

# The World Price of Earnings Opacity\*

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## **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 earnings opacity per country – earnings aggressiveness, loss avoidance, and earnings smoothing. We combine these three dimensions to obtain an overall earnings opacity time-series measure per country. We find that overall earnings opacity in the world is declining in the late 1990s.

The paper then goes on to explore whether earnings opacity affects two dimensions of an equity market in a country – the return the shareholders demand and how much they trade. Our panel data tests document that, after controlling for other influences, an increase in earnings opacity in a country is linked to a decrease in trading in the stock market of that country. The results with respect to the cost of equity of the country are mixed; one test shows a positive linkage, whereas another test shows no linkage.

## I. INTRODUCTION

The goal of this paper is to measure the level of earnings opacity occurring in a country every year, and then test whether earnings opacity affects the equity market of that country. To be precise, we explore whether earnings opacity in a country is associated with the return shareholders demand for holding equity in that country and is associated with shareholder trading of equity in that country.<sup>1</sup>

After the debacle of Enron in late 2001, the prevailing view in the U.S. Congress and in the global financial press is that earnings opacity, by obscuring information about a firm's underlying performance, undermines the investing public's confidence in capital markets, and something should be immediately done about it.<sup>2</sup> All this sound and fury about Enron, however, obscures two critical questions. First, how bad is this phenomenon of earnings opacity in the U.S. compared to earnings opacity in the rest of the world? Second, and more important, do sophisticated investors care, in the sense that they trade less or demand an extra required return – the “earnings opacity premium” – in countries where earnings opacity is pervasive? We attempt to answer both these questions in this paper by exploring the link between earnings opacity and equity markets in a broad cross-section of countries.

What is earnings opacity? Earnings opacity is a measure that reflects how little information there is in a firm's earnings number about its true, but unobservable, economic performance. 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). Our definition also reflects the views of many academic accounting researchers. See,

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<sup>1</sup> 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 was the case for the other two equity market measures. 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; therefore, we dropped this section.

<sup>2</sup> See the special reports on Enron in the Financial Times (<http://specials.ft.com/afr2002/>) for a comprehensive coverage of all views.

for example, Ball, Kothari, and Robin (2000), who view earnings transparency – the opposite of earnings opacity – as the timely incorporation of (unobservable) economic income into accounting earnings.

Earnings of a particular firm could be opaque because of a complex interaction between three factors: managerial motivation, accounting standards, and the enforcement of accounting standards (audit quality). It could be that earnings are opaque because managers have a motive to manipulate earnings, and they can do this either because accounting standards are loose and/or their enforcement is lax. It could also be that earnings are opaque, not because managers manipulate earnings, but simply because accounting standards are bad.

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. So, instead of attempting to measure any of the above three factors directly, we focus on 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 are associated with earnings opacity: earnings aggressiveness, loss avoidance, and earnings smoothing. We focus on these three dimensions because the past literature has identified the existence of these three dimensions as weakening the link between accounting performance and the true economic performance of a firm. We discuss the details of our three earnings opacity measures in the next section of the paper.

Our first measure of earnings opacity is earnings aggressiveness. Ball, Kothari and Robin (2000) argue that accounting conservatism – the opposite of earnings aggressiveness – which is the quicker incorporation of economic losses and the slower incorporation of economic gains, arises in common law countries to ameliorate information asymmetry. In code law countries, on the other hand, institutional features such as closer stakeholder relations are used to resolve informational problems. They go on to argue that accounting conservatism is related to accounting transparency, implying that earnings aggressiveness

is positively linked to earnings opacity. Note that we remain agnostic as to why earnings aggressiveness comes about; it could be that standards are not as conservative as they should be, or it could be that managers have an incentive to increase reported earnings numbers (to understand these managerial motivations, see, for example, Rangan (1998), Teoh et al. (1998), Shivakumar (2000), Healy (1985), Barth et al. (1999).)

Our second measure of earnings opacity is loss avoidance behavior. Hayn (1995), and 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 for some sample firms. Such loss avoidance behavior obscures the relationship between earnings and economic performance, increasing earnings opacity.

Our third measure of earnings opacity is earnings smoothing. Some accounting standards (example, in cases of high book/tax conformity) or some managerial motives may lead to smooth earnings over time (see, for example, Trueman and Titman (1988) and Fudenberg and Tirole (1995)). If accounting earnings are artificially smooth, they will fail to depict the swings in underlying firm performance, which will increase earnings opacity.

We construct a panel data set for each of these three measures 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. An interesting finding from this time-series measure is that overall earnings opacity in the world seems to be declining in the late 1990s. There is some evidence of convergence across various countries, but this is driven almost entirely by the earnings aggressiveness measure.<sup>3</sup>

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<sup>3</sup> Land and Lang (2002) document convergence of some earnings multiples between Australia, Canada, Germany, France, U.K., Japan and the U.S.A. in the period 1987-1999.

We then estimate earnings opacity per country. Our estimates are significantly associated with several variables that have been used in the past accounting literature as proxies for the overall quality of a financial reporting regime of a country. For example, we find that earnings aggressiveness, loss avoidance, and earnings smoothing in a country decrease as the number of auditors per 100,000 population in that country increases. An interesting finding in these cross-sectional tests is a negative finding: the use of International Accounting Standards (IAS) seems to have an insignificant effect on our measures of earnings opacity.

The second part of our paper goes on to investigate if earnings opacity affects equity markets. 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 equity and other markets. First, better financial 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, may increase the level of asymmetric information. Asymmetric information can affect equity markets in the following way. An increase in asymmetric information would lead 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.<sup>4</sup> This increases the transaction cost, which in turn induces a shareholder to require an even higher return on equity for compensation.<sup>5</sup> An increase in transaction costs would also make shareholders trade less often or not

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<sup>4</sup> See Glisten and Milgrom (1985) and Kyle (1985) for formal models.

<sup>5</sup> 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.

trade at all.<sup>6</sup>

It is important to mention here that three assumptions lead to the hypothesis that earnings opacity adversely affects equity markets. First, markets are efficient in the sense that investors can detect the level of earnings opacity, but they cannot “see through” it. This implies that the opaque earnings of any particular organization adds noise to the signal about its underlying economic performance. Second, 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. Third, 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. Shivakumar (2000) gives some interesting evidence to show that the capital market sees through earnings manipulation during seasoned equity offerings. The above assumptions, therefore, need to be tested. This is what the second part of our paper attempts to do.

Many factors may affect equity markets in a country, not just earnings opacity. It is impossible for us to control for all these factors in simple cross-sectional regressions. So we employ panel data tests that control for country fixed-effects, for country-specific heteroskedasticity, and for country-specific autocorrelation. These panel data tests are very powerful because, by construction, they control for *all* country-specific variables that affect equity markets, as long as these variables do not change over the test period. We control for all country-specific variables that the literature reveals to us have changed in our 1985 to 1998 test period.

We first examine the effect of earnings opacity on the return shareholders demand for holding equity (cost of equity). We measure the effect on the cost of equity using two different approaches. 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.

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<sup>6</sup> See Bhattacharya and Spiegel (1991) for an analysis of the critical level of asymmetric information needed for a market breakdown.

After controlling for some variables that have changed in our test period and have been documented in previous papers to affect the cost of capital, we find in our panel data tests that earnings opacity has significant adverse effects on the cost of equity. An increase in overall earnings opacity from the 25<sup>th</sup> percentile rank to the 75<sup>th</sup> percentile rank is associated with a 3.3 % increase in the cost of equity.

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 some variables that have changed in our test period and have been documented in previous papers to affect the cost of capital, we find in our panel data tests that earnings opacity does not seem to have any significant effect on the cost of equity.

Why does one test reveal a linkage between earnings opacity and the cost of equity and the other test does not? One reason may be that the international asset pricing factor model lacks power. This is so because in the international asset pricing factor model, one has to estimate all the independent variables, which introduces noise, which diminishes power. Bekaert and Harvey (2000) discuss the many advantages the dividend yield approach has over the international asset pricing factor model with respect to this point. Another reason could be that the results of the international asset pricing factor model are correct, whereas the dividend yield approach yields incorrect results. Shareholders may be smart enough to see through earnings opacity, or earnings opacity may not be an important factor, and so earnings opacity is not priced. There is evidence, however, against this hypothesis in papers by Sloan (1996), Collins and Hribar (2000), and Chan et al. (2001). They find that accruals, which is one measure of earnings opacity in the literature and is a measure in our paper as well, predicts future returns.

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 some variables that have changed in our test period and have been documented in previous papers to affect trade in a stock market, we find that earnings opacity has significant adverse effects on trade. A decrease in overall

earnings opacity from the 75<sup>th</sup> percentile rank to the 25<sup>th</sup> percentile rank is associated with a 5.0 % increase in annual trade.

To summarize, we find that, after controlling for other influences, an increase in earnings opacity in a country is linked to a decrease in trading in the stock market of that country. The results with respect to the cost of equity of the country are mixed; one test shows a positive linkage, whereas another test shows no linkage.

A cross-country comparison of earnings opacity has many advantages. 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. Ours is not the first paper to exploit these two advantages. It 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)), analyst forecasts (Ashbaugh and Pincus (2001), Chang et al. (2000)), earnings timeliness and conservatism (Ball et al. (2000)), or the effect of institutional factors on earnings management (Leuz et al. (2001).) Our contribution to the above literature is that we are 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 use 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.(2001), 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.

The rest of the paper is organized as follows. Section II 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 III we discuss the data and give some summary statistics. Section IV, which is the main section of this paper, tests the null hypothesis that the level of earnings opacity in a country does not affect the stock market of that country. We conclude in Section V.

## **II. MEASUREMENT ISSUES**

### **Earnings Opacity Measures**

We focus on distributional properties of reported accounting numbers across countries and across time to develop metrics for earnings opacity of a country. We make this choice for the following two related reasons. First, it is difficult for us to measure the complex interaction between the underlying three factors that lead to earnings opacity in a country: management’s intentions, accounting standards and the enforcement of these accounting standards. For example, it is not clear whether accounting practice responds to changes in accounting standards and their enforcement or vice versa. Second, even if we could obtain the above data for a country over a sample period, it would be impossible for us to get this data for a country every year and create a panel data set.

As previously discussed, we identify three characteristics of accounting numbers that suggest opaque earnings: earnings aggressiveness, loss avoidance, and earnings smoothing. While none of these measures is a direct measure of the extent to which accounting earnings fail to correspond to economic earnings in a particular country, each of these three measures reveals the existence of patterns in reported accounting numbers that would be expected to result in more opaque earnings. We discuss these three measures in detail below.

#### ***Earnings aggressiveness measure***

An important facet of all accounting standards is conservatism, which is the quicker incorporation of economic losses and the slower incorporation of economic gains in a firm’s income statement. Ball,

Kothari and Robin (2000) argue that accounting conservatism is positively related to accounting transparency. As earnings aggressiveness is the opposite of conservatism, we expect earnings aggressiveness to be positively related to earnings opacity.

As earnings aggressiveness is the tendency to delay the realization of losses and speed the realization of gains, it implies that, if cash flow realizations are held equal, we would expect accruals to increase as earnings aggressiveness increases. Though it is true that unrealized gains and unrealized losses would eventually be recognized, the more conservative accounting system is expected to result in more negative accruals, because a greater proportion of economic losses relative to economic gains will be reflected in the income statement at a 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. Higher the median observation of scaled accruals of country  $i$  in year  $t$ , higher is the earnings aggressiveness in country  $i$ , year  $t$ . Teoh and Wong (2002) present some indirect evidence that scaled accruals affects earnings opacity by affecting analysts' forecast errors.

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.

Using scaled accruals to measure earnings aggressiveness has its problems. The most important problem is that it penalizes countries with high economic growth rates. This is because young firms with expanding operations in such countries undertake a lot of investment expenditure and tend to sell on credit; this depresses cash flows with respect to earnings, thus increasing accruals. We address this bias by controlling for the country's gross domestic product growth (GDP growth) in all our tests. Ball et al. (2000) 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.

Consistent with much of the past literature (e.g., Healy (1985), Jones (1991), Dechow et al. (1995), Leuz et al. (2001)), 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. 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
$\Delta CA_{kt}$	= Change in total current assets for firm k, year t
$\Delta CL_{kt}$	= Change in total current liabilities for firm k, year t
$\Delta CASH_{kt}$	= Change in cash for firm k, year t
$\Delta STD_{kt}$	= 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
$\Delta TP_{kt}$	= Change in income taxes payable for firm k, year t
$TA_{kt-1}$	= Total assets for firm k, year t-1.

We also repeated all our tests where scaled accruals were defined without subtracting depreciation and amortization. This measurement of accruals focuses on working capital accruals, consistent with users of financial statements focusing on earnings numbers that exclude depreciation and amortization (e.g., EBITDA). Our results using this definition of accruals is qualitatively similar to the results reported in this paper.

### ***Loss avoidance measure***

We define firms with small positive earnings (small negative earnings) as firms with bottom line 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. Higher this ratio for country  $i$  in year  $t$ , higher is the loss avoidance in country  $i$ , year  $t$ .

The idea behind this measure comes from Burgstahler and Dichev (1997). A variant of this measure is used in Leuz et al (2001). The idea is that many small positive earnings numbers and few small negative earnings numbers is indicative of managers trying to avoid losses, which is the most salient benchmark for earnings identified in DeGeorge et al. (1999). Since this type of earnings management is expected to obscure the relationship between accounting earnings and economic earnings, it is expected to increase earnings opacity.

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.

Using the above ratio to measure loss avoidance has its problems. The most important problem is that, like before, it penalizes countries with high economic growth rates. This is because firms are likely to have positive net income rather negative net income in such countries, and this will bias the ratio upwards. We address this bias, as before, by controlling for the country's gross domestic product growth (GDP growth) in all our tests.

### ***Earnings Smoothing Measures***

Our third and final measure of earnings opacity is earnings smoothing, which allows earnings to obscure the underlying volatility of the firm's economic performance, thus increasing earnings opacity. Following Leuz et al. (2001), 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 was 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. So, the lower this correlation in country  $i$  in year  $t$ , the higher is the earnings smoothing in country  $i$ , year  $t$ .

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 Measures***

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. We then average the time-series earnings aggressiveness rank, the time-series loss avoidance rank, and the time-series earnings smoothing rank in each year per country to obtain a time-series of overall earnings opacity rank per country.

To construct cross-sectional measures of each individual dimension of earnings opacity per country, we simply average over time the raw or the rank time-series measure of each individual dimension of earnings opacity per country. To construct cross-sectional measures of overall earnings opacity per country, we simply average over time the time-series of overall earnings opacity ranks per country we computed before.

### **Stock Market Measures**

#### ***Cost of Equity Measures***

The cost of equity in country  $i$  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 use two approaches that have been employed in the previous literature.

The first approach is to compute the cost of equity by backing it out from the classical constant growth dividend discount model. It turns out to be the sum of the forecast of the dividend yield and the

forecast of the growth rate of dividends. Appendix A in Bekaert and Harvey (2000) explores in great detail the relationship between dividend yields and the cost of equity for more general 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  $\times$  (1+current growth rate of dividends) + current growth rate of dividends. This is how we estimate the cost of equity in our first approach.

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. The second factor, though a concern in Bekaert and Harvey (2000), who look at the effect of liberalization, may not be an issue in our paper. The reason is that earnings opacity is not likely to influence the growth opportunities of firms.

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. This is our first test.

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:

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

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  $t$ ,

$\alpha_0$  is a constant that would be estimated,

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

$\lambda_{\text{cov}}$  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  $t$ ,

$\lambda_{\text{var}}$  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:

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

where

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

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

$\varepsilon_{w,t-j}$  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:

$$\phi_{i,t} = \frac{\exp \left( \alpha_1 \left( \frac{\text{exports}_{i,t} + \text{imports}_{i,t}}{gdp_{i,t}} \right) \right)}{1 + \exp \left( \alpha_1 \left( \frac{\text{exports}_{i,t} + \text{imports}_{i,t}}{gdp_{i,t}} \right) \right)} \tag{4}$$

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.

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. This is our second test.

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 definitely reduces power.

### ***Trade Measures***

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.

## **III. DATA AND DESCRIPTIVE STATISTICS**

### **Our 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)).<sup>7</sup> Because 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 is given in Column 1 in the Appendix, the sample period per 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. (2001), 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. As discussed earlier, we do not use cash flow information directly.

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 firms. As expected, average accruals are negative, averaging about 2% of lagged total assets.

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<sup>7</sup> We ran all our tests using a broader sample consisting of all non-financial firms (i.e., we excluded only SIC codes 6000) in a previous version of this paper. Such a sample has been constructed by Leuz et al. (2001) 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. Finally, the earnings smoothing measure – the average cross-sectional correlation between the change in cash flows and the change in accruals – are presented in column 4. As expected, the correlation is strongly negative in every country in our sample.

### **Other Earnings Opacity Measures**

There are alternative cross-country measures related to the financial reporting environment that have been documented in the past literature. We identify four of them. 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 proxy for the enforcement of accounting standards. 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. The second 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. The higher the number, more is the disclosure. Column 6 in Table 1 gives this variable. As disclosure and earnings opacity are expected to be negatively correlated as was auditors per 100,000 population, 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 third measure is extent of compliance with International Accounting Standards (IAS). This data comes from Choi, Frost and Meek (1999), exhibit 8.6, page 264. They took it

from International Accounting Standards Committee (IASC *Insight*, October, 1997). We assign a score of 0 for 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 for 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 for 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 are better or worse than the local standards. The fourth measure is the legal origin of the country. Column 8 in Table 1 gives this variable, where common law countries are coded 1, whereas the rest are coded 0. This data comes from the CIA World Factbook, 2001. Ball et al. (2000) argue that common law countries have a demand for more transparent earnings, suggesting a negative relationship with 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 opacity variables. As predicted, we observe that all earnings opacity variables decrease as the number of auditors per 100,000 population increases. Two of the earnings opacity variables decrease as disclosure level increases; however there seems to be no link between earnings smoothing and the disclosure variable. 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, though five of the six correlations have the predicted sign. The latter finding is interesting. It tells us that if we believe in our earnings opacity measures, we should conclude that the use of international accounting standards does not help in making earnings numbers more transparent.

Table 2 also presents the correlation between each of our three earnings opacity variables. These correlations 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.

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. U.S.A. has the least amount of earnings opacity, followed by Norway. Greece, South Korea and Indonesia show the most severe earnings opacity in our sample.

The time-series properties of our three dimensions of earnings opacity, as well as overall earnings opacity, for the mean, the 25<sup>th</sup> percentile and the 75<sup>th</sup> percentile are presented in Figure 2. We can only graph these series from 1994 because most of the emerging markets have data beginning only from this year. Several points about these graphs are worth noting. First, all dimensions of earnings opacity appear to decline in the late 1990s. Second, looking at the distance between the 25<sup>th</sup> percentile and the 75<sup>th</sup> percentile, it seems that there is a little bit of convergence in earnings opacity across countries in the late 1990s, and this convergence seems to be coming from the convergence in earnings aggressiveness in the late 1990s.

### **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 tenth column in Table I gives the mean of the dividend yield plus dividend growth rate variable per country in the 1986-1998 sample period (some countries do not have data for the full period.)

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 eleventh 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 with a country's gross domestic product to obtain a variable that proxies 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, since two of our measures of earnings opacity are being based on the distribution of accruals, they 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 twelfth column in Table 1.

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

#### **IV. 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 a significant variation among countries in these dimensions. It could be argued that these 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 much earnings are opaque in that country.<sup>8</sup> It could be even further argued that it is impossible to control all these factors in cross-sectional tests.

The above are valid criticisms. To mitigate this criticism, all our tests are panel data tests. Our panel data tests are corrected for country fixed-effects, country-specific heteroskedasticity and country-specific autocorrelation. Therefore, though it may be true that institutional factors impact the stock market more than earnings opacity, as long as these country-specific institutional factors remain stable during our period of study, their inclusion has no effect on the coefficient estimates in panel data tests with the above corrections.

## **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.

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 13 and 14 in Table 1), we use an indicator for liberalization and an indicator for insider trading enforcement as our control variables in each case. As discussed before,

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<sup>8</sup> 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.

we also control for GDP growth rates. Note that institutional variables that did not change, or for which we do not have data for changes (e.g., shareholder rights), 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 coefficients 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. As the independent variable is increasing in the level of earnings opacity, this means that an increase in earnings opacity in a country is associated with an increase in the cost of equity in the stock market of that country. The association is also economically significant. An increase in overall earnings opacity from the 25<sup>th</sup> percentile rank to the 75<sup>th</sup> percentile rank is associated with a 3.3% increase in the cost of equity.<sup>9</sup> 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). Liberalization seems not to have an effect.

#### *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 ( $\lambda_{cov}$  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 ( $\lambda_{var}$  is positive), the estimates are statistically significant only

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<sup>9</sup> This is calculated as 0.0014766 (per month) X 12 months X (6.538 (rank of 75<sup>th</sup> percentile) - 4.692 (rank of 25<sup>th</sup> percentile))

at the thirteen 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.

If the earnings opacity variables have no incremental effect on the cost of equity after controlling for risk, then those earnings opacity variables will be orthogonal to the residuals from model (2). We therefore test the null hypothesis that the earnings opacity variables have no effect by regressing the residuals in (2) on the earnings opacity variables.<sup>10</sup>

Using the residuals from (2) as the dependent variable, we run four panel time-series regressions with country-fixed effects. Model 1 uses the “earnings aggressiveness” measure as the independent variable, model 2 uses the “loss avoidance” measure as the independent variable, model 3 uses the “earnings smoothing” measure as the independent variable, whereas model 4 uses the “overall earnings opacity” measure as the independent variable. 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))<sup>11</sup> as well as liquidity risk (Brennan and Subrahmanyam (1996))<sup>12</sup> – and which continuously change in our sample period.

Panel B of Table 5 presents the results from this panel time-series regression. None of the coefficients of the earnings opacity variables are significant, except the coefficient on the loss avoidance

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<sup>10</sup> The reader may be wondering why 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.) The reason is because of convergence problems in the one-step non-linear estimation procedure.

<sup>11</sup> 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 ( $ifx$ ).

<sup>12</sup> 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.

measure, which has the wrong sign.

## **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. Model 1 uses the “earnings aggressiveness” measure as the independent variable, model 2 uses the “loss avoidance” measure as the independent variable, model 3 uses the “earnings smoothing” measure as the independent variable, whereas model 4 uses the “overall earnings opacity” measure as the independent variable. 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 all the earnings opacity measures (models 1 and 3) as well as the coefficient of the overall earnings opacity measure (model 4) are negative and statistically significant at the five percent level. As the independent variable is increasing in the level of earnings opacity, this means that an increase in earnings opacity in a country is associated with a decrease in trading activity in the stock market of that country. A decrease in overall earnings opacity from the 75<sup>th</sup> percentile rank to the 25<sup>th</sup> percentile rank is associated with a 5.0 % increase in annual trade. The coefficients on liberalization and insider trading enforcement have the right sign, and are also statistically significant.

## **V. CONCLUSIONS**

Though earnings opacity has been documented in the past literature, it has not been clear whether shareholders price earnings opacity in equity markets. This paper attempts to shed light on this issue by exploring the link between earnings opacity and equity markets in a broad cross-section of countries. The two characteristics of equity markets that we explore are the return the shareholders demand (cost of equity) and

how much they trade (turnover).

Given the constraints of our data set, which makes it impossible to compare across countries managerial motivations, accounting standards and audit quality, we attempt to measure earnings opacity directly from the financial statements of firms. We use these distributional properties 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.

This is what we find. Overall earnings opacity is declining in the late 1990s. We document in our panel data tests that, after controlling for other influences, an increase in earnings opacity in a country is linked to a decrease in trading in the stock market of that country. The results with respect to the cost of equity of the country are mixed; one test shows a positive linkage, whereas another test shows no linkage.

## 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	80Y-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.

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**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) Dividend Yield +Dividend Growth	(11) Trade	(12) Real % GDP growth (1985-1998)	(13) Insider Trading Enforcement Date	(14) Liberalization date
Australia	-0.0213	-0.04615	-0.82374	539	80	0	Yes	0.1292	0.00935	-3.3862	3.14	1996	Before 01/86
Austria	-0.03727	0.500397	-0.87909	NA	62	0	No	0.0980	0.01547	-3.5173	2.49	No	Before 01/86
Belgium	-0.05467	0.317765	-0.87866	38	68	0	No	0.3282	0.00944	-4.6080	2.21	1994	Before 01/86
Brazil	-0.0068	0.035416	-0.77614	1	NA	1	No	0.0285	NA	NA	2.70	1978	05/91
Canada	-0.03433	0.450318	-0.81781	350	75	0	Yes	0.1446	0.00446	-3.6756	2.54	1976	Before 01/86
Chile	-0.01706	0.6	-0.91368	87	78	NA	No	0.2628	0.00543	-4.9177	6.75	1996	01/92
Denmark	-0.03937	0.267444	-0.91274	106	75	0	No	0.2198	0.01353	-5.0497	2.37	1996	Before 01/86
Finland	-0.03267	0.621092	-0.88223	10	83	0	No	0.1572	0.00785	NA	2.12	1993	Before 01/86
France	-0.03827	0.376352	-0.86549	45	78	1	No	0.2164	0.01187	-4.0970	2.13	1975	Before 01/86
Germany	-0.04138	0.586525	-0.8978	26	67	0	No	0.1671	0.00846	-1.9795	2.96	1995	Before 01/86
Greece	0.01344	0.652206	-0.91468	12	61	NA	No	0.1708	0.01757	-4.0892	2.15	1996	12/87
Hong Kong	-0.01194	0.17013	-0.85786	110	73	0	Yes	0.1455	0.01283	-3.401	5.30	1994	Before 01/86
India	0.001681	0.735644	-0.86787	9	61	1	Yes	0.0301	0.01447	-3.7879	5.73	1998	11/92
Indonesia	-0.00098	0.733766	-0.85613	2	NA	NA	No	-0.0876	0.01152	-4.5513	4.55	1996	09/89
Ireland	-0.024	0.153846	-0.86847	262	81	1	Yes	0.2213	0.01216	NA	5.95	No	Before 01/86
Italy	-0.02733	0.505334	-0.92531	110	66	0	No	0.1339	0.00898	-4.2832	1.93	1996	Before 01/86
Japan	-0.01247	0.642863	-0.92135	10	71	0	No	0.0698	0.00475	-4.2534	2.74	1990	Before 01/86
Korea (South)	-0.0115	0.595265	-0.93793	7	68	0	No	0.0433	-0.00543	-2.9382	7.48	1988	12/88
Malaysia	-0.01226	0.469553	-0.87234	48	79	2	Yes	0.0271	-0.00042	-4.3673	6.50	1996	05/89
Mexico	-0.02058	-0.03333	-0.74486	15	71	1	No	0.1243	0.00042	-3.3118	3.27	No	Before 01/86
Netherlands	-0.04506	0.378023	-0.9172	52	74	1	No	0.3426	0.01126	-2.8995	2.74	1994	Before 01/86
Norway	-0.03786	0.178788	-0.72913	NA	75	1	No	0.0839	0.00845	-3.4892	2.94	1990	02/91
Pakistan	-0.02584	0.616327	-0.91133	2	73	2	Yes	0.0369	NA	NA	4.26	No	07/86
Portugal	-0.06614	0.211112	-0.87479	NA	NA	1	No	0.0822	-0.00791	-5.1253	4.38	No	Before 01/86
Singapore	-0.02534	0.484873	-0.88578	273	79	1	Yes	0.0958	0.00538	-4.0609	6.97	1978	01/92
South Africa	-0.02021	0.307692	-0.88157	35	79	1	No	0.0609	0.00761	-4.2894	1.30	No	Before 01/86
Spain	-0.0379	0.514142	-0.85582	18	72	0	No	0.2321	0.00925	-3.3038	3.18	1998	Before 01/86
Sweden	-0.02256	0.340096	-0.84528	41	83	0	No	0.2242	0.01257	-3.6422	1.49	1990	Before 01/86
Switzerland	-0.03963	0.589985	-0.87921	53	80	1	No	0.2602	0.01252	-3.3903	1.51	1995	Before 01/86
Taiwan	-0.02405	0.691198	-0.85276	17	58	NA	No	0.0950	0.00817	-2.3109	7.26	1989	01/91
Thailand	-0.03953	0.730403	-0.85693	5	66	2	Yes	0.0542	0.00223	-3.3376	5.97	1993	09/87
Turkey	0.127142	0.5	-0.67144	NA	58	1	No	0.0698	0.00244	-3.6251	4.82	1996	08/89
United Kingdom	-0.02924	0.372985	-0.8683	352	85	0	Yes	0.2369	0.01099	-3.1222	2.57	1981	Before 01/86
United States	-0.03833	0.350638	-0.77688	168	76	0	Yes	0.3097	0.00694	-2.7766	2.73	1961	Before 01/86
All Countries	-0.02141	0.38765	-0.86541	93	73			0.1416	0.00789	-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) Data on monthly dividend yield and dividends come from Datastream. We add monthly dividend yield to dividend growth rate to estimate cost of equity. The average of this sum across time per country is given in Column 10. The sample periods used to calculate this are given in Column 7 of the Appendix.
- (11) 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 11.
- (12) 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 12.
- (13) The insider trading enforcement date in Column 13 comes from Bhattacharya and Daouk (2002), Table 1, pages 80-84.
- (14) The official liberalization date, which was obtained from Bekaert and Harvey (2000), is given in Column 14.

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

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

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

<sup>a</sup> 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.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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.

<sup>e</sup> 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.

<sup>f</sup> 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.

<sup>g</sup> The common law data in Column 8 comes from the CIA World Factbook, 2001, <http://www.odci.gov/cia/publications/factbook>.

**TABLE 3**  
**Earnings Opacity Ranking of Countries <sup>a</sup>**

	Earnings aggressiveness <sup>b</sup>	Loss avoidance <sup>c</sup>	Earnings smoothing <sup>d</sup>	Overall earnings opacity <sup>e</sup>
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	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	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

<sup>a</sup> The data used to construct the earnings opacity variables come from Worldscope.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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.

<sup>e</sup> 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)<sup>a</sup>**

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

Dependent variable <sup>b</sup>	Cost of equity			
Independent variables <sup>c</sup>	(1)	(2)	(3)	(4)
Earnings aggressiveness <sup>d</sup>	0.0011 (0.0000)			
Loss avoidance <sup>e</sup>		0.0003 (0.0813)		
Earnings smoothing <sup>f</sup>			0.0004 (0.1262)	
Overall earnings opacity <sup>g</sup>				0.0015 (0.0000)
Liberalization <sup>h</sup>	0.0001 (0.9858)	0.0001 (0.9754)	-0.0001 (0.9828)	0.0001 (0.9821)
Insider trading enforcement <sup>i</sup>	-0.0041 (0.0257)	-0.0044 (0.0174)	-0.0039 (0.0355)	-0.0038 (0.0361)
GDP growth <sup>j</sup>	0.0009 (0.0000)	0.0014 (0.0000)	0.0013 (0.0000)	0.0011 (0.0000)

<sup>a</sup> 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.

<sup>b</sup> The dependent variable "Cost of equity" is constructed as follows. The cost of equity, if backed out from the dividend discount model, is the sum of the expected dividend yield and the expected dividend growth rate. Assuming that both these variables 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.

<sup>c</sup> 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.

<sup>d</sup> 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.

<sup>e</sup> 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.

<sup>f</sup> 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.

<sup>g</sup> 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.

<sup>h</sup> 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.

<sup>i</sup> 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.

<sup>j</sup> 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

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

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

$$\phi_{i,t} \equiv \frac{\exp\left(\alpha_1 \left(\frac{\text{exp } or \text{ts}_{i,t} + \text{imp } or \text{ts}_{i,t}}{\text{gdp}_{i,t}}\right)\right)}{1 + \exp\left(\alpha_1 \left(\frac{\text{exp } or \text{ts}_{i,t} + \text{imp } or \text{ts}_{i,t}}{\text{gdp}_{i,t}}\right)\right)}$$

and  $\lambda_{\text{cov}}$  is the price of the covariance risk with the world, and  $\lambda_{\text{var}}$  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:

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

where

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

Panel A: Some coefficients of the risk-adjustment model, MODEL 1 <sup>a</sup>

Dependent variable <sup>b</sup>	Excess return of country
Some independent variables <sup>c</sup>	
Covariance of the country's equity return with the world equity return multiplied by the measure of the country's integration with the world	$\lambda_{\text{cov}} = 2.1625$ (0.1076)
Variance of the country's equity return multiplied by one minus the measure of the country's integration with the world	$\lambda_{\text{var}} = 2.6432$ (0.1244)

<sup>a</sup> The numbers below are coefficient estimates from the panel regressions described above. p-values are in parentheses.

<sup>b</sup> The dependent variable is the monthly equity return for each country minus the one month 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.

<sup>c</sup> 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  $i^{\text{th}}$  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.

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

where

$\varepsilon_{i,t,j}$  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  $\varepsilon_{ifx,t,j}$  is the innovation in monthly depreciation of the  $i^{\text{th}}$  foreign currency with respect to the dollar at time  $t-j$ ,  $j \in \{0,1,2,3\}$ .

$$MODEL 2: Residual from Model 1, u_{i,t} = \beta_0 + \beta_1 Dimension\ of\ Earnings\ Opacity_{i,t} + \beta_2 Foreign\ Exchange\ Risk_{i,t} + \beta_3 Liquidity\ Risk_{i,t} + \beta_4 Liberalization_{i,t} + \beta_5 Insider\ Trading\ Enforcement_{i,t} + \beta_6 GDP\ Growth_{i,t} + v_{i,t}$$

Panel B: Coefficients of Model 2 <sup>a</sup>

Dependent variable <sup>b</sup>	Residual from Risk Adjustment Model			
	(1)	(2)	(3)	(4)
Independent variables <sup>c</sup>				
Earnings aggressiveness <sup>d</sup>	0.0005 (0.3721)			
Loss avoidance <sup>e</sup>		-0.0011 (0.0136)		
Earnings smoothing <sup>f</sup>			-0.0006 (0.2586)	
Overall earnings opacity <sup>g</sup>				-0.0014 (0.0884)
Foreign exchange risk, $h_{i,ifx,t}$ <sup>h</sup>	7.8360 (0.0001)	7.6014 (0.0001)	7.8278 (0.0001)	7.6883 (0.0001)
Liquidity <sup>i</sup>	0.0031 (0.0220)	0.0031 (0.0220)	0.0028 (0.0425)	0.0027 (0.0452)
Liberalization <sup>j</sup>	-0.0103 (0.0279)	-0.0106 (0.0233)	-0.0101 (0.0310)	-0.0102 (0.0293)
Insider trading enforcement <sup>k</sup>	-0.0046 (0.1077)	-0.0041 (0.1499)	-0.0047 (0.1000)	-0.0044 (0.1261)
GDP growth <sup>l</sup>	0.0002 (0.7220)	0.0005 (0.3034)	0.0005 (0.3188)	0.0007 (0.1820)

<sup>a</sup> 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.

<sup>b</sup> The dependent variable is the residual from Model 1.

<sup>c</sup> 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.

<sup>d</sup> 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.

<sup>e</sup> 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.

<sup>f</sup> 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.

<sup>g</sup> 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.

<sup>h</sup> The control variable "foreign exchange risk" is estimated from the multivariate ARCH model given above.

<sup>i</sup> 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.

<sup>j</sup> 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.

<sup>k</sup> 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.

<sup>l</sup> 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 <sup>a</sup>**

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

Dependent variable <sup>b</sup>	Trade			
Independent variables <sup>c</sup>	(1)	(2)	(3)	(4)
Earnings aggressiveness <sup>d</sup>	-0.0156 (0.0007)			
Loss avoidance <sup>e</sup>		0.0033 (0.3069)		
Earnings smoothing <sup>f</sup>			-0.0294 (0.0000)	
Overall earnings opacity <sup>g</sup>				-0.0270 (0.0000)
Liberalization <sup>h</sup>	0.1935 (0.0000)	0.1897 (0.0000)	0.1840 (0.0000)	0.1836 (0.0000)
Insider trading enforcement <sup>i</sup>	0.4850 (0.0000)	0.4965 (0.0000)	0.4876 (0.0000)	0.4960 (0.0000)
GDP growth <sup>j</sup>	-0.0015 (0.6745)	-0.0072 (0.0227)	-0.0008 (0.8180)	-0.0008 (0.8049)

<sup>a</sup> 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.

<sup>b</sup> 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.

<sup>c</sup> 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.

<sup>d</sup> 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.

<sup>e</sup> 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.

<sup>f</sup> 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.

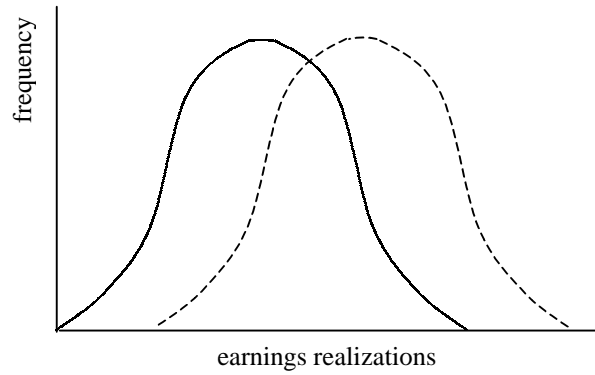
<sup>g</sup> The "overall earnings opacity" time-series variable per country is the average of the "earnings aggressiveness" time-series variable per country, the "loss avoidance" time-series variable per country and the "earnings smoothing" time-series variable per country.

<sup>h</sup> 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.

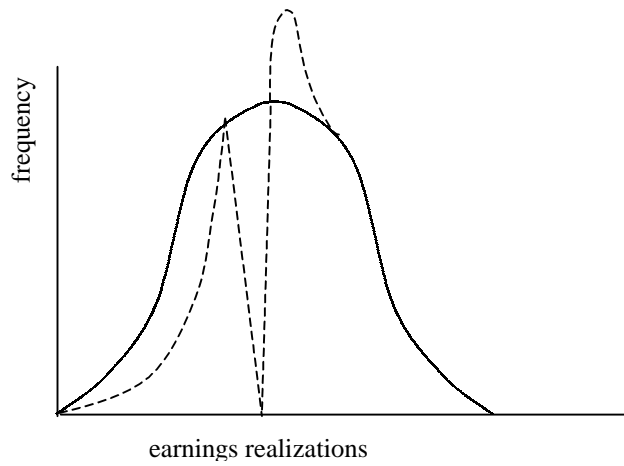
<sup>i</sup> The control variable "insider trading enforcement" is an indicator variable. It changes from 0 to 1 in the year after the first enforcement of insider trading laws. This date was obtained from Bhattacharya and Daouk (2002). These insider trading enforcement dates are given in Table 1.

<sup>j</sup> 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>).

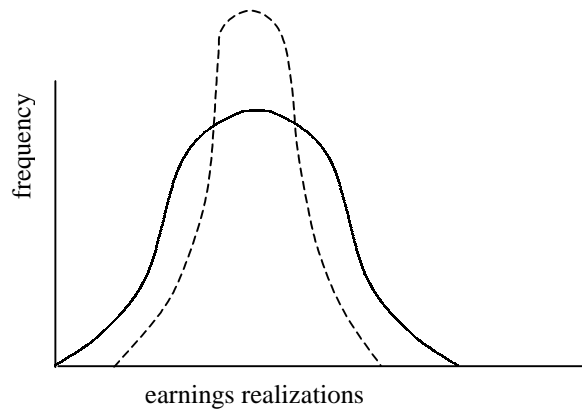
**FIGURE 1**  
**Distributional properties of**  
**accounting earnings vs. economic earnings**



**Earnings Aggressiveness**



**Loss Avoidance**



**Earnings Smoothing**

— Economic earnings  
- - - Accounting earnings

## FIGURE 2

### Time-Series Behavior of Earnings Opacity Variables

