] It should be noted here that the point estimates obtained by two completely different methods of estimating the cost of equity – the dividend yield method (implicitly controls for risk, but has less estimation risk) and an international asset pricing model (explicitly controls for risk, but has more estimation risk) – are very similar – 2.8 percent and 3.2 percent, respectively.

Trading

The measure of trade is turnover, which is defined as the ratio of volume of trade to market capitalization. Using the natural logarithm of this ratio as the dependent variable, we run four panel time-series regressions with country-fixed effects. Models 1, 2, 3 and 4 are as previously defined. We correct for country-specific heteroskedasticity and country-specific autocorrelation in each case. We control for liberalization, insider trading enforcement, and GDP growth as before. The panel regressions use data for the 30 countries for which we have trading data from January 1986 to December 1998 (some countries do not have data for the full time period).

Table 6 presents the results from this panel time-series regression. Except for model 2 whose coefficient is insignificant, the coefficients of the earnings opacity measures (models 1 and 3) and the coefficient of the overall earnings opacity measure (model 4) are negative and statistically significant at the

[20] This is calculated as 0.001430 (per month) X 12 months X (6.538 (rank of 75th percentile) - 4.692 (rank of 25th percentile))

five percent level. This result is consistent with our joint hypotheses that our earnings aggressiveness measure, our earnings smoothing measure and our overall measure are correlated with earnings opacity, and earnings opacity adversely affects the cost of equity. An increase in overall earnings opacity from the 25th percentile rank to the 75th percentile rank is associated with a 8.8 percent decrease in annual trade. The coefficients on liberalization and insider trading enforcement are significant, and have the right sign.

Further Robustness Checks

Despite a couple of features of our research design that we believe help mitigate concerns over omitted explanatory variables and endogeneity – panel data tests and use of lagged variables – we run two tests to further allay concerns.[21] First, we reran all our tests including equity market development, measured as stock market capitalization divided by GDP, as an additional control variable. This variable is measured on an annual basis and comes from DataStream. While there is no direct conceptual basis for including this variable in equations explaining either cost of equity or trade, we include this measure of equity market development as a proxy for unobserved institutional factors that might promote the development of equity markets within a country and thus impact both earnings opacity and our stock market variables. We find that equity market development is unrelated to either of our measures of the cost of equity capital, but it is positively related to trade. Our previous inferences on the effect of earnings opacity variables on cost of equity or trade are not affected by the addition of this control variable.

Second, we estimated a Vector Auto Regression (VAR) model proposed by Sims (1980) in order to explicitly model earnings opacity, the cost of equity, and trade as endogenously determined dependent variables. The endogenous variables are modeled as linear functions of lagged endogenous variables and all exogenous variables in the system. The system of equations in the VAR is estimated *jointly*. This means that

[21] We do not present the results of these additional tests in tables. Interested readers may obtain these tables directly from the authors.

the effect of the independent variables on each endogenous variable takes into account the endogenous nature of the other endogenous variables.[22]

Formally, the system of equations to estimate the effect on the cost of equity is:

$$\textit{Cost of Equity}_{i,t} = \beta_{10} + \beta_{11}\,\textit{Dimension of Earnings Opacity}_{i,t-1} + \beta_{12}\,\textit{Liberalization}_{i,t} + \beta_{13}\,\textit{Insider Trading Enforcement}_{i,t} + \beta_{14}\,\textit{GDP Growth}_{i,t} + \beta_{15}\,\textit{Market Capitalization / GDP}_{i,t-1} + u_{1i,t}$$

and

$$\textit{Dimension of Earnings Opacity}_{i,t} = \beta_{20} + \beta_{21}\,\textit{Cost of Equity}_{i,t-1} + \beta_{22}\,\textit{Liberalization}_{i,t} + \beta_{23}\,\textit{Insider Trading Enforcement}_{i,t} + \beta_{24}\,\textit{GDP Growth}_{i,t} + \beta_{25}\,\textit{Market Capitalization / GDP}_{i,t-1} + u_{2i,t} \quad (5)$$

and the system of equations to estimate the effect on trade is:

$$\textit{Trade}_{i,t} = \beta_{10} + \beta_{11}\,\textit{Dimension of Earnings Opacity}_{i,t-1} + \beta_{12}\,\textit{Liberalization}_{i,t} + \beta_{13}\,\textit{Insider Trading Enforcement}_{i,t} + \beta_{14}\,\textit{GDP Growth}_{i,t} + \beta_{15}\,\textit{Market Capitalization / GDP}_{i,t-1} + u_{1i,t}$$

and

$$\textit{Dimension of Earnings Opacity}_{i,t} = \beta_{20} + \beta_{21}\,\textit{Trade}_{i,t-1} + \beta_{22}\,\textit{Liberalization}_{i,t} + \beta_{23}\,\textit{Insider Trading Enforcement}_{i,t} + \beta_{24}\,\textit{GDP Growth}_{i,t} + \beta_{25}\,\textit{Market Capitalization / GDP}_{i,t-1} + u_{2i,t} \quad (6)$$

The system of equations is estimated jointly using Seemingly Unrelated Regressions (SUR). SUR computes estimates using the technique of joint GLS (Generalized Least Squares). The two error terms $u_{1i,t}$ and $u_{2i,t}$ are allowed to be correlated (see Enders (1996) for further details). The estimation allows for country fixed-effects, for country-specific heteroskedasticity, and for country-specific autocorrelation.

We find that endogeneity does exist. Overall earnings opacity as well as all dimensions of earnings opacity, except earnings smoothing, are positively affected by the cost of equity using the dividend yield method. Earnings aggressiveness and earnings smoothing are affected by trade, but loss avoidance as well as overall earnings opacity are not affected by trade. However, though endogeneity exists and we explicitly

[22] A VAR is like a simultaneous equations model except that, instead of contemporaneous simultaneity, a lead-lag relationship is estimated. This lead-lag relationship is consistent with our empirical specification using lagged earnings opacity measures. The estimation procedure is akin to a 3SLS. The first two stages are similar to the 2SLS. The third stage takes into account that the error terms in the two equations are not independent. This third stage corrects for country-specific heteroskedasticity, and for country-specific autocorrelation.

account for it, our previous inferences on the effect of earnings opacity variables on cost of equity (using the dividend yield method) or trade are not affected.[23]

VI. CONCLUSION

This paper explores the link between earning opacity and cost of equity and share trading in a broad cross-section of countries. We attempt to measure earnings opacity directly from the financial statements of firms. We use distributional properties of reported earnings to estimate for each country, for each year, three dimensions of earnings opacity – earnings aggressiveness, loss avoidance, and earnings smoothing. We combine these three dimensions to obtain an overall earnings opacity time-series measure per country. While not all results are consistent for our individual earnings opacity measures, we document in our panel data tests that, after controlling for other influences, an increase in overall earnings opacity in a country is linked to an increase in the cost of equity and a decrease in trading in the stock market of that country.

Our analyses have important limitations that should be kept in mind when interpreting our results. First, it is possible that earnings opacity, the cost of equity capital and trading volume are all impacted by some unknown third variable, resulting in a spurious association between earnings opacity and our equity market measures. While we have attempted to control for the factors suggested by the past literature, theoretical and empirical limitations prevent us from knowing whether all important influences have been controlled. While our research design mitigates concerns over the endogeneity of earnings opacity, we are unable to ensure that endogeneity does not impact our analyses. Second, we undoubtedly measure earnings opacity with error, and this measurement error could impact our analyses. Finally, our cross-sectional tests relating earnings opacity to various factors that might influence financial reporting quality are cross-sectional tests rather than panel data tests. As such, these tests lack power due to the lack of data, and are particularly susceptible to bias caused by correlated omitted variables.

[23] Because of the two-stage nature of the estimation of the cost of equity using the international asset pricing model method, it was not possible for us to run a VAR for this method.

Keeping these limitations in mind, there are important implications of our analyses for investors, securities regulators and academics. Our cross-sectional analysis documents associations between the proportion of auditors in the population and disclosure level and earnings opacity, suggesting that increased enforcement of accounting standards through auditing, and increased disclosure may improve earnings transparency. We document economically and statistically important relations between our measures of the distributional properties of reported earnings opacity and the cost of equity capital and trade. These findings are consistent with the joint hypotheses that our earnings opacity measures are associated with opaque earnings, and that investors perceive risk associated with opaque earnings, and demand compensation for that risk. So our result is consistent with the widely-held belief that recent sharp declines in U.S. equity prices are in response to widely publicized accounting "scandals" in the United States, scandals which have heightened investors concerns over earnings opacity, prompting investors to demand greater premiums.

Our analyses clearly suggest that further research into the impact of informational risk in general, and earnings opacity specifically, on equity markets is warranted. One avenue of future research could develop techniques to assess earnings opacity at the individual firm level, and then test for links between earnings opacity and equity market variables at the firm level rather than at a country level. A second avenue for research would be to determine which institutional factors impact which dimension of earnings opacity. A third avenue for research, and in our view the most useful avenue, is to develop more refined earnings opacity measures from the distribution of reported earnings.

APPENDIX
Description of Data Used

(1) Country	(2) Financial Statement Data (Annual) (Sample Period)	(3) Number of Firm-Years	(4) Indices of Stock Markets (Monthly) (Sample Period)	(5) Market Capitalization of Main Exchange (Monthly) (Sample Period)	(6) Dollar Volume in Main Exchange (Monthly) (Sample Period)	(7) Dividend Yield (Monthly) (Sample Period)	(8) GDP of Country (Quarterly or Annual) (Sample Period)	(9) Exports of Country (Monthly) (Sample Period)	(10) Imports of Country (Monthly) (Sample Period)	(11) Exchange Rate (Monthly) (Sample Period)
Australia	86Y-98Y	888	01/86-12/98	01/86-12/98	01/86-12/98	01/86-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
Austria	87Y-98Y	472	01/86-12/98	01/86-12/98	08/86-12/98	01/86-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
Belgium	86Y-98Y	567	01/86-12/98	01/86-12/98	01/86-12/98	01/86-12/98	86Y-98Y	01/93-12/98	01/93-12/98	01/86-12/98
Brazil	91Y-98Y	550	01/86-12/98	07/94-12/98	NA	NA	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Canada	86Y-98Y	1,997	01/86-12/98	01/86-12/98	01/86-12/98	01/86-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
Chile	94Y-98Y	147	01/86-12/98	07/89-12/98	07/89-12/98	01/86-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Denmark	88Y-98Y	953	01/86-12/98	01/86-12/98	04/88-12/98	01/86-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Finland	86Y-98Y	704	12/87-12/98	03/88-12/98	NA	03/88-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
France	86Y-98Y	3,834	01/86-12/98	01/86-12/98	06/88-12/98	01/86-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
Germany	86Y-98Y	3,847	01/86-12/98	01/86-12/98	06/88-12/98	01/86-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
Greece	90Y-98Y	491	01/86-12/98	01/88-12/98	01/88-12/98	01/90-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Hong Kong	87Y-98Y	925	01/86-12/98	01/86-12/98	06/88-12/98	01/86-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
India	92Y-98Y	1,342	01/86-12/98	01/90-12/98	01/95-12/98	01/90-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Indonesia	92Y-98Y	493	12/89-12/98	04/90-12/98	04/90-12/97	04/90-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Ireland	86Y-98Y	445	12/87-12/98	01/86-12/98	NA	01/86-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Italy	86Y-98Y	1,146	01/86-12/98	01/86-12/98	07/86-12/98	01/86-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Japan	86Y-98Y	8,762	01/86-12/98	01/86-12/98	01/90-12/98	01/86-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
Malaysia	86Y-98Y	1,233	01/86-12/98	01/86-12/98	01/86-12/98	01/86-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Mexico	90Y-98Y	361	01/86-12/98	01/88-12/98	01/88-12/98	05/89-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Netherlands	86Y-98Y	1,367	01/86-12/98	01/86-12/98	02/86-12/98	01/86-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Norway	88Y-98Y	502	01/86-12/98	01/86-12/98	01/86-12/98	01/86-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
Pakistan	92Y-98Y	361	01/86-12/98	NA	NA	NA	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Portugal	93Y-98Y	165	01/86-12/98	01/90-12/98	01/90-12/98	01/90-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Singapore	86Y-98Y	566	01/86-12/98	01/86-12/98	01/86-12/98	01/86-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
South Africa	86Y-98Y	889	12/92-12/98	01/86-12/98	01/90-12/98	01/86-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
South Korea	89Y-98Y	867	01/86-12/98	09/87-12/98	09/87-12/98	09/87-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
Spain	88Y-98Y	483	01/86-12/98	03/87-12/98	02/90-12/98	03/87-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Sweden	86Y-98Y	1,004	01/86-12/98	01/86-12/98	01/86-12/98	01/86-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Switzerland	86Y-98Y	1,261	01/86-12/98	01/86-12/98	01/89-12/98	01/86-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Taiwan	93Y-98Y	577	01/86-12/98	09/87-12/98	04/91-12/98	05/88-12/98	85Q4-98Y	01/88-12/98	01/88-12/98	12/93-12/98
Thailand	92Y-98Y	765	01/86-12/98	01/87-12/98	01/87-12/98	01/87-12/98	86Y-98Y	01/86-12/98	01/86-12/98	01/86-12/98
Turkey	93Y-98Y	188	12/86-12/98	01/88-12/98	01/88-12/98	06/89-12/98	87Q1-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
United Kingdom	86Y-98Y	8,974	01/86-12/98	01/86-12/98	10/86-12/98	01/86-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
United States	86Y-98Y	11,527	01/86-12/98	01/86-12/98	01/86-12/98	01/86-12/98	85Q4-98Q4	01/86-12/98	01/86-12/98	01/86-12/98
All Countries		58,653								

Notes:

(1) Annual financial statement data for firms in 20 developed markets and 14 emerging markets were obtained from Worldscope. These countries are listed in Column 1. The sample period per country is given in Column 2. The number of firm-years is given in Column 3.
(2) Data on monthly stock market indices for the 20 developed markets were obtained from Morgan Stanley Capital Market International (MSCI). Data on monthly stock market indices for the 14 emerging markets were obtained from the International Financial Corporation (IFC). The sample periods are given in Column 4.
(3) Data on monthly market capitalization, dollar volume, and monthly dividend yields were obtained from Datastream. The sample periods are given in Columns 5,6, and 7.
(4) Data on quarterly/annual GDP, monthly exports, monthly imports, and monthly foreign exchange rates were from the International Financial Statistics of the International Monetary Fund. The statistics for Taiwan come from Datastream. The sample periods are given in Columns 8, 9, 10 and 11.

REFERENCES

Alford, A., J. Jones, R. Leftwich, and M. Zmijewski. 1993. Relative informativeness of accounting disclosures in different countries. *Journal of Accounting Research* 31 (Supplement): 183-233.

Ahmed, A., B. Billings, R. Morton, and M. Stanford-Harris. 2002. The role of accounting conservatism in mitigating bondholder-shareholder conflicts over dividend policy and in reducing debt costs. *The Accounting Review* 77: 867-890.

Ali, A., and L-S. Hwang. 2000. Country-specific factors related to financial reporting and the value relevance of accounting data. *Journal of Accounting Research* 38: 1-21.

Amihud, Y., and H. Mendelson. 1986. Asset pricing and the bid-ask spread. *Journal of Financial Economics* 15: 223-249.

Ashbaugh, H., and M. Pincus. 2001. Domestic accounting standards, international accounting standards, and the predictability of earnings. Working paper, Tippie College of Business, The University of Iowa, Iowa City, IA. (Forthcoming in *The Journal of Accounting Research*.)

Ball, R., S. P. Kothari, and A. Robin. 2000. The effect of international institutional factors on properties of accounting earnings. *Journal of Accounting and Economics* 29: 1-51.

Ball, R., A. Robin and J.S. Wu. 2000. Incentives versus standards: Properties of accounting income in four East Asian countries, and implications for acceptance of IAS, Working Paper # FR00-04, University of Rochester.

Barth, M. E., J. A. Elliott, and M. W. Finn. 1999. Market rewards associated with patterns of increasing earnings. *Journal of Accounting Research* 37 (Autumn): 387-413.

Basu, S. 1997. The conservatism principle and the asymmetric timeliness of earnings, *Journal of Accounting and Economics* 24, 3-37.

Bekaert, G., and C. Harvey. 1995. Time varying world market integration. *Journal of Finance* 50: 403-444.

Bekaert, G., and C. Harvey. 1997. Emerging equity market volatility. *Journal of Financial Economics* 43: 29-77.

Bekaert, G., and C. Harvey. 2000. Foreign speculators and emerging equity markets. *Journal of Finance* 55: 565-613.

Bhattacharya, U., and M. Spiegel. 1991. Insiders, outsiders, and market breakdowns. *Review of Financial Studies* 4: 255-282.

Bhattacharya, U., and H. Daouk. 2002. The world price of insider trading. *Journal of Finance* 57: 75-108.

Bollerslev, T., R. Engle, and J. Wooldrige. 1988. A capital asset pricing model with time-varying covariances. *Journal of Political Economy* 96: 116-131.

Brennan, M., and A. Subrahmanyam. 1996. Market microstructure and asset pricing: On the compensation for illiquidity in stock returns. *Journal of Financial Economics* 41: 441-464.

Burgstahler, D., and I. Dichev. 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24: 99-126.

Bushman, R.. and A. Smith, 2001. Financial accounting information and corporate governance. *Journal of Accounting and Economics* 32: 237-333.

Center for International Financial Analysis & Research (CIFAR). 1995. *International Accounting and Auditing Trends*, 4th Edition. Edited by V. B. Bavishi. Princeton, NJ: CIFAR.

Chang, J. J., T. Khanna, and K. G. Palepu. 2000. Analyst activity around the world. Working paper, The Wharton School of the University of Pennsylvania, Philadelphia, PA.

Choi, F. Frost, C., and G. K. Meek, *International Accounting*, 3rd Edition, Prentice Hall, NJ, 1999.

Dechow, P. M., R. Sloan, and A. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70: 193-226.

Degeorge, F., J. Patel, and R. Zeckhauser. 1999. Earnings management to exceed thresholds. *Journal of Business* 72: 1-33.

Demirguc-Kunt, A., and V. Maksimovic. 1998. Law, finance, and firm growth. *Journal of Finance* 53: 2107-2137.

Dumas, B., and B. Solnik. 1995. The world price of foreign exchange risk. *Journal of Finance* 50: 445-479.

Enders, W., 1996, *RATS Handbook for Econometric Time Series* (John Wiley and Sons, New York)

Engle, R., D. Lilien, and R. Robins. 1987. Estimating time varying risk premia in the term structure: The ARCH-M model. *Econometrica* 55: 391-407.

Ferson, W., and C. Harvey. 1993. The risk and predictability of international equity returns. *Review of Financial Studies* 6: 527-566.

Financial Accounting Standards Board (FASB). 1978. *Objectives of Financial Reporting by Business Enterprises*. Statement of Financial Accounting Concepts No 1, Norwalk, CT: FASB.

Fudenberg, D., and J. Tirole. 1995. A theory of income and dividend smoothing based on incumbency rents. *Journal of Political Economy* 103: 75-93.

Givoly, D. and C. Hayn. 2000. The changing time-series properties of earnings, cash flows and accruals: Has financial reporting become more conservative? *Journal of Accounting and Economics* 29: 287-320.

Glosten, L., and P. Milgrom. 1985. Bid, ask and transaction prices in a specialist model with heterogeneously informed traders. *Journal of Financial Economics* 14: 71-100.

Harris, T. S., M. Lang, and H. P. Möller. 1994. The value relevance of German accounting measures: An empirical analysis. *Journal of Accounting Research* 32 (Autumn): 187-209.

Harvey, C. 1991. The world price of covariance risk. *Journal of Finance* 46: 111-157.

Harvey, C. 1995. Predictable risk and returns in emerging markets. *Review of Financial Studies* 8: 773-816.

Hayn, C. 1995. The information content of losses. *Journal of Accounting and Economics* 20: 125-153.

Healy, P. 1985. The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics* 7: 85-107.

Henry, P. 2000. Stock market liberalization, economic reform, and emerging market equity prices. *Journal of Finance* 55: 529-564.

Himmelberg, C., R.G. Hubbard and D. Palia. 1999. Understanding the determinants of managerial ownership and the link between ownership and performance, *Journal of Financial Economics* 53, 353-384.

International Accounting Standards Committee, *Insight*, (October, 1997)

Jacoby, G., D. Fowler, and A. Gottesman. 2000. The capital asset pricing model and the liquidity effect: A theoretical approach. *Journal of Financial Markets* 3: 69-81.

Jones, J. J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29 (Autumn): 193-228.

Joos, P., and M. Lang. 1994. The effects of accounting diversity: Evidence from the European union. *Journal of Accounting Research* 32 (Supplement): 141-168.

Kyle, A. 1985. Continuous auctions and insider trading. *Econometrica* 53: 1315-1335.

Land, J., and M. Lang. 2002. Empirical evidence on the evolution of international earnings. Working paper, Kenan-Flagler Business School, University of North Carolina, Chapel Hill, NC.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny. 1997. Legal determinants of external finance, *Journal of Finance* 52: 1131-1150.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny. 1998. Law and finance. *Journal of Political Economy* 106: 1113-1155.

Leuz, C., D. Nanda, and P. Wysocki. 2002. Earnings management and institutional factors: An international comparison. Forthcoming, *Journal of Financial Economics*.

Levine, R. 1997. Financial development and economic growth: Views and agenda. *Journal of Economic Literature* 35: 688-726.

PricewaterhouseCoopers. 2001. *The Opacity Index*.

Rangan, S. 1998. Earnings management and the performance of seasoned equity offerings. *Journal of Financial Economics* 50: 101-122.

Saudagaran, S, and J. Diga. 1997. Financial reporting in emerging capital markets: characteristics and policy issues," *Accounting Horizons* 11: 41-64.

Shivakumar, L. 2000. Do firms mislead investors by overstating earnings before seasoned equity offerings? *Journal of Accounting and Economics* 29: 339-371.

Sims, C. 1980. Macroeconomics and reality. *Econometrica* 48: 1-49.

Stulz, René, 1999a, Globalization of equity markets and the cost of capital, Working paper, National Bureau

of Economic Research.

Stulz, René, 1999b, Globalization, corporate finance, and the cost of capital, *Journal of Applied Corporate Finance*, Fall 1999, 8-25.

Teoh, S. H., I. Welch, and T. J. Wong. 1998. Earnings management and the underperformance of seasoned equity offerings. *Journal of Financial Economics* 50: 63-99.

Teoh, S. H., and T. J. Wong. 2002. Why do new issues and high-accrual firms underperform: the role of analysts' credulity. Forthcoming, *Review of Financial Studies*.

Trueman, B., and S. Titman. 1988. An explanation for accounting income smoothing. *Journal of Accounting Research* 26 (Supplement): 127-139.

World Factbook. 2001. Central Intelligence Agency, VA

Zarowin, P. 2002. Does income smoothing make stock prices more informative? Working paper, New York University, New York, NY.

Zhou, X. 2001. Understanding the determinants of managerial ownership and the link between ownership and performance: comment. *Journal of Financial Economics* 62: 559-571.

TABLE 1

Summary Statistics

	EARNINGS OPACITY					OTHER VARIABLES						
(1) Countries	(2) Earnings Aggressiveness	(3) Loss Avoidance	(4) Earnings Smoothing	(5) Auditors per 100,000 population	(6) Disclosure level	(7) IAS use	(8) Common law	(9) Mean monthly return/ standard deviation of monthly return	(10) Trade	(11) Real % GDP growth (1985-1998)	(12) Insider Trading Enforcement Date	(13) Liberalization date
Australia	-0.0213	-0.04615	-0.82374	539	80	0	Yes	0.1292	-3.3862	3.14	1996	Before 01/86
Austria	-0.03727	0.500397	-0.87909	NA	62	0	No	0.0980	-3.5173	2.49	No	Before 01/86
Belgium	-0.05467	0.317765	-0.87866	38	68	0	No	0.3282	-4.6080	2.21	1994	Before 01/86
Brazil	-0.0068	0.035416	-0.77614	1	NA	1	No	0.0285	NA	2.70	1978	05/91
Canada	-0.03433	0.450318	-0.81781	350	75	0	Yes	0.1446	-3.6756	2.54	1976	Before 01/86
Chile	-0.01706	0.6	-0.91368	87	78	NA	No	0.2628	-4.9177	6.75	1996	01/92
Denmark	-0.03937	0.267444	-0.91274	106	75	0	No	0.2198	-5.0497	2.37	1996	Before 01/86
Finland	-0.03267	0.621092	-0.88223	10	83	0	No	0.1572	NA	2.12	1993	Before 01/86
France	-0.03827	0.376352	-0.86549	45	78	1	No	0.2164	-4.0970	2.13	1975	Before 01/86
Germany	-0.04138	0.586525	-0.8978	26	67	0	No	0.1671	-1.9795	2.96	1995	Before 01/86
Greece	0.01344	0.652206	-0.91468	12	61	NA	No	0.1708	-4.0892	2.15	1996	12/87
Hong Kong	-0.01194	0.17013	-0.85786	110	73	0	Yes	0.1455	-3.401	5.30	1994	Before 01/86
India	0.001681	0.735644	-0.86787	9	61	1	Yes	0.0301	-3.7879	5.73	1998	11/92
Indonesia	-0.00098	0.733766	-0.85613	2	NA	NA	No	-0.0876	-4.5513	4.55	1996	09/89
Ireland	-0.024	0.153846	-0.86847	262	81	1	Yes	0.2213	NA	5.95	No	Before 01/86
Italy	-0.02733	0.505334	-0.92531	110	66	0	No	0.1339	-4.2832	1.93	1996	Before 01/86
Japan	-0.01247	0.642863	-0.92135	10	71	0	No	0.0698	-4.2534	2.74	1990	Before 01/86
Korea (South)	-0.0115	0.595265	-0.93793	7	68	0	No	0.0433	-2.9382	7.48	1988	12/88
Malaysia	-0.01226	0.469553	-0.87234	48	79	2	Yes	0.0271	-4.3673	6.50	1996	05/89
Mexico	-0.02058	-0.03333	-0.74486	15	71	1	No	0.1243	-3.3118	3.27	No	Before 01/86
Netherlands	-0.04506	0.378023	-0.9172	52	74	1	No	0.3426	-2.8995	2.74	1994	Before 01/86
Norway	-0.03786	0.178788	-0.72913	NA	75	1	No	0.0839	-3.4892	2.94	1990	02/91
Pakistan	-0.02584	0.616327	-0.91133	2	73	2	Yes	0.0369	NA	4.26	No	07/86
Portugal	-0.06614	0.211112	-0.87479	NA	NA	1	No	0.0822	-5.1253	4.38	No	Before 01/86
Singapore	-0.02534	0.484873	-0.88578	273	79	1	Yes	0.0958	-4.0609	6.97	1978	01/92
South Africa	-0.02021	0.307692	-0.88157	35	79	1	No	0.0609	-4.2894	1.30	No	Before 01/86
Spain	-0.0379	0.514142	-0.85582	18	72	0	No	0.2321	-3.3038	3.18	1998	Before 01/86
Sweden	-0.02256	0.340096	-0.84528	41	83	0	No	0.2242	-3.6422	1.49	1990	Before 01/86
Switzerland	-0.03963	0.589985	-0.87921	53	80	1	No	0.2602	-3.3903	1.51	1995	Before 01/86
Taiwan	-0.02405	0.691198	-0.85276	17	58	NA	No	0.0950	-2.3109	7.26	1989	01/91
Thailand	-0.03953	0.730403	-0.85693	5	66	2	Yes	0.0542	-3.3376	5.97	1993	09/87
Turkey	0.127142	0.5	-0.67144	NA	58	1	No	0.0698	-3.6251	4.82	1996	08/89
United Kingdom	-0.02924	0.372985	-0.8683	352	85	0	Yes	0.2369	-3.1222	2.57	1981	Before 01/86
United States	-0.03833	0.350638	-0.77688	168	76	0	Yes	0.3097	-2.7766	2.73	1961	Before 01/86
All Countries	-0.02141	0.38765	-0.86541	93	73			0.1416	-3.7196	3.74		

Notes and Sources:

(1) Annual financial statement data for firms in 20 developed markets and 14 emerging markets were obtained from Worldscope. These countries are listed in Column 1.
(2) We scale accruals by lagged total assets for each firm, determine its median in the cross-section of firms per country per year, and then average across time to obtain the "earnings aggressiveness" variable per country. This is listed in Column 2.
(3) We define firms with small positive earnings (small negative earnings) as firms with net income scaled by lagged total assets between 0 and 1% (between 0 and -1%). We subtract the number of firms with small negative earnings from the number of firms with small positive earnings per country per year, divide this difference by the sum of the two, and then average this ratio across time to obtain the "loss avoidance" variable per country. This is listed in Column 3.
(4) We find the correlation between the change in accruals and the change in operating cash flows (both scaled by lagged total assets) in the cross-section of firms per country per year, and then average across time to obtain the "earnings smoothing" variable per country. This is listed in Column 4.
(5) The number of auditors per 100,000 population in Column 5 comes from Saudagaran and Diga (1997), Table 6, page 51. The original source is the International Federation of Accountants (IFAC) secretariat, 8/13/1996.
(6) Disclosure level data in Column 6 comes from Saudagaran and Diga (1997), Table 2, page 46. The original source is the Center for International Financial Analysis and Research (CIFAR (1995)). The higher the number, more is the disclosure.
(7) International Accounting Standards (IAS) use data in Column 7 comes from Choi, Frost and Meek (1999), exhibit 8.6, page 264.They took it from International Accounting Standards Committee (IASC *Insight* dated October, 1997.) 0 - completely independent standard setting, no use of IAS except possibly a comparison with IAS; 1 - separate accounting standards that are based on and similar to IAS in most cases, however, some standards provide more or less choice; 2 - IAS are used as national standards with some modification for local conditions, standards not covered by IAS added.
(8) The common law data in Column 8 comes from the CIA World Factbook, 2001, http://www.odci.gov/cia/publications/factbook.
(9) Data on monthly stock market indices for the 20 developed markets were obtained from Morgan Stanley Capital Market International (MSCI). Data on monthly stock market indices for the 14 emerging markets were

obtained from the International Financial Corporation (IFC). The mean return scaled by the standard deviation of returns is given in Column 9. The sample periods used to calculate these statistics are given in Column 4 of the Appendix.

(10) Trade is defined as the natural logarithm of the ratio of volume of dollar trade per month to dollar market capitalization at the end of the month. Monthly data on these two variables were obtained from Datastream. Their sample periods are given in Columns 6 and 7 in the Appendix. The mean trade per country is given in Column 10.

(11) The real growth in Gross Domestic Product per country per year is obtained from the World Bank, http://www.worldbank.org/research/growth/GDNdata.htm. The average per country is given in Column 11.

(12) The insider trading enforcement date in Column 12 comes from Bhattacharya and Daouk (2002), Table 1, pages 80-84.

(13) The official liberalization date, which was obtained from Bekaert and Harvey (2000), is given in Column 13.

TABLE 2
Relation Between Earnings Opacity Measures and Other Financial Reporting Measures

Correlation Matrix

	Loss Avoidance[b]	Earnings Smoothing[c]	Auditors per 100,000 Population[d]	Disclosure Level[e]	IAS Use[f]	Common Law[g]
Earnings Aggressiveness[a]	.152	.453*	-.135	-.404*	.135	-.034
Loss Avoidance[b]	1	-.431*	-.448*	-.429*	.096	-.069
Earnings Smoothing[c]		1	.210	-.094	.138	.050
Auditors per 100,000 Population[d]			1	.458*	-.284	.581*
Disclosure Level[e]				1	-.031	.251
IAS Use[f]					1	.250
Common Law[g]						1

* significant at $p < .05$, two-tailed test

[a] We scale accruals by lagged total assets for each firm, determine its median in the cross-section of firms per country per year, and then average across time to obtain the "earnings aggressiveness" variable per country.
[b] We define firms with small positive earnings (small negative earnings) as firms with net income scaled by lagged total assets between 0 and 1% (between 0 and -1%). We subtract the number of firms with small negative earnings from the number of firms with small positive earnings per country per year, divide this difference by the sum of the two, and then average this ratio across time to obtain the "loss avoidance" variable per country.
[c] We find the correlation between the change in accruals and the change in operating cash flows (both scaled by lagged total assets) in the cross-section of firms per country per year, and then average across time to obtain the "earnings smoothing" variable per country.
[d] The number of auditors per 100,000 population comes from Saudagaran and Diga (1997), Table 6, page 51. The original source is communication with the International Federation of Accountants (IFAC) Secretariat, August 13, 1996.
[e] Disclosure level data comes from Saudagaran and Diga (1997), Table 2, page 46. The original source is the Center for International Financial Analysis and Research (CIFAR (1995)). The higher the number, more is the disclosure.
[f] International Accounting Standards (IAS) use data comes from Choi, Frost and Meek (1999), exhibit 8.6, page 264.They took it from International Accounting Standards Committee (IASC *Insight* dated October, 1997.) 0 - completely independent standard setting, no use of IAS except possibly a comparison with IAS; 1 - separate accounting standards that are based on and similar to IAS in most cases, however, some standards provide more or less choice; 2 - IAS are used as national standards with some modification for local conditions, standards not covered by IAS added.
[g] The common law data comes from the CIA World Factbook, 2001, http://www.odci.gov/cia/publications/factbook.

TABLE 3
Earnings Opacity Ranking of Countries [a]

	Earnings aggressiveness [b]	Loss avoidance [c]	Earnings smoothing [d]	Overall earnings opacity [e]
Least, 1	Portugal	Brazil	Turkey	United States
	Belgium	Mexico	United States	Norway
	Netherlands	Australia	Brazil	Portugal
	Germany	United States	Norway	Brazil
	Switzerland	Norway	Mexico	Belgium
	United States	Ireland	Canada	Mexico
	Denmark	Denmark	Australia	Canada
2	France	France	Taiwan	France
	Spain	United Kingdom	Spain	Australia
	Finland	Belgium	France	Spain
	Austria	Sweden	Thailand	United Kingdom
	Canada	Portugal	Sweden	Denmark
	Thailand	Canada	United Kingdom	Switzerland
	Norway	Hong Kong	India	Sweden
3	Italy	Netherlands	Hong Kong	Germany
	United Kingdom	South Africa	Portugal	Netherlands
	Pakistan	Austria	Indonesia	Finland
	Ireland	Singapore	Malaysia	Austria
	Australia	South Korea	Switzerland	Thailand
	Sweden	Malaysia	Finland	Ireland
	Singapore	Germany	Singapore	Hong Kong
4	Taiwan	Italy	Belgium	Singapore
	Chile	Spain	South Africa	Taiwan
	Japan	Switzerland	Austria	Turkey
	South Africa	Japan	Germany	South Africa
	Brazil	Finland	Ireland	Malaysia
	Mexico	Pakistan	Pakistan	Italy
	Hong Kong	Chile	Denmark	Pakistan
Most, 5	Malaysia	Greece	Chile	Japan
	South Korea	Turkey	Greece	Chile
	Indonesia	Taiwan	Japan	India
	India	Thailand	Netherlands	Indonesia
	Greece	India	Italy	South Korea
	Turkey	Indonesia	South Korea	Greece

[a] The data used to construct the earnings opacity variables come from Worldscope.
[b] We scale accruals by lagged total assets for each firm, determine its median in the cross-section of firms per country per year, and then rank these medians across years and across countries. This rank is the "earnings aggressiveness" time-series variable per country.
[c] We define firms with small positive earnings (small negative earnings) as firms with net income scaled by lagged total assets between 0 and 1% (between 0 and -1%). We subtract the number of firms with small negative earnings from the number of firms with small positive earnings per country per year, divide this difference by the sum of the two, and then rank this ratio across years and across countries. This rank is the "loss avoidance" time-series variable per country.
[d] We find the correlation between the change in accruals and the change in operating cash flows (both scaled by lagged total assets) in the cross-section of firms per country per year, and then rank these correlations across years and across countries. This rank is the "earnings smoothing" time-series variable per country.
[e] The "overall earnings opacity" time-series variable per country is the average of the "earnings aggressiveness" time-series variable per country, the "loss avoidance" time-series variable per country and the "earnings smoothing" time-series variable per country.

TABLE 4
Effect of Earnings Opacity on the Cost of Equity
(Using Dividend Yields) [a]

MODEL: $Cost\ of\ Equity_{i,t} = \beta_0 + \beta_1\ Dimension\ of\ Earnings\ Opacity_{i,t-1} + \beta_2\ Liberalization_{i,t} + \beta_3\ Insider\ Trading\ Enforcement_{i,t} + \beta_4\ GDP\ Growth_{i,t} + u_{i,t}$

Dependent variable [b]	Cost of equity			
Independent variables [c]	(1)	(2)	(3)	(4)
Earnings aggressiveness [d]	0.0012 (0.0000)			
Loss avoidance [e]		0.0000 (0.9479)		
Earnings smoothing [f]			0.0001 (0.7443)	
Overall earnings opacity [g]				0.0012 (0.0011)
Liberalization [h]	-0.0045 (0.0862)	-0.0040 (0.1301)	-0.0040 (0.1293)	-0.0043 (0.1033)
Insider trading enforcement [i]	-0.0038 (0.0345)	-0.0039 (0.0300)	-0.0039 (0.0320)	-0.0040 (0.0260)
GDP growth [j]	0.0011 (0.0000)	0.0013 (0.0000)	0.0013 (0.0000)	0.0012 (0.0000)

[a] The numbers below are coefficient estimates from panel regressions, and are corrected for country fixed-effects, country-specific heteroskedasticity and country-specific autocorrelation. p-values are in parentheses.
[b] The dependent variable "Cost of equity" is constructed as follows. The cost of equity, if backed out from the dividend discount model, equals current dividend yield (1+ expected dividend growth rate) + expected dividend growth rate. Assuming that dividend growth rates follow a random walk, we replace expected values with contemporary values. The dividend yield data were obtained from Datastream for the main stock market of each country. The sample periods for which this data were obtained are given in the Appendix.
[c] The first four independent variables are the earnings opacity variables, whereas the other independent variables are the control variables. The earnings opacity variables are rank variables. A higher rank implies more earnings opacity. The data to construct the earnings opacity variables come from Worldscope.
[d] We scale accruals by lagged total assets for each firm, determine its median in the cross-section of firms per country per year, and then rank these medians across years and across countries. This rank is the "earnings aggressiveness" time-series variable per country.
[e] We define firms with small positive earnings (small negative earnings) as firms with net income scaled by lagged total assets between 0 and 1% (between 0 and -1%). We subtract the number of firms with small negative earnings from the number of firms with small positive earnings per country per year, divide this difference by the sum of the two, and then rank this ratio across years and across countries. This rank is the "loss avoidance" time-series variable per country.
[f] We find the correlation between the change in accruals and the change in operating cash flows (both scaled by lagged total assets) in the cross-section of firms per country per year, and then rank these correlations across years and across countries. This rank is the "earnings smoothing" time-series variable per country.
[g] The "overall earnings opacity" time-series variable per country is the average of the "earnings aggressiveness" time-series variable per country, the "loss avoidance" time-series variable per country and the "earnings smoothing" time-series variable per country.
[h] The control variable "Liberalization" is an indicator variable. It changes from 0 to 1 in the month after the official liberalization date that was obtained from Bekaert and Harvey (2000). These liberalization dates are given in Table 1.
[i] The control variable "insider trading enforcement" is an indicator variable. It changes from 0 to 1 in the year after the first enforcement of insider trading laws. This date was obtained from Bhattacharya and Daouk (2002). These insider trading enforcement dates are given in Table 1.
[j] The control variable "GDP growth" is the growth rate of gross domestic product of a country every year. This data comes from the World Bank (http://www.worldbank.org/research/growth/GDNdata.htm).

TABLE 5
Effect of Earnings Opacity on the Cost of Equity
(Using an International Asset Pricing Factor Model)

MODEL 1:

The international asset pricing factor model used for risk-adjusting is

$$\left(r_{i,t} - r_{f,t}\right) = \alpha_0 + \phi_{i,t}\lambda_{\text{cov}}h_{i,w,t} + \left(1 - \phi_{i,t}\right)\lambda_{\text{var}}h_{i,t} + e_{i,t}$$

where the measure of integration of country i at time t, $\Phi_{i,t}$, is defined as

$$\phi_{i,t} \equiv \frac{\exp\left(\alpha_1\left(\frac{\text{exp}orts_{i,t} + imports_{i,t}}{gdp_{i,t}}\right)\right)}{1 + \exp\left(\alpha_1\left(\frac{\text{exp}orts_{i,t} + imports_{i,t}}{gdp_{i,t}}\right)\right)}$$

and λ_{cov} is the price of the covariance risk with the world, and λ_{var} is the price of own country variance risk. The independent variables are the conditional covariances and variances, $h_{i,w,t}$ and $h_{i,t}$, respectively, and these are obtained from the multivariate ARCH model below:

$$\begin{aligned}
r_{i,t} &= c_1 + \varepsilon_{i,t}, \\
r_{w,t} &= c_2 + \varepsilon_{w,t}, \\
h_{i,t} &= b_1 + a_1\left(\tfrac{1}{2}\varepsilon_{i,t-1}^2 + \tfrac{1}{3}\varepsilon_{i,t-2}^2 + \tfrac{1}{6}\varepsilon_{i,t-3}^2\right), \\
h_{w,t} &= b_2 + a_2\left(\tfrac{1}{2}\varepsilon_{w,t-1}^2 + \tfrac{1}{3}\varepsilon_{w,t-2}^2 + \tfrac{1}{6}\varepsilon_{w,t-3}^2\right), \\
h_{i,w,t} &= b_3 + a_3\left(\tfrac{1}{2}\varepsilon_{i,t-1}\varepsilon_{w,t-1} + \tfrac{1}{3}\varepsilon_{i,t-2}\varepsilon_{w,t-2} + \tfrac{1}{6}\varepsilon_{i,t-3}\varepsilon_{w,t-3}\right), \\
\varepsilon_{i,t}, \varepsilon_{w,t} &\sim \text{N}\left(\begin{bmatrix}0\\0\end{bmatrix}, \begin{bmatrix}h_{i,t} & h_{i,w,t}\\ h_{i,w,t} & h_{w,t}\end{bmatrix}\right).
\end{aligned}$$

where
$\epsilon_{i,t-j}$ is the innovation in monthly return of the stock market index of country i at time t-j, j ∈ {0,1,2,3}, and
$\epsilon_{w,t-j}$ is the innovation in monthly return of the stock market index of the world at time t-j, j ∈ {0,1,2,3}.

Panel A: Some coefficients of the risk-adjustment model, MODEL 1 [a]

Dependent variable [b]	Excess return of country
Some independent variables [c]	
Covariance of the country's equity return with the world equity return multiplied by the measure of the country's integration with the world	λ_{cov} = 2.1625 (0.1076)
Variance of the country's equity return multiplied by one minus the measure of the country's integration with the world	λ_{var} = 2.6432 (0.1244)

[a] The numbers below are coefficient estimates from the panel regressions described above. p-values are in parentheses.
[b] The dependent variable is the monthly equity return for each country minus the one mounth U.S. T-Bill return. The equity return for each country is computed from its stock market index. Data on monthly stock market indices for the 20 developed markets were obtained from Morgan Stanley Capital Market International (MSCI). Data on monthly stock market indices for the 14 emerging markets were obtained from the International Financial Corporation (IFC). The sample periods are given in the Appendix. The data for the one-month U.S. Treasury bill return was obtained from Datastream.
[c] The measure of a country's integration with the world, as defined above, is computed from its exports, imports, and GDP. It is equation (4) in the text. Data on quarterly/annual GDP, monthly exports and monthly imports were from the International Financial Statistics of the International Monetary Fund. The statistics for Taiwan come from Datastream. The sample periods are given in the Appendix.

The conditional covariance of the return of the stock market index with the depreciation of the i^{th} foreign currency with respect to the dollar at time t, defined as the foreign exchange risk and denoted as $h_{i,ifx,t}$, is estimated from the multivariate ARCH model below.

$$
\begin{aligned}
r_{i,t} &= f_1 + \varepsilon_{i,t}, \\
r_{ifx,t} &= f_2 + \varepsilon_{ifx,t}, \\
h_{i,t} &= e_1 + d_1\left(\tfrac{1}{2}\varepsilon_{i,t-1}^2 + \tfrac{1}{3}\varepsilon_{i,t-2}^2 + \tfrac{1}{6}\varepsilon_{i,t-3}^2\right), \\
h_{ifx,t} &= e_2 + d_2\left(\tfrac{1}{2}\varepsilon_{ifx,t-1}^2 + \tfrac{1}{3}\varepsilon_{ifx,t-2}^2 + \tfrac{1}{6}\varepsilon_{ifx,t-3}^2\right), \\
h_{i,ifx,t} &= e_3 + d_3\left(\tfrac{1}{2}\varepsilon_{i,t-1}\varepsilon_{ifx,t-1} + \tfrac{1}{3}\varepsilon_{i,t-2}\varepsilon_{ifx,t-2} + \tfrac{1}{6}\varepsilon_{i,t-3}\varepsilon_{ifx,t-3}\right), \\
\varepsilon_{i,t}, \varepsilon_{ifx,t} &\sim \mathrm{N}\left(\begin{bmatrix}0\\0\end{bmatrix}, \begin{bmatrix} h_{i,t} & h_{i,ifx,t} \\ h_{i,ifx,t} & h_{ifx,t}\end{bmatrix}\right).
\end{aligned}
$$

where

$\epsilon_{i,\,t-j}$ is the innovation in monthly return of the stock market index of country i at time t-j, $j \in \{0,1,2,3\}$, and
$\epsilon_{ifx,\,t-j}$ is the innovation in monthly depreciation of the i^{th} foreign currency with respect to the dollar at time t-j, $j \in \{0,1,2,3\}$.

MODEL 2: Residual from Model 1, $e_{i,t} = \beta_0 + \beta_1$ *Dimension of Earnings Opacity*$_{i,t-1} + \beta_2$ *Foreign Exchange Risk*$_{i,t} + \beta_3$ *Liquidity Risk*$_{i,t} + \beta_4$ *Liberalization*$_{i,t} + \beta_5$ *Insider Trading Enforcement*$_{i,t} + \beta_6$ *GDP Growth*$_{i,t} + \nu_{i,t}$

Panel B: Coefficients of Model 2 [a]

Dependent variable [b]	Residual from Risk Adjustment Model			
Independent variables [c]	(1)	(2)	(3)	(4)
Earnings aggressiveness [d]	-0.0001 (0.8121)			
Loss avoidance [e]		0.0013 (0.0022)		
Earnings smoothing [f]			0.0000 (0.9899)	
Overall earnings opacity [g]				0.0014 (0.0783)
Foreign exchange risk, $h_{i,ifx,t}$ [h]	7.4670 (0.0002)	7.5572 (0.0002)	7.4821 (0.0002)	7.6567 (0.0001)
Liquidity [i]	0.0035 (0.0190)	0.0034 (0.0142)	0.0035 (0.0137)	0.0041 (0.0042)
Liberalization [j]	-0.0143 (0.0275)	-0.0142 (0.0029)	-0.0143 (0.0027)	-0.0145 (0.0024)
Insider trading enforcement [k]	-0.0032 (0.2613)	-0.0045 (0.1220)	-0.0033 (0.2473)	-0.0040 (0.1720)
GDP growth [l]	0.0007 (0.1920)	0.0006 (0.2971)	0.0007 (0.2020)	0.0005 (0.3852)

[a] The numbers below are coefficient estimates from panel regressions, and are corrected for country fixed-effects, country-specific heteroskedasticity and country-specific autocorrelation. p-values are in parentheses.
[b] The dependent variable is the residual from Model 1.
[c] The first four independent variables are the earnings opacity variables, whereas the other independent variables are the control variables. The earnings opacity variables are rank variables. A higher rank implies more earnings opacity. The data to construct the earnings opacity variables come from Worldscope.
[d] We scale accruals by lagged total assets for each firm, determine its median in the cross-section of firms per country per year, and then rank these medians across years and across countries. This rank is the "earnings aggressiveness" time-series variable per country.
[e] We define firms with small positive earnings (small negative earnings) as firms with net income scaled by lagged total assets between 0 and 1% (between 0 and -1%). We subtract the number of firms with small negative earnings from the number of firms with small positive earnings per country per year, divide this difference by the sum of the two, and then rank this ratio across years and across countries. This rank is the "loss avoidance" time-series variable per country.
[f] We find the correlation between the change in accruals and the change in operating cash flows (both scaled by lagged total assets) in the cross-section of firms per country per year, and then rank these correlations across years and across countries. This rank is the "earnings smoothing" time-series variable per country.
[g] The "overall earnings opacity" time-series variable per country is the average of the "earnings aggressiveness" time-series variable per country, the "loss avoidance" time-series variable per country and the "earnings smoothing" time-series variable per country.
[h] The control variable "foreign exchange risk" is estimated from the multivariate ARCH model given above.
[i] The control variable "liquidity" is defined as the natural logarithm of the ratio of volume of dollar trade per month to dollar market capitalization at the end of the month. This data were obtained from Datastream for the main stock market of each country. The sample periods for which this data were available are given in the Appendix.
[j] The control variable "Liberalization" is an indicator variable. It changes from 0 to 1 in the month after the official liberalization date that was obtained from Bekaert and Harvey (2000). These liberalization dates are given in Table 1.
[k] The control variable "insider trading enforcement" is an indicator variable. It changes from 0 to 1 in the year after the first enforcement of insider trading laws. This date was obtained from Bhattacharya and Daouk (2002). These insider trading enforcement dates are given in Table 1.
[l] The control variable "GDP growth" is the growth rate of gross domestic product of a country every year. This data comes from the World Bank (http://www.worldbank.org/research/growth/GDNdata.htm).

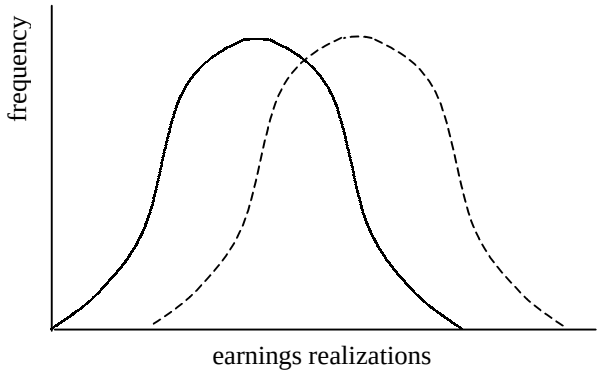
TABLE 6
Effect of Earnings Opacity on Trade [a]

MODEL: $Trade_{i,t} = \beta_0 + \beta_1 Dimension\ of\ Earnings\ Opacity_{i,t-1} + \beta_2 Liberalization_{i,t} + \beta_3 Insider\ Trading\ Enforcement_{i,t} + \beta_4 GDP\ Growth_{i,t} + u_{i,t}$

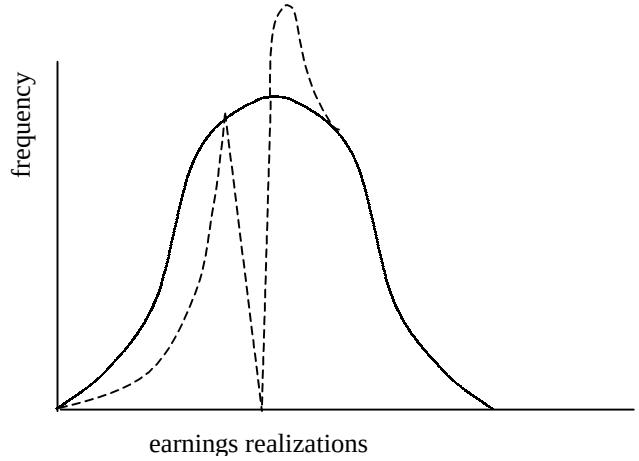
Dependent variable [b]	Trade			
Independent variables [c]	(1)	(2)	(3)	(4)
Earnings aggressiveness [d]	-0.0423 (0.0000)			
Loss avoidance [e]		0.0026 (0.4440)		
Earnings smoothing [f]			-0.0375 (0.0000)	
Overall earnings opacity [g]				-0.0496 (0.0000)
Liberalization [h]	0.2581 (0.0000)	0.2212 (0.0000)	0.2298 (0.0000)	0.2230 (0.0000)
Insider trading enforcement [i]	0.4535 (0.0000)	0.5010 (0.0000)	0.4813 (0.0000)	0.4855 (0.0000)
GDP growth [j]	-0.0030 (0.3613)	-0.0114 (0.0005)	-0.0051 (0.1197)	-0.0013 (0.7147)

[a] The numbers below are coefficient estimates from panel regressions, and are corrected for country fixed-effects, country-specific heteroskedasticity and country-specific autocorrelation. p-values are in parentheses.
[b] The dependent variable "trade" is defined as the natural logarithm of the ratio of volume of dollar trade per month to dollar market capitalization at the end of the month. This data were obtained from Datastream for the main stock market of each country. The sample periods for which this data were available are given in the Appendix..
[c] The first four independent variables are the earnings opacity variables, whereas the other independent variables are the control variables. The earnings opacity variables are rank variables. A higher rank implies more earnings opacity. The data to construct the earnings opacity variables come from Worldscope.
[d] We scale accruals by lagged total assets for each firm, determine its median in the cross-section of firms per country per year, and then rank these medians across years and across countries. This rank is the "earnings aggressiveness" time-series variable per country.
[e] We define firms with small positive earnings (small negative earnings) as firms with net income scaled by lagged total assets between 0 and 1% (between 0 and -1%). We subtract the number of firms with small negative earnings from the number of firms with small positive earnings per country per year, divide this difference by the sum of the two, and then rank this ratio across years and across countries. This rank is the "loss avoidance" time-series variable per country.
[f] We find the correlation between the change in accruals and the change in operating cash flows (both scaled by lagged total assets) in the cross-section of firms per country per year, and then rank these correlations across years and across countries. This rank is the "earnings smoothing" time-series variable per country.
[g] The "overall earnings opacity" time-series variable per country is the average of the "earnings aggressiveness" time-series variable per country, the "loss avoidance" time-series variable per country and the "earnings smoothing" time-series variable per country.
[h] The control variable "Liberalization" is an indicator variable. It changes from 0 to 1 in the month after the official liberalization date that was obtained from Bekaert and Harvey (2000). These liberalization dates are given in Table 1.
[i] The control variable "insider trading enforcement" is an indicator variable. It changes from 0 to 1 in the year after the first enforcement of insider trading laws. This date was obtained from Bhattacharya and Daouk (2002). These insider trading enforcement dates are given in Table 1.
[j] The control variable "GDP growth" is the growth rate of gross domestic product of a country every year. This data comes from the World Bank (http://www.worldbank.org/research/growth/GDNdata.htm).

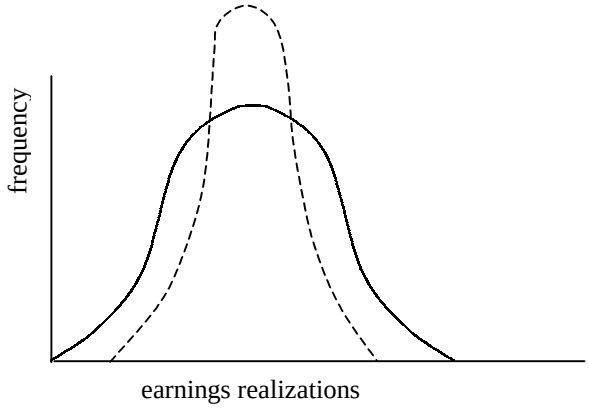
FIGURE 1
Distributional properties of accounting earnings vs. economic earnings



Earnings Aggressiveness



Loss Avoidance



Earnings Smoothing

———Economic earnings
- - - - - - -Accounting earnings