Measurement and Determinants of International Stock Market Efficiency[+]

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Abstract

We propose measures of both public and private information incorporation and investigate the efficiency of 55 individual equity markets using daily and weekly data from 1994 to the present. We examine the distinction between private and public information by studying the reaction of firm returns to earnings announcements and find that the average emerging market exhibits no reaction to earnings announcements. Markets with high levels of investor protection and progressive security laws such as the allowance of short sales exhibit more reaction to earnings events. For public information incorporation, we examine the speed at which public information is incorporated into prices and surprisingly find that many emerging markets are remarkably efficient at incorporating market-wide information. We also examine the R^2 measure of informational efficiency as proposed in Morck, Yeung, and Yu (2000) and find that it is not related to regulatory variables like investor protection, but it is related to transactions costs in a manner inconsistent with information efficiency. Overall, our research supports using new and separate measures of public and private information incorporation.

Informational efficiency refers to the extent to which a market incorporates all available information into prices quickly and correctly. The literature examining information efficiency within the U.S. is large and generally concludes that information is incorporated into markets quickly and reasonably correctly. However, relatively little is known about differences in the degree of efficiency across markets and what legal, institutional, and developmental characteristics are associated with greater efficiency. This paper contributes to the literature by providing a broad examination of information efficiency across 33 emerging and 22 developed markets.

Information can be broadly classified into two types: public and private. Public information is known and understood by all market participants, while private information is known and/or understood by few. Testing for the incorporation of private information is more challenging since such information is typically unobservable. Markets where insiders cannot trade on private information may foster greater incentives for other investors to invest in producing information and, hence, lead to more efficient long-run pricing. Thus we study the incorporation of private information by examining if additional information is contained in prices around earnings announcements or if (possibly due to information leakage) this information is already contained in prices ex ante. To examine efficiency with respect to public information, we analyze the ability of a market to incorporate the most basic form of public information in prices—information contained in the market index. We calculate measures of market efficiency for 55 international markets and study the relation between these measures of efficiency with each other, with market frictions, and with cross-country regulatory and market quality proxies.

To study private informational efficiency, we use the approach pioneered by Bhattacharya, Daouk, Jorgenson, and Kehr (2000) in a case study of Mexico, but we apply it to a wide variety of markets. This approach is used by Bailey, Karolyi, and Salva (2005) to study the change in a firm's information environment before and after cross-listing in an array of markets. DeFond, Hung, and

Trezevant (2005) study the informativeness of earnings announcements in 26 countries. Due to differences in methodologies, focus, and our larger sample of earnings announcements from 49 markets, our approach leads to different conclusions regarding the facets facilitating the separation of public and private information. We find that most developed markets experience much higher return variation around earnings announcements, while the typical emerging market sees no abnormal return moves around earnings announcements. The exception is a handful of emerging markets (China, Hong Kong, India, Malaysia, and Singapore). Our cross-country analysis indicates that earnings announcements are more informative in markets with good investor protection, that allow short-selling, and where analysts are able to more accurately forecast earnings.

It is not completely obvious how to interpret the lack of price responses around earnings announcements. Assuming the lack of response is because the information was already impounded in stock prices, it is unclear whether this pre-announcement information leakage results in prices that are overall more or less efficient. Leland (1992) argues that private information leakage improves the efficiency of prices and induces a welfare improvement. On the other hand, Fishman and Hagerty (1992) and Brunnermeier (2005), among others, argue that insider trading crowds out outside informed trading because it lowers the profitability of information gathering by outside investors and results in less efficient prices in the long run.

To measure the public aspect of information efficiency, we examine the fraction of variation in returns explained by past weekly market returns as compared to the variation explained solely by contemporaneous market returns. This is similar to the delay measure used by Hou and Moskowitz (2005). The measure relies on the basic principles of market efficiency. A security price that is slow to incorporate simple information, such as that contained in the market index movements, is less efficient than a security price which rapidly incorporates publicly available information. Hou and Moskowitz (2005) use delay to measure efficiency in stocks within the U.S. and then focus on the premium to bearing stocks with high delay. In contrast, our approach in this international study is to propose and evaluate delay as a measure of public informational efficiency rather than focusing on delay as a source of undiversifiable risk. Surprisingly, we find that the typical emerging market has less information delay than developed markets.

Our paper is not the first to study informational efficiency across markets. In a thorough and original study, Morck, Yeung, and Yu (2000), proposes the average market model R^2 across firms as a measure of how much firm-specific information production occurs. We also examine R^2 and its relation to the two previously discussed measures of efficiency. We find several results that contrast with earlier work. First, within country [as the measure has been applied in the U.S. by Durnev, Morck, Yeung, and Zarowin (2003) and Durnev, Morck, and Yeung (2004)], smaller stocks have much lower R^2s on average (Roll (1988)). Under the interpretation of low R^2 as a proxy for higher informational efficiency, this evidence conflicts with a multitude of other evidence showing that less information is available for small stocks [Atiase (1985), Arbel and Strebel (1982), and Collins, Kothari, Rayburn (1987), among others]. Second, the measure is negatively related to transactions costs both within and across countries, which is also inconsistent with a low R^2 proxying for higher market efficiency. Third, the Morck, Yeung, and Yu (2000) interpretation of the R^2 as related to investor protection does not hold up over our longer and more recent 1994 to 2005 sample period. Indeed, investor protection is never significant in either simple or multiple specifications. Instead, cross-country regression evidence indicates that the strongest determinants of a high R^2 (informationally inefficient) market are low transactions costs, high levels of market volatility, and markets with high analyst forecasts errors. Overall, it is not clear what the Morck, Yeung, and Yu R^2 is proxying for.[1]

[1] Our conclusions are consistent with Kelly (2006) who examines the relation between R^2 and various proxies for information production across firms within the U.S.

Our findings indicate that measuring market efficiency is a complex task and that measures of public and private information incorporation may provide different assessments about the efficiency of an equity market. Security laws and investor protection help foster a market where inside information is kept private, but these same factors have little to do with the ability of a market to efficiently incorporate publicly available information into prices. For this aspect, low transactions costs are crucial.

The paper outline is as follows. Section II describes our sample size and the construction of our efficiency and transactions costs measures. Section III displays empirical estimates of our efficiency measures: delay, abnormal earnings returns, and market-model R^2; and examines simple correlations both within and across countries, among these measures as well as transactions costs. Section IV examines multiple regressions of the efficiency measures on cross-country variables that help to disentangle the economic meaning of the efficiency measures. Section V concludes.

II. Data and Methodology

A. Data

We collect market data from 1994 through 2005 for 33 emerging markets and 22 developed markets. Countries are classified as developed/emerging based on World Bank income classifications near the end of our period (as of November 2005). Daily price, return, volume, and market capitalization are from CRSP for the United States and from Thomson Datastream for the rest of the world. Daily and weekly Wednesday-to-Wednesday returns are adjusted for dividends and stock splits from Datastream. Assets representing preferred stock, warrants, unit or investment trusts, ADRs, duplicates, or cross-listings are excluded from the sample. With Datastream data this requires an extensive screening process described in detail in the appendix.

Because we are not confident in Datastream volume data, we use changes in price as a proxy for trading activity, although in some cases we use volume as an additional screen. We require evidence of trading activity on at least 30% of the days when the market is open to mitigate the appearance of market inefficiency solely as a function of infrequent trading.[2]

Impediments to information incorporation may plausibly be associated with size. Small firms are more likely to be neglected and have higher trading costs. To avoid results that are driven by market capitalization differences across countries, we sort all stocks that pass the above criteria into five equally weighted size portfolios based on US-dollar break points.

In June of each year, all US common equity are sorted into five portfolios with the same number of securities. Using end of June exchange rates from Datastream, we convert each asset's market capitalization into US dollars and use these breakpoints when forming the quintile portfolios within each country. The portfolios are held for one year from July to June and rebalanced at the end of June. To be included in our analysis a portfolio must have five or more companies with June market capitalization that also pass the criteria listed above. Market returns are computed from Datastream total return indices.[3] The individual stock returns are in local currency, as is the local market return. For our event study, we collect earnings reporting dates from IBES as a proxy for earnings announcement dates.

Table I presents the average number of firms in each portfolio at the end of each June, the number of the eleven years for which we have returns for that portfolio, and the total June-end market capitalization for the portfolio expressed in US dollars both for developed (Panel A) and emerging (Panel B) portfolios. Both in terms of the average number of firms in each portfolio as

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[2] If a stock were to trade only once per month, then lagged weekly returns ought to be related to the current stock return as they contain information about the change in the fundamental value of the asset during the period it did not trade. If this were the case, delay would not be an indicator of information efficiency, but merely a sign of illiquidity.
[3] In the six markets where Datastream indices are not available, we compute our own value-weighted index.

well as the number of years with representation, most markets have broad coverage with the exception of some smaller emerging markets and Portugal. The average market capitalization for each portfolio is fairly homogenous across countries for each size group indicating that the simple size groupings are effective at controlling for size differences in firms across countries. It is also somewhat surprising that many emerging markets have reasonable coverage in the large cap group.

B. Methodology

We use several methods to explore market efficiency. As a measure of private information incorporation we use differences in the level of abnormal volatility around earnings announcements using a methodology proposed by Bhattacharya, Daouk, Jorgenson, and Kehr (2000). To examine the incorporation of public information, we use levels and differences of the Hou and Moskowitz (2005) delay measure. To measure trading cost across portfolios and across countries, we use trading cost estimates at the firm level using methodologies from Hasbrouck (2005) and Lesmond, Ogden, and Trzinka (1999).

B.1. Abnormal Event Volatility

Following Bhattacharya, Daouk, Jorgenson and Kehr (2000), we use a test of abnormal volatility to detect the extent to which private information is incorporated in stocks' prices prior to the earnings announcement date. Absence of an event day movement in the absolute return suggests that either the information contained in the announcement is already impounded in the stock's price or that there was no value relevant information.

Whether or not private information leakage improves the overall level of market efficiency is a question of some debate. Private information leakage increases the informativeness of prices in the short-run. However, Easley and O'Hara (2004) point out that greater private-information based trading reduces the level of liquidity trading and causes the market maker to set wider bid-ask spreads to compensate for the risk of trading against the informed. Brunnermeier (2005) argues that increased insider trading reduces the profitability of information gathering and leads to less trading by outsiders and less informative prices in the long-run.

To gauge the economic magnitude of the event day returns, we simply calculate the difference between the average absolute returns during the announcement window (-1 to +2) and the average absolute non-event day return during the testing window (-55 to -2 and +3 to +10). To assess significance, we use a non-parametric rank-deviation test for differences in abnormal absolute returns first proposed by Corrado (1989) and as implemented by Bhattacharya, el al (2000). For each event, we sort and rank the absolute market model excess return over the -55 to +10 testing window from lowest to highest. We choose to extend the testing window no longer than 55 days prior to the event in order to avoid including other earnings announcements in the event window. The mean rank deviation is a measure of how much higher in order (not magnitude) volatility is. It is calculated over the -1 to +2 event window as:

$$\mu(k) = \frac{1}{N}\sum_{i=1}^{N}\left(\sum_{t=-1}^{2}(K_{i,t} - 33.5\right) \qquad (1)$$

Where K is the rank of the absolute excess return for event i on day t and N is the number of events in the sample. 33.5 is the mean rank for our 66 day testing window. The standard deviation of the mean rank deviation is:

$$\sigma(K) = \sqrt{\frac{4}{66}\sum_{t=-55}^{+10}\left(\frac{1}{N}\sum_{i=1}^{N}(K_{i,t} - 33.5\right)}. \qquad (2)$$

The test statistic for the test that volatility is significantly different from normal is:

$$t = \frac{\mu(K)}{\sigma(K)}. \qquad (3)$$

Similar to the requirements in Bhattacharya, et al (2000), an event must have at least 30 trading days during the 66 day testing window to be included.[4]

B.2. Delay

The second measure we use to explore market efficiency is Hou and Moskowitz (2005) delay, which measures the sensitivity of current stock returns to 4 weeks of lagged market returns. We use the local market index because Griffin (2002) shows that individual stocks are much more responsive to local market factors than to global factors. To ensure that the delay measure is not purely a function of infrequent trading, only stocks trading on at least 30% of the trading days in each year are included in our analysis. Like Hou and Moskowitz (2005), we find that delay on individual firms is extremely noisy, but the formation of portfolios substantially reduces the estimation error with delay. We form five equal-weighted size portfolios within each country.

For each country/size portfolio, we estimate the restricted and the unrestricted models below over the entire July 1994 to June 2005 sample period[5]. The unrestricted model is:

$$r_{i,t} = \hat{\alpha}_i + \hat{\beta}_{0i} r_{m,t} + \hat{\beta}_{1i} r_{m,t-1} + \hat{\beta}_{2i} r_{m,t-2} + \hat{\beta}_{3i} r_{m,t-3} + \hat{\beta}_{4i} r_{m,t-4} + \varepsilon_{i,t}\,. \quad (4)$$

The restricted model constraints the coefficients on the lagged market returns to zero.

$$r_{i,t} = \hat{\alpha}_i + \hat{\beta}_{0i} r_{m,t} + \varepsilon_{i,t}\,. \quad (5)$$

The R^2s from these regressions are used to calculate delay as follows:

$$Delay = Adj.R^2_{unrestricted} - Adj.R^2_{restricted}\,. \quad (6)$$

[4] A daily return is considered missing or inactive if it has no price change and also no volume. We also require an event of have trading on at least 15 of the 20 days from -9 to +10, similar to the procedure used by Brown and Warner (1985). We treat missing returns in the testing window as low absolute return days. This has the possible effect of overstating event day volatility. However, this overstatement should be more severe in portfolios with a large fraction of missing returns, such as occurs in emerging markets. However, emerging markets are typically characterized by low absolute returns.

[5] On the other hand, calculating delay at the firm level and then averaging across portfolios does not solve problems with estimation error but merely aggregates the errors.

Delay is simply the incremental explanatory power due to lagged factors. To control for explanatory power simply due to increased regressors, adjusted R^2 are used. Delay is a measure of weak form efficiency similar in spirit to the variance ratio test.

Our measure of delay is slightly different from the measure calculated in Hou and Moskowitz. Their measure is:

$$Delay = 1 - \frac{R^2_{restricted}}{R^2_{unrestricted}}. \tag{7}$$

Using this measure a market could have high delay but if it is scaled by a large adjusted R^2, (as it may happen in some emerging markets), then the size of the delay is reduced. Nevertheless, we find that our inferences are similar if using the scaled Hou and Moskowitz measure.

To avoid spurious overstatement of delay for mechanical reasons, we de-mean (or de-bias) our delay measure by subtracting a bootstrapped version of the same measure. This bootstrapped adjustment factor should have no lagged explanatory power because through random sampling, the bootstrap destroys any existing autocorrelative structure. Therefore, the adjusted delay measure should reflect delay solely as a function of sensitivity to past returns, and not measure error.

B.3. Trading Costs

Inefficient incorporation of information may be a function of impediments to trading. For instance, bid-ask spreads, trading commissions, and lack of liquidity undermine the ability of arbitrageurs to exploit deviations from efficient pricing. Unfortunately, intraday transaction costs measures are not available for a broad number of countries. Hence, we use two different estimates of transactions costs that are derived from daily data and capture slightly different aspects of the costs involved in trade.

The first measure is based on the Roll (1984) model and developed by Hasbrouck (2003 and 2005). This measure is designed to proxy for the log effective spread,[6] defined for a trade at time t as:

$$c = \begin{cases} p_t - m_t, \; for \; a \, buy \; order \\ m_t - p_t, \; for \; a \, sell \; order \end{cases} \tag{8}$$

where m_t is the (log) efficient price and p_t is the (log) observed price. To estimate c we use the following variant of the Roll model:

$$\begin{aligned} m_t &= m_{t-1} + u_t \\ p_t &= m_t + cq_t \end{aligned} \tag{9}$$

where q_t is the trade direction indicator, with +1 indicating a purchase and –1 indicating a sale and u_t is a Gaussian i.i.d. error term. Therefore, depending on q_t, the log transaction price is either at the bid or ask. Because intra-daily signed order flow, transaction prices and quotes are unavailable, the unobserved efficient price and the trade directions need to be treated as latent and estimated from the daily series of prices. This is the primary motivation for us to rely on the Bayesian approach proposed by Hasbrouck (2003 and 2005). In this approach the latent variables are treated as parameters and estimated using the Gibbs sampler. We use daily prices for international stocks and closely follow the implementation by Hasbrouck (2005). Hasbrouck (2005) shows that in the United States, despite possible model misspecifications in the simple framework above, the Bayesian estimate of the log effective spread has a .94 correlation with the log effective spread calculated using microstructure data. This strong association with actual trading costs further motivates the use of the Bayesian measure in our study.

The second trading cost measure developed by Lesmond, Ogden, and Trzcinka (1999) [LOT] infers the cost of trade from the occurrence of zero returns. The LOT measure is advantageous in that it captures not only direct costs of trade such as the bid-ask spread and commissions, but it also

[6] The effective spread is arguably a better measure of the cost to trade than the quoted spread because it allows for price improvement within the spread.

implicitly includes trading costs associated with price impact and opportunity costs. A firm return of zero either means that there has been no change in the fundamental value of the firm or that the change in the value of the firm is not sufficient to overcome the costs associated with trade. Given that the value of the firm co-moves with the market, the probability of a firm return being non-zero increases with rebalancing and information effects due to large absolute market returns. The LOT measure implicitly calculates the size of the transactions costs by estimating the difference between what the price would have moved to in the presence of no transactions costs as compared to the zero price moved that occurred in the presence of transactions costs. A limited dependent model is estimated by maximizing a likelihood function maximized for each firm, each year where the details are provided in Lesmond, Ogden, and Trzcinka (1999).[7] Lesmond, Ogden, and Trzcinka show that their estimates have a cross-sectional correlation of 0.85 with realized spread plus commission estimates within NYSE/AMEX stocks.

III. Measures of Efficiency

In this section we empirically examine three measures of informational efficiency for five size portfolios in each developed and emerging market. The first measure of efficiency, the abnormal return around earnings announcements, proxies for the magnitude of private versus public information delay. The second measure, delay, is meant to capture lagged responses to public information. We also report the overall measure of informational efficiency used by Morck, Yeung, and Yu (2000).

A. Earnings Responses

[7] The LOT measure is estimated through the use of an iterative non-linear estimation procedure in SAS. The procedure requires starting values for each of the estimated parameters, α_{Ni}, α_{Pi}, β_i, and σ_i. We use -.01, .01, 1 and .1 respectively. If the procedure fails to converge, we change the starting values to -.1, .1, 1 and .1 and re-estimate. All estimations converge using this procedure.

First, we examine the volatility of returns around earnings announcements. Figure 1 reports the average absolute value of the event day abnormal return as compared to the average absolute non-event period market-adjusted return. Cross-firm averages are reported for firms in each size quintile. Since returns are in absolute value a positive number indicates that returns are more responsive around the earnings announcement. Significant bars are stripped where significance is determined with the Corrado test as discussed above. Panel A is for developed markets and Panel B is for emerging markets.

Earnings responsiveness varies drastically across markets and developed markets generally exhibit much larger earnings response than emerging markets. First, there are only a few developed markets that have economically small and statistically insignificant responses to earnings (Austria, Portugal, South Korea, and Spain).[8] Second, even within developed markets responses vary widely with some U.S. and U.K. portfolios experiencing abnormal daily absolute returns close to one percent more than non-event days, whereas the magnitude is much lower in smaller developed markets. Third, within most developed markets earnings announcements seem to be more informative for small firms. In contrast, there are a few emerging markets that have economically large and/or statistically significant positive abnormal returns around earnings announcements. Namely, only in China, Hong Kong, India, Malaysia, and Singapore do we see reliably positive excess return responses in two or more portfolios. It is interesting that except for Hong Kong and India the other countries are arguably Asian dictatorships. Hungary, Indonesia, Lithuania, the Philippines, Romania, and Sri Lanka all have one portfolio with significant reactions around the announcement but the other portfolios are insignificant and the differences are economically quite small. The other 17 emerging markets have no portfolio with significant reactions around earnings

[8] Some markets like Ireland exhibit large earnings responses in the smaller cap portfolios but low significance likely due to a low number of earnings events.

announcements. This lack of response to earning announcements in emerging markets parallels the findings of Bhattacharya, et al (2000) for Mexico.

B. Delay

As described above, delay is calculated for size portfolios over the July, 1994 to June, 2005 period. Figure 2 displays the magnitude of delay for each of the five size portfolios within each of the 55 countries. Stripped bars represent significant delay coefficients and solid bars are insignificant. Although five or more stocks are required to form delay portfolios, it is important to note that significance may be less in some emerging markets due to the smaller number of stocks leading to more volatile portfolios. Panel A shows delay for developed markets and Panel B is for emerging markets. Figure 2 displays several interesting findings. First, delay is universally low in large cap stocks. Second, within most countries, delay is generally decreasing in firm size. In almost all markets delay for the largest two portfolios is extremely small. However, delay for most small cap portfolios is much larger. In countries where delay is not monotonically increasing in firm size there are typically fewer stocks in the portfolios and the differences between portfolios may reflect noise in delay. This first finding is perhaps not surprising in that one expects large cap stocks to be more efficient than small cap stocks and Hou and Moskowitz find more delay among small cap stocks in the U.S.

Second, delay estimates fluctuate widely across countries. Third, countries with high delay for the smallest cap portfolio typically have higher delay for the quintile two or three portfolio as well, indicating that delay contains a country-specific component. Fourth, delay is generally larger in developed markets. In comparing size quintiles, emerging markets have significantly less delay in all but the largest size quintile. In terms of their ability to incorporate market information into prices, the average emerging market is every bit as effective as the developed markets.[9]

C. Average R^2

To examine R^2, as a measure of efficiency, we estimate market model regressions like those in Morck, Yeung, and Yu (2000) on individual securities and then aggregate the R^2 for different portfolios. Figure 3 displays the average R^2s for each quintile portfolio for developed markets in Panel A and emerging markets in Panel B. We first observe that like Morck, Yeung, and Yu, R^2s are generally larger for emerging markets. Second, a consistent pattern that emerges is that within each country R^2s are nearly monotonically decreasing with firm size. Morck, Yeung, and Yu conclude that high R^2 firms are less informationally efficient, yet it seems counterintuitive that large cap firms are less informationally efficient than small cap firms. Third, a rough inspection of the level of the R^2 across markets appears to yield quite different inferences than examining delay or earnings responses. For example, China has quite high adjusted R^2s which Morck et al (2000) argue indicates inefficiency, but low delay (indicating more efficiency), and significant earnings responses (possibly indicating more long-run efficiency).

D. Comparing Measures

We now turn to comparing the measures of efficiency both within and across countries. Transactions costs are a barrier to efficient incorporation of information. Additionally, holding constant other features of spreads, securities with rampant insider trading must have higher transactions costs to compensate the market maker for adverse selection risk. While low transactions costs may not be sufficient to guarantee informationally efficient pricing, investors facing low

[9] In unreported results we also calculate the delay with respect to a global market portfolio that is beyond the delay to local market factors. Global market delay varies widely across countries, generally decreasing with firm size, and much smaller than local market delay. Given the smaller magnitudes of global market delay and how these magnitudes are likely influenced by a countries' foreign sales activity or foreign listings, we choose to focus on the cleaner domestic delay measures but see global delay as an interesting area for further investigation.

transactions costs can more readily (profitably) trade on incremental information, thereby increasing efficiency.

We examine correlations between delay, excess absolute return moves (as compared to non-event times), and R^2. We also correlate these measures to both the Hasbrouck (2005) and Lesmond, Ogden, and Trzcinka (1999) trading costs measures. To compare within countries we take the time-series average value of each variable within each country for each portfolio and then calculate a Spearman rank correlation across the five portfolios within each country. We then average the correlation estimates across countries and report the values in the upper diagonal of the correlation matrix in Table II. We also compute cross-country correlations. To do so we take the average delay and abnormal earnings return across the five portfolios within each country to obtain a country average delay, abnormal earnings return, or transactions costs and then we compute cross-country correlations using those numbers.[10]

Our comparison of the three measures of efficiency leads us to three interesting findings. First, delay and R^2 are strongly inversely related; an association that is somewhat weaker across countries than within. R^2 has a correlation of -0.81 with delay within country, and correlation of -0.51 across countries. This finding is notable, because it suggests that delay and R^2 may actually work in opposite directions in measuring efficiency. Second, within each country, the upper diagonal elements of Table II show that delay has an average correlation of 0.09 with abnormal absolute earning announcement returns and this correlation is 0.35 across countries. This tells us that delay, a measure of public informational efficiency, is not associated with the presence of information leakage. Third, R^2 has a correlation of -0.12 with abnormal absolute earnings announcement returns within country, and a correlation of -0.36 across countries. Although the evidence within countries is

[10] To be consistent with Morck, Yeung, and Yu (2000), we compute our average R^2 by averaging across all stocks each year and not taking the average across five size groups. However, using average R^2s that are calculated as the average across five size groups yields extremely similar inferences.

weak, across countries it seems to be the case that markets with restrictions on trading based on private information have a lower R^2. If abnormal volatility surrounding earnings announcements is indeed indicative of more accurate incorporation of private information in the long-run, then these findings are consistent with the Morck, Yeung, and Yu (2000) interpretation of low R^2 as a measure for private information incorporation.

We also examine the relation between trading costs and our measures of efficiency. Delay is strongly positively associated with trading costs within countries and weakly positively associated across countries. This relation is consistent with more efficient incorporation of information into prices of securities with low transactions costs. Abnormal event returns exhibit weak relations to transactions costs indicating that private information trading is not the main driver of trading costs. Conversely, R^2 is negatively associated with both trading costs measures across and especially within countries. High R^2 is associated greater efficiency not less.

There is mixed and weak evidence on the relation between abnormal announcement returns and transactions costs. Taken together, the positive relation of transactions costs with delay and the negative relation with R^2 suggestive that delay works much better than R^2 as a measure of efficiency. The weak relations between delay and earnings responses suggest that private information trading is generally not associated with efficiency with respect to public information. We now turn to an analysis of the economic drivers behind the various measures of efficiency.

IV. The Determinants of Efficiency Measures

A. Cross-Country Data

There are a multitude of cross-country variables that may be related to our measures of stock market efficiency. While many international papers focus on a narrow set of cross-country variables, we follow Griffin, Nardari, and Stulz (2006) and use a broad set of variables that have been shown to have *a priori* appeal for various facets of stock market activity. These variables can be roughly grouped into regulatory, economic/financial development, informational environment, economic risk, and properties of market returns. Variables are constructed at the annual frequency from 1994 to 2005 when possible, but when taken from other papers are limited to the sample period therein. Possible interpretations of most of these variables are discussed in Griffin, Nardari, and Stulz, but we also discuss interpretations of the relevant variables below. We examine whether efficiency is associated with these country-level characteristics first with correlation analysis, then through multiple regression analysis.

A. Simple Relations

For each country and year, we construct average delay by taking the equal-weighted average delay across five portfolios and then the average across time. We also compute this average delay across the bottom two size portfolios. Pearson correlations between these variables and twenty cross-country time averaged variables are reported in the first and second column of Table III. The abnormal absolute return around earnings announcements in excess of the average non-event absolute return is the variable in the third column and the average R^2 for a country (computed following Morck, Yeung, and Yu (2000) and not at the portfolio level) is reported in the fourth column. Spearman correlation coefficients and p-values are also reported.

Table III shows that for both delay averaged across all five portfolios and for delay across the bottom two portfolios, there are a few cross-country variables that are significantly related to them. Market volatility is strongly negatively related to delay, and there is some evidence that short-sale restrictions may be positively related to delay.

Regulatory, development, informational accounting variables, and market return variables are all related to the measure of abnormal volatility around earnings announcements. R^2 is significantly related to trading-volume-to-GDP, turnover, forecast errors, forecast dispersion, market volatility, and momentum. We need to examine specifications with multiple variables to disentangle the role of competing cross-sectional variables.

B. Multiple Regressions

We now turn to examining abnormal event returns, cross-country determinants of delay, and the Morck, Yeung, and Yu R^2. Table V presents the results from regressing the average absolute abnormal return on various combinations of most of the variables from Table III.[11] We compute GMM heteroskedasticity consistent standard errors.

There is reliable evidence that short sales, investor protection (except in one specification), and analysts forecast errors are significantly related to excess return movement around earnings announcements. In unreported analysis we also estimate a host of other cross-sectional regressions that confirm these predictions. The positive coefficients on the short sale variable means that countries that both allow and experience short-sale activity exhibit more stock price movements around earnings announcements. While there are clearly direct relations between short-sales and price informativeness, we believe that the short sales variable is likely proxying for a correctly functioning stock market. Markets that allow for short selling activity are also more likely to prohibit investors from trading on private information. The insider trading variable of Bhattacharya and Daouk (2002) captures whether a market has and enforces insider trading laws. In unreported specifications we find that the variable is significant in one-variable regressions but rendered insignificant in two-variable regressions either by including the short-sales variable or by investor protection, indicating that short-sales and investor protection sufficiently capture the effect of a good regulatory environment. The positive coefficient on investor protection in most of the specifications indicates that good governance is associated with more informative earnings

[11] For ease of presentation, several of the variables from Table III that were generally unimportant are excluded. However, we also estimated regressions with all of the excluded variables in various multivariate specifications where they rendered insignificant coefficients.

announcements. The negative coefficient on forecast error indicates that announcements are more informative in countries where analysts provide more accurate earnings estimates. One interpretation is that if analysts' forecasts are extremely noisy, then earnings announcements are so noisy that investors pay little attention to them. With a smaller set of 26 markets, DeFond, Hung, and Trezevant (2005) perform a similar cross-sectional analysis and find that insider trading laws are positively related to reactions around earnings announcements. Overall, we find that the regulatory environment is extremely important for a distinction between private and public information.

Table V shows the cross-sectional relation between delay and the same variables displayed in Table IV. Out of the sixteen cross-country variables, there is evidence in some specifications that short-sales, insider trading, and investor protection, are often significant. However, the relations are positive suggesting that the allowance and practice of short-sales, the protection of insider trading, and good governance lead to more, not less delay.

Table VI uses the average delay for the smallest two portfolios as the regressand and estimates similar cross-sectional regressions. Because delay is for the smallest two quintile portfolios, we include the average transactions costs for the bottom two portfolios. Inferences are similar to Panel A, more developed markets with better security laws have more variation explained by lagged market returns.

We now turn our attention to examining the relation between the Morck, Yeung, and Yu R^2 with the cross-country variables. Table VII shows that analysts forecast error, trading costs, and especially market volatility are highly associated with a countries' average market model R^2. Market volatility drastically increases the explanatory power of the regressions. The positive coefficient on market volatility indicates that markets that fluctuate more have a stronger proportion of variation explained by market forces. The positive coefficient on forecast error indicates that in countries where analysts' forecasts are poor predictors of earnings markets exhibit high R^2. The negative coefficient on the trading costs measures is inconsistent with the interpretation of R^2 as a proxy for informational efficiency, since markets should incorporate information better with lower transactions costs. Morck, Yeung, and Yu (2000) find strong evidence from their cross-sectional regressions that good governance is significant in 1993, 1994, and 1995. Over our 1994 to 2005 period however, the regression evidence confirms the univariate relations in Table III showing that R^2 is not related to investor protection or other regulatory variables. In unreported specifications we replicate Morck's finding in their sample period but not with R^2 over an extended period and we also find insignificant relations with five other governance variables. Overall, our regression evidence finds that the Morck, Yeung, and Yu (2000) R^2 is driven mainly by the volatility of the market and inversely related to other efficiency proxies such as transactions costs.

V. Conclusion

This paper examines pricing efficiency with respect to public and private information. To proxy for the leakage in private information, we examine absolute abnormal return movements around earnings announcements. Return volatility around earnings announcements varies dramatically across countries, with the average emerging market exhibiting no responsiveness to earnings announcements. In cross-country analyses we find that the regulatory climate such as the allowance of short-sales and good investor protection is strongly associated with informative earnings announcements. We find almost no correlation between the response to earnings announcements and delay, indicating that private information leakage is not broadly associated with the incorporation of public information. We find that delay, our measure of public information incorporation, indicates that the average emerging market is somewhat better than a developed markets at incorporating market-wide information into prices. Our cross-sectional regression analysis yields puzzling results that markets with poor security laws actually have more variation explained by lagged market returns.

We also examine the commonly used market model R^2 as a measure of informational efficiency and find that it is largely driven by the volatility of a market. Additionally, a country's average R^2 is unrelated to the regulatory variables previously emphasized and related to transactions costs in a manner suggesting that a low R^2 proxies for an inefficient (not efficient) market.

Measuring informational efficiency is a complex task but one worth addressing given that the information environment is crucial for a stock market to efficiently allocate capital. Our findings suggest that, in terms of incorporating public information, many emerging markets are more efficient than some developed markets and, hence, point to benefits of local stock markets not previously recognized. Our findings strongly point to the use of separate measures of efficiency for public and private information. A policy implication is that governance and security laws are effective in fostering a more efficient transmission of private information but not useful for the ability of prices to incorporate public information.

Capturing the efficiency of a stock market is useful for many important questions not examined here such as whether stock market efficiency fosters economic development. We hope our examination of stock market efficiency will spawn future research exploring the importance of these efficiency measures for a variety of economic and financial issues.

Appendix

In this appendix we describe the data collection and filtering procedures used to collect and develop the dataset of 22 developed markets and 33 emerging.

A.1 United States

Daily data for the United States are collected from CRSP. We restrict our analysis to common equity,by selecting only stocks with SHRCD=10 or 11. Delisting returns are used when necessary and when available through CRSP. Following Shumway (1997), if a firm delists for performance related reasons, we set the delisting return to -30%.

A.2 Rest of World

Daily data for all countries except the US are collected from Thomson Datastream International. We restrict our analysis to domestic common equity. We first collected lists of both active and inactive assets and collect the cross-section of assets. We eliminate stocks which are cross-listed; that is where their "home country" is different from that of the market list used to pull the asset data.

The particular challenge when using Datastream data is that there is no consistent way to restrict the sample to common equity only. Ince and Porter (2004, forthcoming in *Journal of Financial Research*) is a useful reference. Additional criteria are as follows. We eliminate assets which:

1) Datastream codes as non-equity
2) Are duplicates or have the following words in the name field:
   - DUPLICATE, DUPL, DUP, DUPE, 1000DUP
3) Have an industry code that indicates the asset is non-common equity:

ITSPL	73	SPLIT CAPITAL INV.TST
ITVNT	76	INV.TST.VENTURE + DEV
INVNK	77	INVESTMENT COS.(6)
ITGSP	88	INV.TST.GEOG.SPECLSTS
IVTUK	89	INVESTMENT TRUST UK
	96	INVESTMENT TRUST - OLD
ITINT	109	INV.TST INTERNATIONAL
UNITS	110	AUTH. UNIT TRUSTS

RLDEV	112	REAL ESTATE DEV.
CURFD	121	CURRENCY FUNDS
INVCO	124	INVESTMENT COS. (UK)
INSPF	125	INS.+ PROPERTY FUNDS
OFFSH	136	OFFSHORE FUNDS
INVTO	137	OTHER INV. TRUSTS
ITEMG	145	INV.TST.EMERGING MKTS
OEINC	148	OPEN ENDED INV. COS.
ITVCT	149	VENTURE CAPITAL TRUST
	154	REAL ESTATE
EXTRF	159	EXCHANGE TRADED FUNDS

The name field of each asset is searched in order to identify non-common equity. We eliminate assets with the following words in the name field:

1) ADR or GDR
2) Preferred stock: PREFERRED, PF, PFD, PREF, and 'PF'
3) Warrants: WARRANT, WARRANTS, WTS, WTS2, WARRT
4) Debt securities: DEBENTURE, DEBT
5) Investment trusts, real estate trusts, and limited partnerships: INV TST, RLST IT, UNT TST, INVESTMENT TRUST, UNIT TRUST, and L P
6) Following Ince and Porter (2004) we use the following codes to eliminate mutual funds, index funds, and partnerships: UT IT. .IT 500 BOND DEFER DEP DEPY ELKS ETF FUND FD IDX INDEX LP MIPS MITS MITT MPS NIKKEI NOTE PERQS PINES PRTF PTNS PTSHP QUIBS QUIDS RATE RCPTS RECEIPTS REIT RETUR SCORE SPDR STRYPES TOPRS UNIT UNT UTS WTS XXXXX YIELD YLD
7) EXPIRED, EXPIRY and EXPY

In addition we have a number of country specific filters. We only list a country if country specific filters were applied.

1) Brazil:
    a. Preferred Shares (Ação Preferencial): PN, PNA, PNB, PNC, PNC, PNE, PNF, PNG, PNDEAD, PNADEAD, PNBDEAD, PNCDEAD, PNDDEAD, PNEDEAD, PNFDEAD, PNGDEAD
    b. Selected Share Portfolio receipts: RCSA
    c. Other Portfolio Receipts: RCTB
2) Columbia: preferred class: PFCL
3) China: we restrict the analysis to A shares only (tradable by domestic investors)
4) Sri Lanka:
    a. Non-Voting Shares: NON VOTING or NONVTG
    b. RIGHTS or RTS
5) Ecuador: Not ranking for dividend: NRFD
6) Greece: Preferred Registered Shares and Preferred Bearer: PR and PB

7) Hungary: osztalékelsőbbségi (preferred share) OE
8) Indonesia:
    a. RIGHTS RTS
    b. foreign board listings: FB and FB DEAD
9) India: delete stocks which trade on XNH
10) Isreal:
    a. Cumulative preferred stocks P1
    b. Assets with par values indicated 1 or 5
11) South Korea:
    a. Preferred shares: 1P, 1PB, 2PB, 3PB, 4PB, 5PB, 1PFD, 1PF, PF2, 2P, 3P
12) Lithuania: PREFERNCE
13) Mexico:
    a. Delete the following classes: C, L, CPO, ACP, and BCP
    b. Multiclass shares: UB, UBC, UBD
14) Malaysia:
    a. assets indicated XCO
    b. A shares
    c. Foreign board: FB
15) Peru: Investment shares are deleted: IVERSION and INVN
16) Philippines: depository receipts are deleted: PDR
17) Portugal: Delete register stocks: R
18) Singapore: non-redeemable convertible shares: NCPS
19) Taiwan: Taiwan depository receipts: TDR
20) Thailand: Delete foreign board stocks: FB and FBDEAD

With the companies that remain we collect daily price, return index, market value, and volume data for each company in our sample period: July 1994 through June 2005. To be included in our analysis a company must have June-end market valuation and the country must have a local currency-US dollar exchange rate available through Datastream. These requirements result in a sample of 301,537 firm-years. We rank all stocks into US dollar, US market quintile portfolios (using NYSE, AMEX, NASDAQ listed stocks). Appendix Table A1 presents the firm-year counts per country, per portfolio.

We require all stocks to trade on at least 30% of the days the market is open. Because volume data is known to be unreliable through Datastream, we use non-zero changes in price as a proxy for indication of trading activity. We infer exchange holidays from the lack of price changes in *any* stock listed on the exchange. The 30% trading requirement reduces the sample to 242,603 firm-years. Appendix Table A1 presents the firm-year counts per country, per portfolio. The last panel presents the average market capitalization of the stocks passing the 30% filter listed in the portfolio as a percentage of the total (unfiltered market capitalization).

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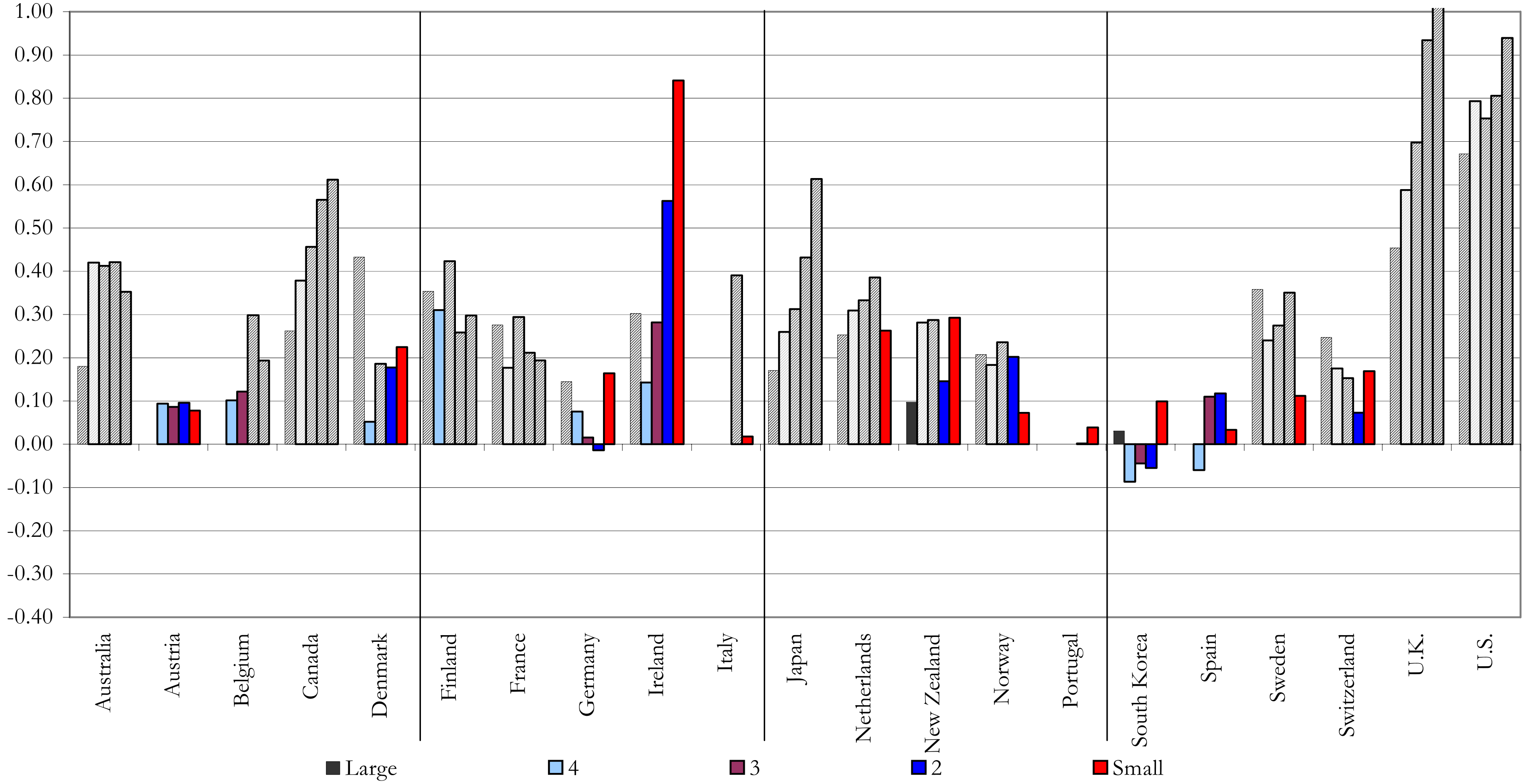

Figure 1A: Difference in return volatility between earnings announcement and non-earnings announcement days: Developed Markets. Differences are between average absolute market-model abnormal returns during the announcement window (-1 to +2) and the average absolute non-event day return during the testing window (-55 to -2 and +3 to +10). Striped bars indicate volatility is significantly higher using a non-parametric rank volatility test following Bhattacharya, el al (2000). The a non-parametric rank-deviation test ranks the absolute market model excess return over the -55 to +10 testing window from lowest to highest. Then calculates the average rank deviation over the window (-1 to +2) the standard deviation of the mean rank deviation. An event must have at least 30 trading days during the 66 day testing window to be included and have trading on at least 15 of the 20 days from -9 to +10. We treat missing returns in the testing window as low absolute return days.

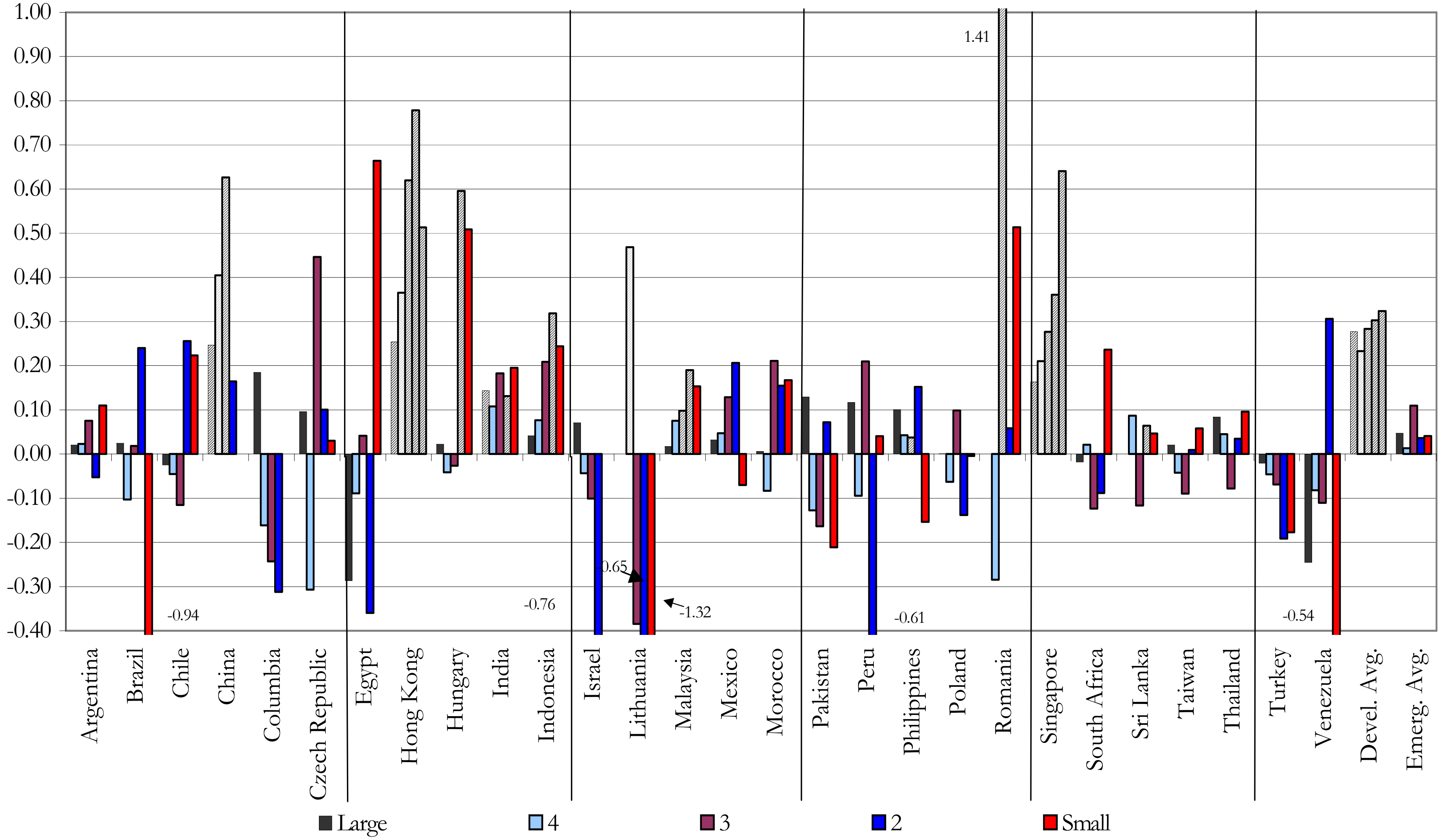

Figure 1B: Difference in return volatility between Earnings announcements and non-earnings announcement days: Emerging markets.

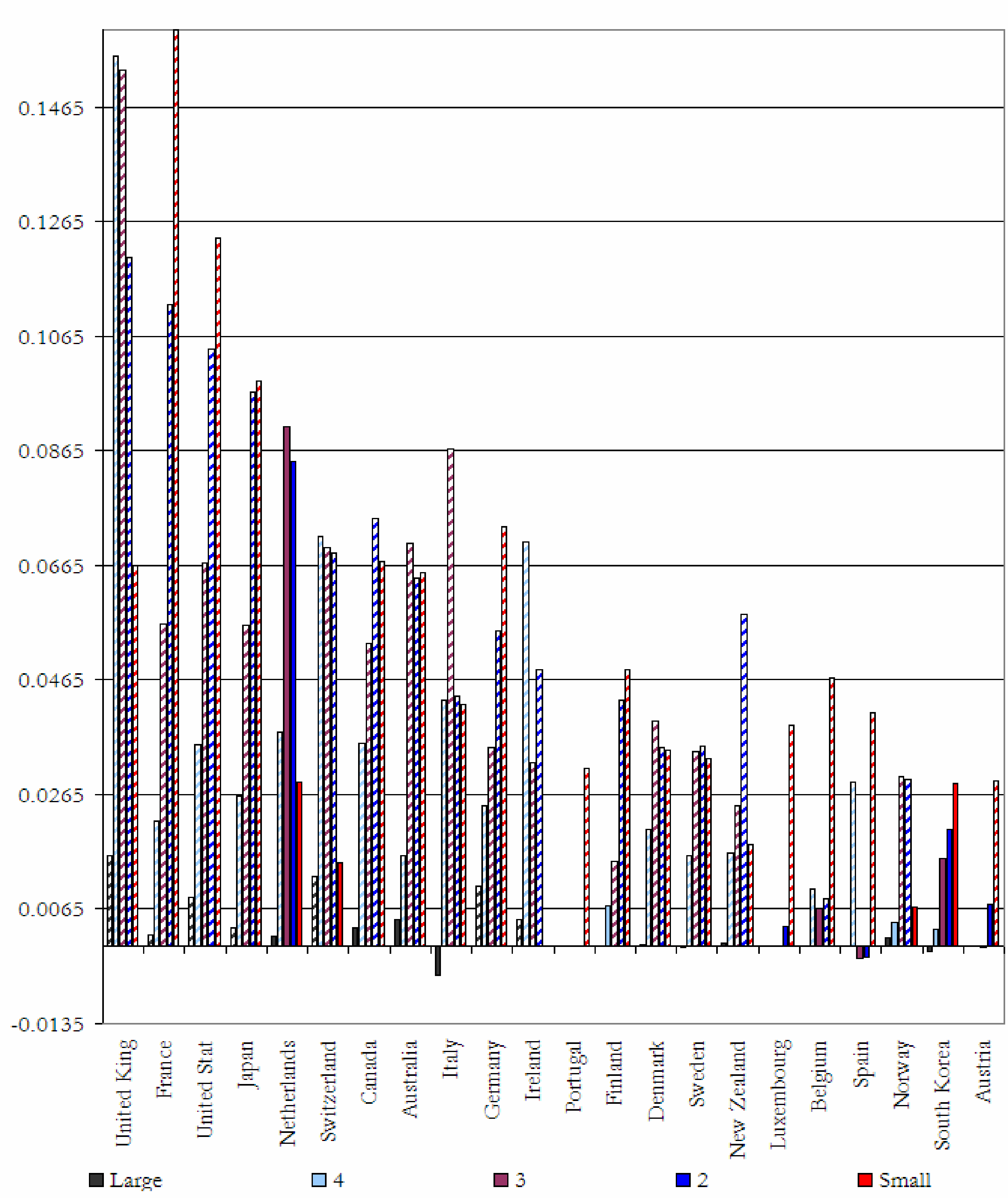

Figure 2A: Developed market-model delay. Delay is calculated following Hou and Moskowitz (2005) for each size portfolio as follows: portfolio returns are regressed on market returns over the 12-year sample and four lags of the market to obtain an unrestricted R-square; then a second regression is run, restricting the coefficients on lagged returns to zero. The delay measure: Delay = R^2unrestricted - R^2restricted. Delay is de-biased using a bootstrap adjustment factor described in the text. Stripes indicate Delay is significant at the 5% level, using bootstrapped standard errors.

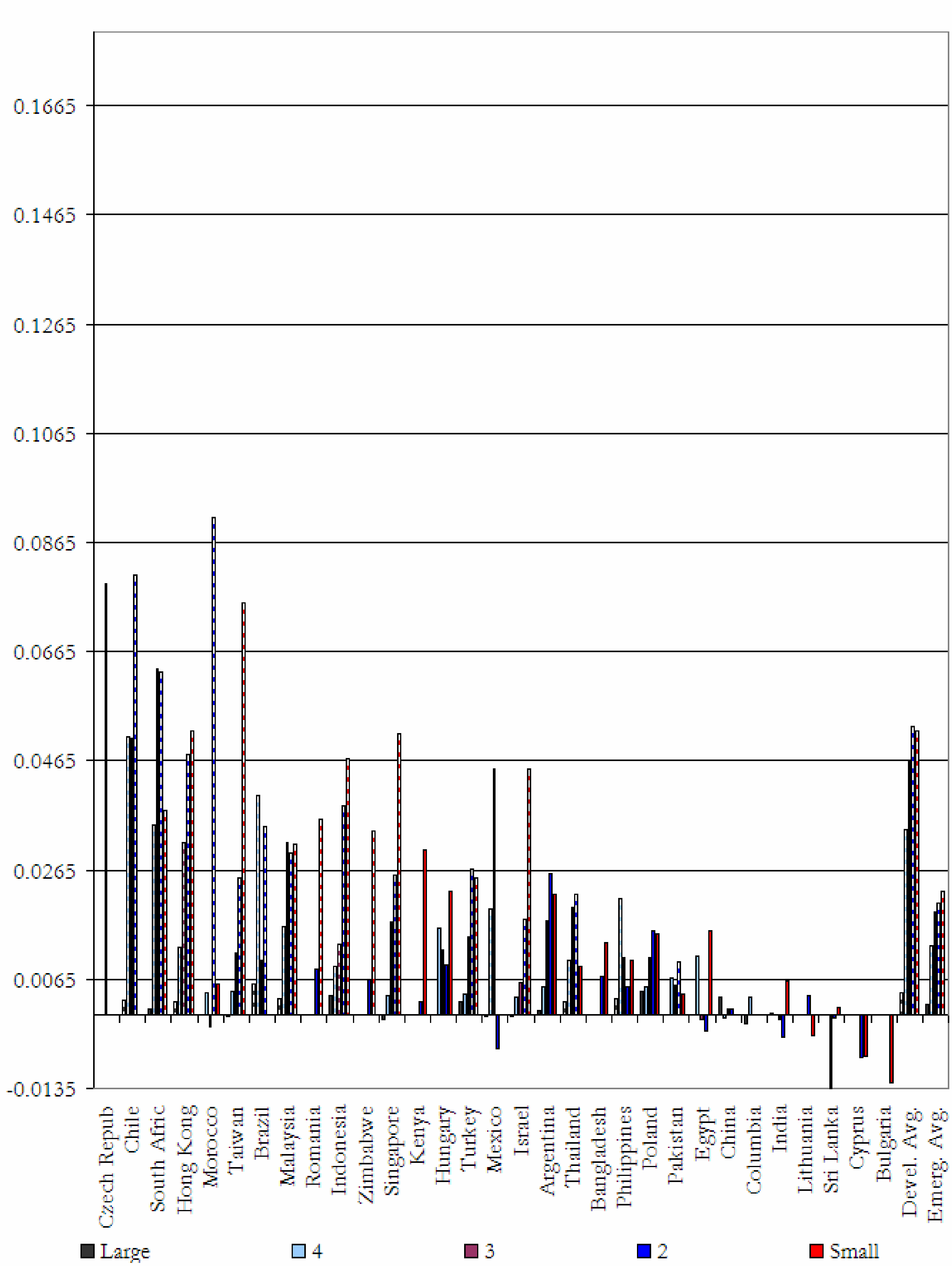

Figure 2B: Emerging market-model delay.

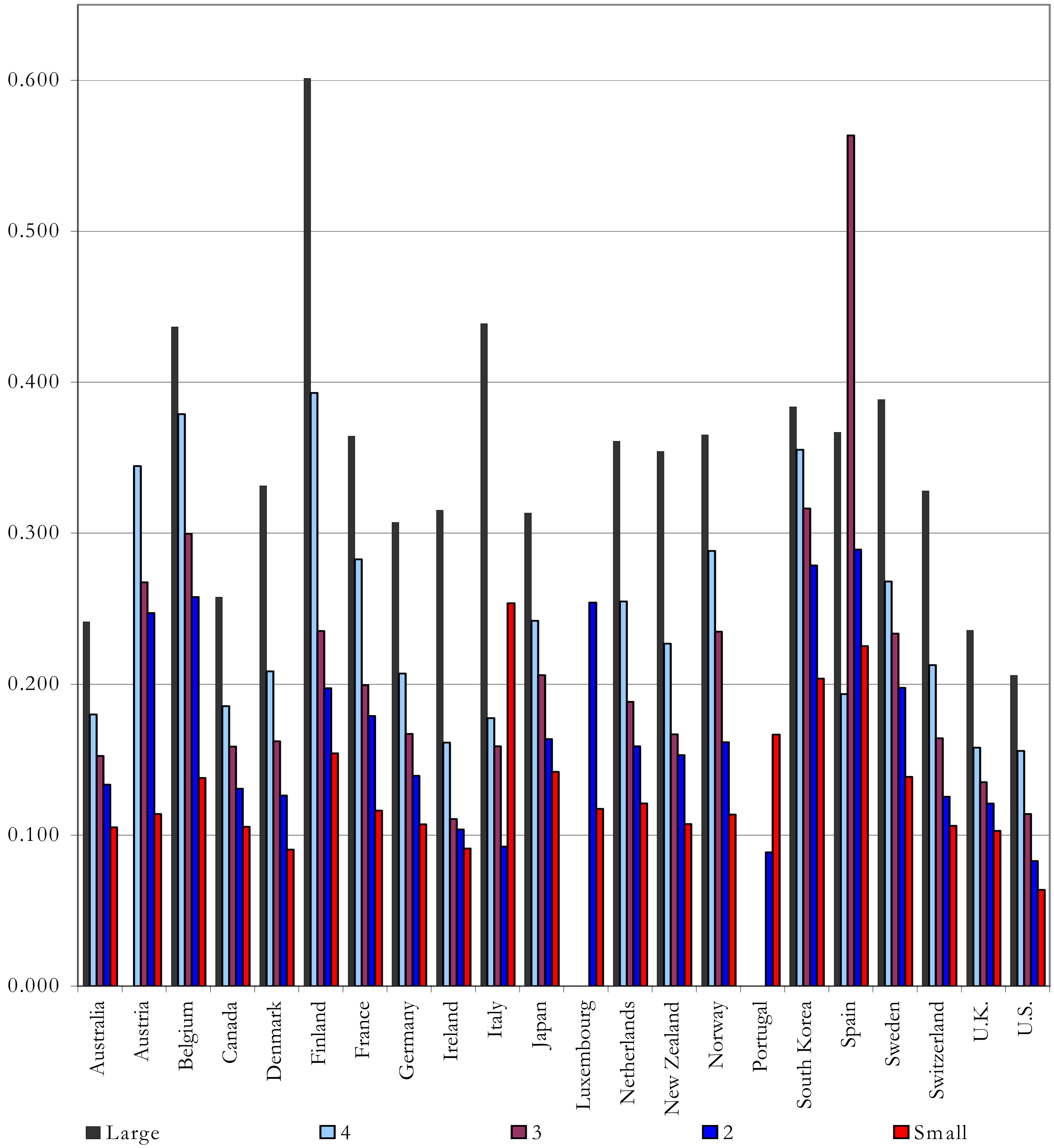

Figure 3A: Morck, Young, and Yu R^2 in developed markets. Following Morck, et al (2000) firms are included if there are more than 15 weeks of biweekly returns. Biweekly returns are set to missing if the absolute value is greater than 25%. R^2 is calculated for each firm each year from a market model that includes the local and US returns converted into local currency return. For each portfolio the SST weighted average R^2 is calculated. The 12-year average of the SST weighted average R^2s is reported below.

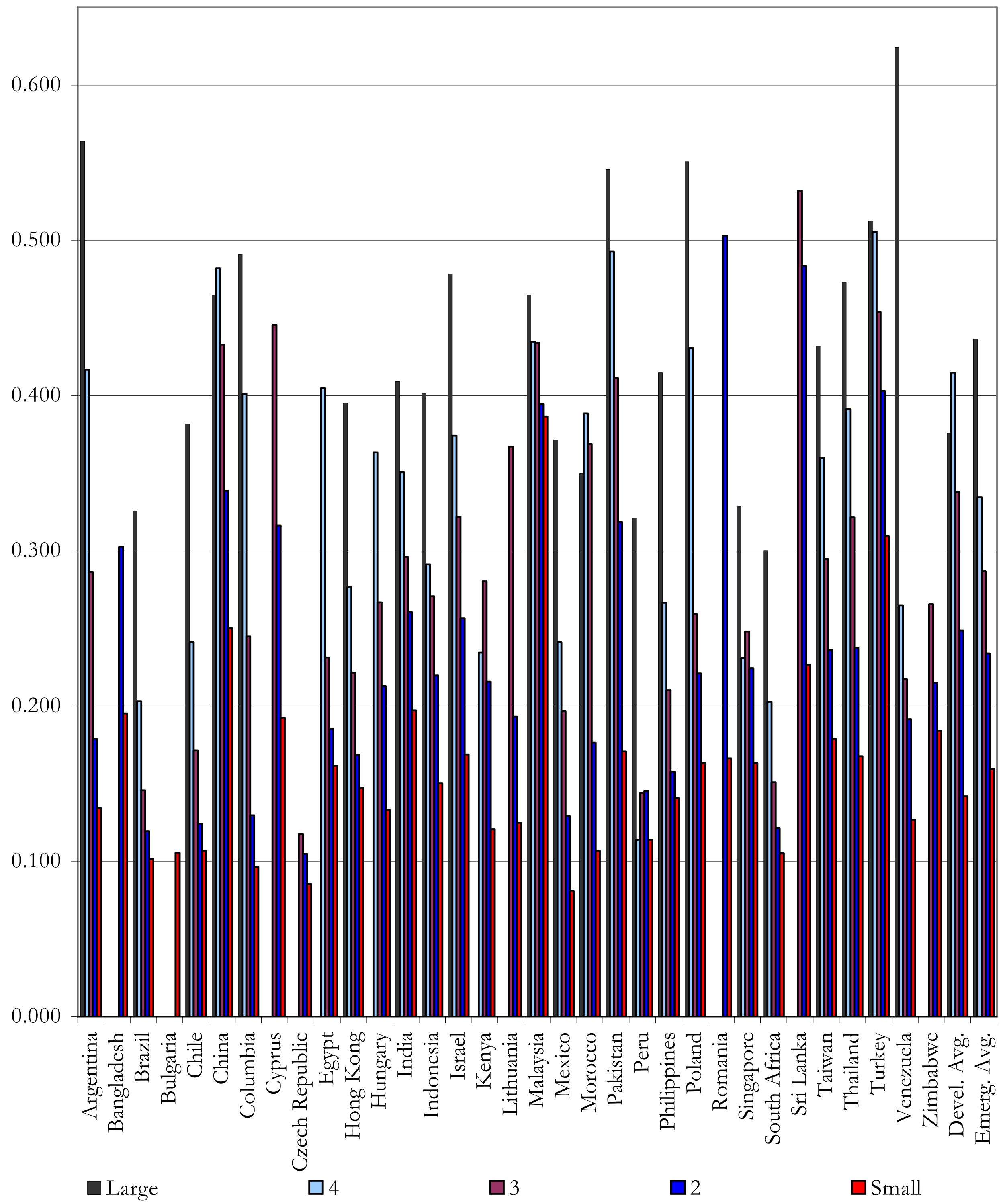

Figure 3B: Morck, Young, and Yu R^2 in emerging market.

Table I
Summary Statistics

At the end of December each year from 1993 through 2004 all common ordinary shares available through Datastream and CRSP with at least 30% active trading days in the following 12 months, as proxied by non-zero changes in price, are sorted into 5 equally weighted NYSE-dollar-size-breakpoint portfolios. We use the last available security market value in December and the prevailing exchange rates on that date to convert market capitalizations to US dollars. Asset market capitalization is converted to US dollars using the prevailing exchange rate on that day. Counts and market capitalization are calculated in from December-end data. The average firm count and average market capitalization represent the average over all non-missing years.

Panel A: Developed Countries

	Average Firm Count (per year)					Year Count					Average Market Capitalization (US$)				
Country	Large	4	3	2	Small	Large	4	3	2	Small	Large	4	3	2	Small
Australia	60	64	77	112	359	12	12	12	12	12	4726	443	138	46	9
Austria		9	8	13	43		4	10	12	12		195	106	47	7
Belgium	8	9	11	10	72	6	11	10	12	12	1867	355	107	48	5
Canada	105	124	154	238	1410	12	12	12	12	12	4085	447	138	47	6
Denmark	22	27	29	29	21	12	12	12	12	12	3317	442	133	50	14
Finland	6	9	23	25	50	7	11	12	12	12	1780	322	137	48	9
France	47	51	60	91	364	12	12	12	12	12	3060	477	137	46	7
Germany	77	81	94	106	211	12	12	12	12	12	5532	453	138	48	9
Ireland	13	10	8	7	7	12	12	12	9	8	4474	507	181	67	35
Italy	10	12	15	8	261	5	5	5	7	12	2327	241	87	32	1
Japan	603	639	661	609	375	12	12	12	12	12	5426	454	140	50	15
Luxembourg				5	6			1	4	12				30	5
Netherlands	28	31	31	30	38	12	12	12	12	12	7295	419	143	47	11
New Zealand	7	13	16	18	15	5	12	12	12	12	2496	476	132	48	13
Norway	17	33	33	27	23	12	12	12	12	12	3661	427	144	49	14
Portugal				5	53				4	12				26	3
South Korea	40	94	145	251	513	12	12	12	9	8	3816	440	134	46	11
Spain		7	6	8	97	12	12	12	12	12		247	123	45	5
Sweden	50	48	45	59	84	2	6	9	12	12	4715	451	138	47	10
Switzerland	56	59	46	30	18	12	12	12	12	12	11036	474	146	50	14
United Kingdom	232	219	197	178	132	12	12	12	12	12	8363	453	142	49	14
United States	1238	1237	1228	1229	1092	12	12	12	12	12	7832	459	141	49	13
Average	145	139	144	140	238	9	10	10	10	11	4767	409	134	46	10

Continued

Table I – *Continued*

Panel B: Emerging Countries															
	Average Firm Count (per year)					Year Count					Average Market Capitalization (US $)				
Country	Large	4	3	2	Small	Large	4	3	2	Small	Large	4	3	2	Small
Argentina	11	10	8	9	15	12	12	12	12	10	3220	438	145	54	14
Bangladesh			9	11	124		1	1	10	11			83	39	5
Brazil	17	14	15	10	6	11	11	10	11	10	3847	494	182	65	14
Bulgaria					11					5					7
Chile	17	20	12	9	10	12	12	12	12	11	2174	454	149	54	19
China	40	324	300	186	70	12	12	12	7	2	1902	397	155	66	49
Colombia	6	6	6	5	6	5	12	11	5	5	1275	511	238	81	16
Cyprus		9	11	14	13		2	5	9	11		405	137	51	15
Czech Republic		5	7	7	6		1	8	6	7		241	86	35	17
Egypt		9	10	16	29		8	9	9	9		452	167	55	11
Hong Kong	47	66	98	128	125	12	12	12	12	11	7450	432	135	47	15
Hungary		6	6	8	8		3	5	5	10		327	171	46	11
India	35	68	110	171	375	12	12	12	12	12	2783	443	135	46	9
Indonesia	14	18	21	33	59	11	12	12	12	12	2223	438	138	46	12
Israel	10	21	31	60	131	12	12	12	12	12	2339	457	136	45	11
Kenya		6	7	6	10		1	5	11	11		205	107	46	11
Lithuania			6	8	12			1	7	7			146	78	14
Malaysia	46	85	106	141	315	12	12	12	12	8	2613	436	135	49	15
Mexico	19	14	10	7	6	12	12	12	12	10	2610	451	171	47	25
Morocco	7	9	7	8	10	2	11	7	9	8	1166	529	222	42	19
Pakistan	6	9	15	23	68	1	8	12	12	12	1297	437	136	45	9
Peru	6	6	5	5	6	3	12	12	11	12	749	408	57	90	13
Philippines	12	14	15	15	30	11	11	12	12	12	1739	353	144	50	9
Poland	6	10	12	22	65	7	8	9	12	10	3111	611	153	49	9
Romania				8	33				3	9				84	7
Singapore	27	39	56	79	89	12	12	12	12	10	6346	452	137	48	16
South Africa	45	49	49	49	62	12	12	12	12	12	2793	456	142	48	11
Sri Lanka			8	11	65			6	12	12			80	42	7
Taiwan	76	141	153	174	198	12	12	12	11	9	3116	436	140	52	17
Thailand	23	37	52	70	98	12	12	12	12	12	2209	434	139	46	12
Turkey	10	20	33	51	79	12	12	12	12	12	2062	436	136	48	12
Venezuela	5	5	5	5		1	2	5	6	6	1042	324	246	31	
Zimbabwe		6	12	11	21		2	7	11	11		418	110	39	10
Emerging Average	22	37	38	42	67	9	9	9	10	9	2639	424	144	52	14
Total Average	77	79	80	82	137	9	9	10	10	10	3597	418	140	50	12

Table II
Correlations within and between

This table presents correlations among the efficiency measures. The upper panel presents the cross-country average of within country correlations across five size-sorted portfolios. The lower panel presents the cross-country correlation of the measures averaged across the five portfolios. At the end of June each year from 1994 through 2004 all common ordinary shares available through Datastream and CRSP with at least 30% active trading days in the following 12 months, as proxied by non-zero changes in price, are sorted into 5 equally weighted NYSE-size-breakpoint portfolios. Daily returns greater than 200% or which increase (decrease) by 100% (50%) and revert to a 2-day cumulative return of less (greater) than 50% (-20%) are assumed to be data errors and are set to missing. Weekly returns are calculated from daily returns for each stock. Delay is calculated following Hou and Moskowitz (2005) as follows: firm returns are regressed on market returns and four lags of the market to obtain an unrestricted R-square; then a second regression is estimated, restricting the coefficients on lagged returns to zero. Delay is calculated for each July to June fiscal year and averaged over the eleven year sample.

	Delay	**Earnings Response**	**R^2**	**Hasb. Trading Cost**	**LOT Trading Cost**
Delay		0.10	-0.63	0.62	0.65
Earnings Response	0.56		-0.12	0.15	0.10
R2	-0.61	-0.31		-0.86	-0.88
Hasb. Trading Cost	-0.04	0.15	-0.14		0.91
LOT Trading Cost	-0.06	-0.07	-0.20	0.67	

Table III

Pearson and Spearman Coefficients

Pairwise correlations among delay are presented. Delay is calculated following Hou and Moskowitz (2005) as follows: size portfolio returns are regressed on market returns and four lags of the market to obtain an unrestricted R-square; then a second regression is run, restricting the coefficients on lagged returns to zero. The delay measure is then calculated using the following equation: Delay = $R^2_{unrestricted}$ - $R^2_{restricted}$. Small firm delay is the average delay over the two smallest portfolios. R^2 is calculated following Morck, et al (2000) firms are included if there are more than 15 weeks of biweekly returns. Biweekly returns are set to missing if the absolute value is greater than 25%. R^2 is calculated for each firm from a market model that includes the local and US returns converted into local currency return. For each portfolio the SST weighted average R2 is calculated. Short sales (from Bris, Goetzmann and Zhu (2003)) is a dummy variable that equals one if short sales are allowed as of the end of 1998 (which is also the mid-point of our sample period). Insider Trading (from Bhattacharya and Daouk (2002)) is a dummy variable that equals one if insider trading laws exist and are enforced as of the end of 1998. Investor Protection is the principal component of private enforcement and anti-director rights on a scale from 0 to 10. British Law is dummy variable for whether the legal system in a country is common law based. Market Cap / GDP is the average of the ratio of stock market capitalization held by shareholders to gross domestic product for the period 1996-2000. Trading/GDP is the average annual ratio of Total Equity Traded Value and GDP for the period 1993-2003 (source: Datastream). Log (GDP) per capita is the natural logarithm of per capita Gross Domestic Product (in US dollars) in 2000. Following Lo and Wang (2000) turnover is calculated per stock as the percentage of shares outstanding traded on each day and summed for the entire year. The number of analysts, the precision of analyst forecasts, and dispersion of analyst forecasts are from Chang, Khanna, and Palepu (2000). Disclosure is a measure of transparency used by Jin and Myers (2005): higher values indicate less disclosure. Corruption is the average for the 1993-2003 period of the Corruption Perception Index published by Transparency International: higher values of the Index indicate less corruption. CountryRisk is the average over the period 1993-2003 of the Country Risk Index published by Euromoney. Higher values indicate lower risk. Market Volatility is the sample standard deviations of weekly equity market local currency returns over the period 1993-2003. The correlation with world is computed for the period 1993-2003 between country equity returns and returns on the Datastream world market index. For the major markets (US, UK, JP, GER, FRA) the world index excludes the own country. Company Hefindahl is the squared June-end market capitalizations summed over all companies with a country each fiscal year. Number of firms is the Jun-end count of listed firms. The Herfindahl index and the number of firms are averaged over the 11 year sample period. Momentum is the average winner minus loser return from 1975 or when first available until December 2000 from Griffin, Ji, and Martin (2003).

Table III – *Continued*

	Pearson Coefficients				Spearman Coefficients			
	Delay All	Small Firm Delay	Earn Diff	R^2	Delay All	Small Firm Delay	Earn Diff	R^2
Panel A: Regulatory								
Short Sales dummy	0.57	0.34	0.38	-0.40	0.60	0.36	0.37	-0.39
(n=55)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)
Insider Trade. Dummy	0.34	0.25	0.23	-0.16	0.33	0.24	0.20	-0.12
(n=54)	(0.01)	(0.06)	(0.11)	(0.26)	(0.02)	(0.08)	(0.17)	(0.40)
Investor Protection	0.32	0.06	0.53	-0.25	0.25	0.17	0.43	-0.23
(n=44)	(0.04)	(0.72)	(0.00)	(0.11)	(0.11)	(0.26)	(0.00)	(0.13)
British Law	0.07	0.00	0.37	-0.08	0.00	0.05	0.29	-0.09
(n=44)	(0.66)	(0.99)	(0.02)	(0.63)	(0.99)	(0.73)	(0.06)	(0.55)
Protestant Religion	0.27	0.36	0.38	-0.41	0.26	0.42	0.33	-0.41
(n=44)	(0.08)	(0.02)	(0.01)	(0.01)	(0.10)	(0.00)	(0.03)	(0.01)
Panel B: Econ. & Fin. Development								
Market Cap/GDP	0.33	0.17	0.37	-0.21	0.46	0.29	0.44	-0.26
(n=53)	(0.02)	(0.23)	(0.01)	(0.13)	(0.00)	(0.04)	(0.00)	(0.06)
Trading/GDP	0.00	-0.10	0.06	0.14	0.16	0.08	0.24	-0.01
(n=53)	(0.99)	(0.47)	(0.69)	(0.30)	(0.25)	(0.59)	(0.11)	(0.95)
Log GDP per capita	0.22	0.31	0.08	-0.23	0.29	0.36	0.08	-0.30
(n=54)	(0.15)	(0.03)	(0.59)	(0.12)	(0.05)	(0.01)	(0.59)	(0.04)
EW Turnover	0.01	-0.08	0.07	0.22	0.18	0.07	0.29	0.08
(n=55)	(0.95)	(0.56)	(0.65)	(0.11)	(0.20)	(0.60)	(0.05)	(0.59)
VW Turnover	0.01	-0.08	0.07	0.23	0.20	0.07	0.30	0.10
(n=55)	(0.93)	(0.55)	(0.62)	(0.09)	(0.15)	(0.60)	(0.03)	(0.49)
Panel C: Information Environment								
Num. Analysts	0.37	0.33	0.53	-0.31	0.36	0.29	0.55	-0.30
(n=43)	(0.02)	(0.03)	(0.00)	(0.04)	(0.02)	(0.06)	(0.00)	(0.05)
Forecast Error	-0.40	-0.29	-0.55	0.47	-0.42	-0.34	-0.49	0.47
(n=43)	(0.01)	(0.06)	(0.00)	(0.00)	(0.01)	(0.03)	(0.00)	(0.00)
Forecast Dispersion	-0.37	-0.19	-0.39	0.35	-0.42	-0.32	-0.40	0.40
(n=42)	(0.02)	(0.24)	(0.01)	(0.02)	(0.01)	(0.04)	(0.01)	(0.01)
Disclosure	0.27	0.05	0.52	-0.16	0.20	0.16	0.46	-0.18
(n=44)	(0.08)	(0.75)	(0.00)	(0.30)	(0.20)	(0.30)	(0.00)	(0.24)
Corruption	0.22	-0.02	0.16	-0.10	0.16	0.05	0.10	-0.11
(n=55)	(0.12)	(0.88)	(0.28)	(0.47)	(0.25)	(0.69)	(0.50)	(0.44)
Panel D: Economic Risk								
Country Risk	0.22	-0.02	0.13	-0.13	0.19	0.13	0.10	-0.16
(n=55)	(0.11)	(0.90)	(0.39)	(0.36)	(0.17)	(0.35)	(0.48)	(0.24)
Panel E: Properties of Market Returns								
Mkt. Volatility	-0.44	-0.39	-0.24	0.56	-0.56	-0.50	-0.34	0.59
(n=55)	(0.00)	(0.00)	(0.10)	(0.00)	(0.00)	(0.00)	(0.02)	(0.00)
Corr. w/ World Mkt.	0.49	0.34	0.52	-0.44	0.49	0.36	0.44	-0.38
(n=55)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Company Herfindahl	-0.21	-0.23	-0.18	0.21	-0.21	-0.17	-0.20	0.22
(n=55)	(0.14)	(0.09)	(0.21)	(0.12)	(0.14)	(0.20)	(0.16)	(0.11)
Number of Firms	0.47	0.24	0.57	-0.42	0.35	0.26	0.36	-0.26
(n=55)	(0.00)	(0.07)	(0.00)	(0.00)	(0.01)	(0.05)	(0.01)	(0.05)
Momentum	0.24	0.23	0.18	-0.51	0.17	0.30	0.11	-0.45
(n=37)	(0.16)	(0.16)	(0.28)	(0.00)	(0.31)	(0.07)	(0.51)	(0.01)

Table IV

Abnormal Earnings Announcement Returns Regressed on Cross-Country Variables. Differences in return volatility between earnings announcements and non-earnings announcement days are regressed on regulatory, economic, financial, and information environment variables, as well as estimates of trading costs volatility, and company Herfindahl index. Return volatility difference is calculated as the differences between average absolute market-model abnormal returns during the announcement window (-1 to +2) and the average absolute non-event day return during the remainder of the testing window (-55 to -2 and +3 to +10) around the earnings announcement date. Earnings announcement dates are from Thomson's I\B\E\S International database. The independent variables are calculated as described in Table III. Note all coefficients are all multiplied by 100.

	Specification											
	1	2	3	4	5	6	7	8	9	10	11	12
	Panel: Regulatory											
Short Sales	0.20	0.06	0.20	.	.	0.15	.	0.10	.	.	.	0.15
Dummy	(3.76)	(0.99)	(3.67)	.	.	(2.73)	.	(1.69)	.	.	.	(2.70)
Insider Trad.	0.07	.	.	.	.	0.07	.	.	.	.	.	.
Dummy	(1.18)	.	.	.	.	(1.08)	.	.	.	.	.	.
Investor	0.03	.	.	.	.	.	0.04	.	.	.	0.01	0.03
Protection	(2.80)	.	.	.	.	.	(2.87)	.	.	.	(0.31)	(2.67)
British Law	0.09	.	0.09	.	.	.	0.01	.	.	.	.	.
	(1.28)	.	(1.08)	.	.	.	(0.17)	.	.	.	.	.
	Panel B: Econ. & Fin. Dev.											
Market Cap/GDP	.	.	.	0.16	0.05	.	.	.	.	.	.	.
	.	.	.	(1.57)	(0.53)	.	.	.	.	.	.	.
Log GDP Per	.	0.00	.	.	.	.	.	-0.01	.	.	.	.
Capita	.	(-0.18)	.	.	.	.	.	(-1.12)	.	.	.	.
EW Turnover	.	.	.	-0.02	0.01	.	.	.	.	.	.	.
	.	.	.	(-0.23)	(0.12)	.	.	.	.	.	.	.
	Panel C: Information Environment											
Num. Analysts	.	.	.	.	.	.	.	0.01	.	0.02	.	.
	.	.	.	.	.	.	.	(1.32)	.	(3.08)	.	.
Forecast Error	.	.	.	.	.	.	.	.	-0.60	.	-0.88	-0.58
	.	.	.	.	.	.	.	.	(-2.72)	.	(-3.76)	(-2.73)
Disclosure	.	.	0.40	.	.	.	.	0.38	.	.	0.22	.
	.	.	(3.04)	.	.	.	.	(2.98)	.	.	(1.09)	.
Corruption	.	0.01	0.00	.	.	.	.	.	.	.	.	.
	.	(0.66)	(0.27)	.	.	.	.	.	.	.	.	.
	Panel D: Trading Costs											
Hasb. Trading	.	.	.	.	.	.	.	12.75	.	.	.	.
Cost	.	.	.	.	.	.	.	(1.94)	.	.	.	.
LOT Trading	.	.	.	.	.	.	.	.	-0.45	0.25	.	.
Cost	.	.	.	.	.	.	.	.	(-0.34)	(0.16)	.	.
	Panel E: Properties of Market Ret.											
Mkt. Volatility	.	.	.	-4.13	-3.09	.	.	-7.07	-3.40	.	.	-2.95
	.	.	.	(-0.93)	(-0.57)	.	.	(-3.37)	(-1.61)	.	.	(-1.46)
Corr. w/ World	.	0.67	.	.	0.67	.	.	0.27	0.67	.	.	.
Mkt.	.	(2.16)	.	.	(2.25)	.	.	(0.80)	(3.48)	.	.	.
Company	.	.	.	-0.04	.	-0.25	.	.	.	.	.	.
Herfindahl	.	.	.	(-0.10)	.	(-0.55)	.	.	.	.	.	.
Number of Obs.	42	46	42	48	48	49	42	39	43	43	39	39
Adjusted R^2	0.458	0.171	0.413	0.107	0.222	0.118	0.246	0.542	0.376	0.249	0.394	0.492

Table V

Average Market Adjusted Delay Regressed on Cross-Country Characteristics

The portfolio level delay measures are averaged over all five US-market size portfolios and regressed on regulatory, economic, financial, and information environment variables as well as estimates of trading costs volatility and company Herfindahl index. Delay is calculated over the 12 year sample from January 1994 through November 2005 as the difference between the unrestricted R^2 with four lags and the restricted R^2 for the local market model with no lags, as described in Figure 1 and in the text. The independent variables are calculated as described in Table III. Note all coefficients are multiplied times 100.

	Specification											
	1	2	3	4	5	6	7	8	9	10	11	12
Panel: Regulatory												
Short Sales	2.10	2.24	2.22	.	.	2.18	.	1.80	.	.	.	1.54
Dummy	(3.86)	(4.41)	(3.60)	.	.	(4.57)	.	(3.49)	.	.	.	(3.05)
Insider Trad.	0.68	.	.	.	.	1.04	.	.	.	.	.	.
Dummy	(1.80)	.	.	.	.	(2.37)	.	.	.	.	.	.
Investor	0.26	.	.	.	.	.	0.36	.	.	.	0.01	0.13
Protection	(2.10)	.	.	.	.	.	(2.11)	.	.	.	(0.03)	(1.10)
British Law	0.15	.	0.27	.	.	.	-0.87	.	.	.	.	.
	(0.22)	.	(0.35)	.	.	.	(-1.23)	.	.	.	.	.
Panel B: Econ. & Fin. Dev.												
Market Cap/GDP	.	.	.	1.40	0.73	.	.	.	.	.	.	.
	.	.	.	(2.25)	(1.12)	.	.	.	.	.	.	.
Log GDP Per	.	0.06	.	.	.	.	.	0.07	.	.	.	.
Capita	.	(0.82)	.	.	.	.	.	(0.92)	.	.	.	.
EW Turnover	.	.	.	-0.18	-0.24	.	.	.	.	.	.	.
	.	.	.	(-0.34)	(-0.47)	.	.	.	.	.	.	.
Panel C: Information Environment												
Num. Analysts	.	.	.	.	.	.	.	.	.	0.11	.	.
	.	.	.	.	.	.	.	.	.	(2.45)	.	.
Forecast Error	.	.	.	.	.	.	.	.	-6.69	.	-8.05	-4.24
	.	.	.	.	.	.	.	.	(-2.16)	.	(-2.80)	(-1.75)
Disclosure	.	.	2.58	.	.	.	.	.	.	.	0.20	.
	.	.	(1.61)	.	.	.	.	.	.	.	(0.08)	.
Corruption	.	0.17	0.07	.	.	.	.	.	.	.	.	.
	.	(1.42)	(0.63)	.	.	.	.	.	.	.	.	.
Panel D: Trading Costs												
Hasb. Trading	.	.	.	.	.	.	.	0.04	.	.	.	.
Cost	.	.	.	.	.	.	.	(6.93)	.	.	.	.
LOT Trading	.	.	.	.	.	.	.	.	0.01	0.10	.	.
Cost	.	.	.	.	.	.	.	.	(11.80)	(68.40)	.	.
Panel E: Properties of Market Ret.												
Mkt. Volatility	.	.	.	-68.01	-51.93	.	.	-54.50	-71.00	.	.	-45.47
	.	.	.	(-2.33)	(-1.83)	.	.	(-2.31)	(-2.17)	.	.	(-2.41)
Corr. w/ World	.	.	.	.	3.79	.	.	.	.	.	.	.
Mkt.	.	.	.	.	(2.37)	.	.	.	.	.	.	.
Company	.	.	.	2.33	.	0.90	-2.38	.	7.30	.	.	.
Herfindahl	.	.	.	(0.52)	.	(0.30)	(-0.40)	.	(1.02)	.	.	.
Number of Obs.	42	46	42	51	51	52	42	46	41	41	37	37
Adjusted R^2	0.325	0.285	0.277	0.186	0.229	0.317	0.061	0.286	0.216	0.099	0.149	0.330

Table VI

Adjusted Delay for Small Firms Regressed on Cross-Country Variables

The portfolio level delay measures are averaged over the two smallest US-market size portfolios and regressed on regulatory, economic, financial, and information environment variables, as well as estimates of trading costs volatility, and company Herfindahl index. Delay is calculated over the 12 year sample from January 1994 through November 2005 as the difference between the unrestricted R^2 with four lags and the restricted R^2 for the local market model with no lags, as described in Figure 1 and in the text. The independent variables are calculated as described in Table III. Note all coefficients are multiplied times 100.

	Specification											
	1	2	3	4	5	6	7	8	9	10	11	12
						Panel: Regulatory						
Short Sales	2.25	2.43	2.48	.	.	2.29	.	1.74	.	.	.	1.59
Dummy	(2.93)	(2.99)	(2.71)	.	.	(3.21)	.	(2.15)	.	.	.	(1.76)
Insider Trad.	1.80	.	.	.	.	1.63	.	.	.	.	.	.
Dummy	(2.84)	.	.	.	.	(2.42)	.	.	.	.	.	.
Investor	0.46	.	.	.	.	.	0.54	.	.	.	0.13	0.25
Protection	(2.20)	.	.	.	.	.	(2.06)	.	.	.	(0.40)	(1.29)
British Law	-0.38	.	-0.59	.	.	.	-1.90	.	.	.	.	.
	(-0.37)	.	(-0.51)	.	.	.	(-1.70)	.	.	.	.	.
						Panel B: Econ. & Fin. Dev.						
Market Cap/GDP	.	.	.	2.02	1.40	.	.	.	.	.	.	.
	.	.	.	(2.57)	(1.73)	.	.	.	.	.	.	.
Log GDP Per	.	0.10	.	.	.	.	.	0.09	.	.	.	.
Capita	.	(1.04)	.	.	.	.	.	(0.78)	.	.	.	.
EW Turnover	.	.	.	-0.77	-0.38	.	.	.	.	.	.	.
	.	.	.	(-1.39)	(-0.69)	.	.	.	.	.	.	.
						Panel C: Information Environment						
Num. Analysts	.	.	.	.	.	.	.	.	.	0.17	.	.
	.	.	.	.	.	.	.	.	.	(2.67)	.	.
Forecast Error	.	.	.	.	.	.	.	.	-6.68	.	-8.92	-5.02
	.	.	.	.	.	.	.	.	(-1.27)	.	(-2.26)	(-1.06)
Disclosure	.	.	6.31	.	.	.	.	.	.	.	0.12	.
	.	.	(2.04)	.	.	.	.	.	.	.	(0.03)	.
Corruption	.	-0.01	-0.12	.	.	.	.	.	.	.	.	.
	.	(-0.03)	(-0.68)	.	.	.	.	.	.	.	.	.
						Panel D: Trading Costs						
Hasb. Trading	.	.	.	.	.	.	.	38.57	.	.	.	.
Cost	.	.	.	.	.	.	.	(0.63)	.	.	.	.
LOT Trading	.	.	.	.	.	.	.	.	-2.49	6.89	.	.
Cost	.	.	.	.	.	.	.	.	(-0.23)	(0.71)	.	.
						Panel E: Properties of Market Ret.						
Mkt. Volatility	.	.	.	-75.69	-70.99	.	.	-81.04	-90.69	.	.	-50.08
	.	.	.	(-2.58)	(-2.14)	.	.	(-2.70)	(-1.90)	.	.	(-1.61)
Corr. w/ World	.	.	.	.	4.75	.	.	.	.	.	.	.
Mkt.	.	.	.	.	(1.68)	.	.	.	.	.	.	.
Company	.	.	.	-6.83	.	-6.05	-12.14	.	-8.68	.	.	.
Herfindahl	.	.	.	(-1.61)	.	(-1.80)	(-1.28)	.	(-0.90)	.	.	.
Number of Obs.	41	44	41	49	49	50	41	44	39	39	36	36
Adjusted R^2	0.290	0.128	0.184	0.249	0.258	0.281	0.134	0.187	0.198	0.125	0.091	0.174

Table VII
R^2 Regressed on Cross-Country Variables

R^2 is calculated following Morck, et al (2000). Firms are included if there are more than 15 weeks of biweekly returns. Biweekly returns are set to missing if the absolute value is greater than 25%. R^2 is calculated for each firm from a market model which includes the local and US returns converted into local currency return. For each portfolio the SST weighted average R^2 is calculated. The 12-year average of the SST weighted average R^2s is regressed on regulatory, economic, financial, and information environment variables as well as estimates of trading costs volatility and company Herfindahl index. The independent variables are calculated as described in Table III.

	Specification											
	1	2	3	4	5	6	7	8	9	10	11	12
Panel: Regulatory												
Short Sales	-0.26	-0.33	-0.27	.	.	-0.15	.	-0.18	.	.	.	-0.07
Dummy	(-2.12)	(-2.69)	(-2.21)	.	.	(-1.43)	.	(-1.97)	.	.	.	(-0.68)
Insider Trad.	0.08	.	.	.	.	-0.05	.	.	.	.	.	.
Dummy	(0.54)	.	.	.	.	(-0.45)	.	.	.	.	.	.
Investor	-0.05	.	.	.	.	.	-0.03	.	.	.	-0.02	-0.01
Protection	(-1.52)	.	.	.	.	.	(-1.04)	.	.	.	(-0.48)	(-0.34)
British Law	0.03	.	-0.09	.	.	.	0.04	.	.	.	.	.
	(0.23)	.	(-0.68)	.	.	.	(0.32)	.	.	.	.	.
Panel B: Econ. & Fin. Dev.												
Market Cap/GDP	.	.	.	-0.21	-0.09	.	.	.	.	.	.	.
	.	.	.	(-2.04)	(-0.90)	.	.	.	.	.	.	.
Log GDP Per	.	-0.02	.	.	.	.	.	.	.	.	.	.
Capita	.	(-1.13)	.	.	.	.	.	.	.	.	.	.
EW Turnover	.	.	.	0.18	0.17	.	.	.	.	.	.	.
	.	.	.	(1.92)	(1.76)							
Panel C: Information Environment												
Num. Analysts	.	.	.	.	.	.	.	.	.	-0.01	.	.
	.	.	.	.	.	.	.	.	.	(-1.85)	.	.
Forecast Error	.	.	.	.	.	.	.	.	0.86	.	1.42	0.67
	.	.	.	.	.	.	.	.	(1.63)	.	(2.05)	(0.90)
Disclosure	.	.	-0.13	.	.	.	.	.	.	.	0.29	.
	.	.	(-0.37)	.	.	.	.	.	.	.	(0.56)	.
Corruption	.	-0.01	-0.01	.	.	.	.	.	.	.	.	.
	.	(-0.33)	(-0.25)	.	.	.	.	.	.	.	.	.
Panel D: Trading Costs												
Hasb. Trading	.	.	.	.	.	.	.	-37.79	.	.	.	.
Cost	.	.	.	.	.	.	.	(-3.11)	.	.	.	.
LOT Trading	.	.	.	.	.	.	.	.	-6.18	-7.09	.	.
Cost	.	.	.	.	.	.	.	.	(-2.49)	(-3.26)	.	.
Panel E: Properties of Market Ret.												
Mkt. Volatility	.	.	.	16.04	13.56	17.79	18.13	20.73	20.31	22.38	.	17.20
	.	.	.	(3.49)	(2.81)	(3.91)	(3.70)	(5.14)	(4.62)	(5.23)	.	(4.27)
Corr. w/ World	.	.	.	.	-0.73	.	.	.	.	.	.	.
Mkt.	.	.	.	.	(-2.43)	.	.	.	.	.	.	.
Company	.	.	.	0.50	0.45	0.35	-0.15	-0.02	-0.21	0.03	.	.
Herfindahl	.	.	.	(1.03)	(0.92)	(0.68)	(-0.18)	(-0.06)	(-0.37)	(0.05)	.	.
Number of Obs.	44	48	44	53	53	54	44	55	43	43	39	39
Adjusted R^2	0.081	0.139	0.038	0.316	0.351	0.295	0.211	0.408	0.470	0.472	0.127	0.281

Appendix Table A
Firm-Year Counts and Percent of Market

The left most panel presents firm-year counts for each USD-US Market break-point quintile portfolio. The break points are calculated each June by sorting all stocks listed on NSADAQ, AMEX and NYSE into quintiles. The dollar market cap breakpoints are converted to local currency using the prevailing exchange rate. The middle panel presents the count of the firm-years that remain after requiring stocks have non-zero price changes for at least 30% of all trading days. The last panel present the average over the 11 year sample of the June-end market capitalizations as a percent of total market cap.

Panel A: Developed Countries

	Firm-Year Count (no screens)					Firm-Year Count (with trading screens)					Percent of Market (%)				
Country	Large	4	3	2	Small	Large	4	3	2	Small	Large	4	3	2	Small
Australia	646	707	927	1246	6177	621	658	816	1046	4150	82.2	8.5	3.3	1.4	1.0
Austria	9	38	87	151	834		15	79	133	477	0.0	18.7	25.8	14.4	8.6
Belgium	35	93	106	121	1226	23	66	85	107	803	69.4	34.6	14.5	6.8	7.0
Canada	1172	1388	1865	2736	22670	1143	1336	1761	2521	15585	79.7	10.3	4.2	2.1	1.6
Denmark	254	322	457	544	899	234	290	327	310	229	70.5	12.3	4.4	1.6	0.4
Finland	45	92	257	308	850	11	81	248	272	585	55.2	14.5	14.2	5.5	2.3
France	600	743	894	1185	6355	510	545	670	927	4148	67.5	11.2	4.2	2.1	1.5
Germany	961	1171	1510	1736	4503	854	870	1087	1098	2427	70.9	6.0	2.3	0.8	0.4
Ireland	15	23	12	9	18	137	111	59	30	11	83.0	8.5	1.8	0.6	0.2
Italy	142	152	145	103	134	23	46	40	19	2865	76.7	7.5	3.5	0.6	47.2
Japan	42	58	63	54	3147	6980	7091	7634	6109	3680	85.1	7.9	3.1	1.0	0.2
Luxembourg	7094	7470	8461	7518	5006				11	46	0.0	0.0	0.0	12.7	4.8
Netherlands	6	3	19	37	178	316	331	352	311	420	88.4	5.5	2.0	0.6	0.2
New Zealand	334	359	371	342	626	32	128	151	206	183	74.7	24.7	9.2	4.7	1.1
Norway	54	135	159	247	420	176	343	387	317	245	60.9	17.8	6.8	1.9	0.5
Portugal	200	393	502	494	546					593	0.0	0.0	0.0	0.0	43.3
South Korea	3	5	5	34	1098	416	988	1738	2753	5412	61.4	17.7	10.1	6.1	3.2
Spain	422	1004	1772	2839	5803		26	25	78	1078	0.0	30.0	38.7	12.8	17.4
Sweden	12	42	54	84	1182	552	494	509	699	963	79.2	7.8	2.4	1.2	0.4
Switzerland	600	529	568	744	1248	622	649	516	290	172	88.9	4.2	1.1	0.2	0.0
United Kingdom	667	738	643	514	532	2537	2328	2209	1816	1446	83.5	4.5	1.4	0.4	0.1
United States	2640	2663	3223	3541	5906	13492	13473	13670	13517	12619	89.1	5.3	1.7	0.6	0.2

Continued

Appendix Table A – *Continued*

Panel B: Emerging Countries															
	Firm-Year Count (no screens)					Firm-Year Count (with trading screens)					Percent of Market (%)				
Country	Large	4	3	2	Small	Large	4	3	2	Small	Large	4	3	2	Small
Argentina	128	119	143	157	293	108	86	106	51	71	79.3	11.2	4.1	1.1	1.4
Bangladesh	1	9	20	95	1931				74	1411	0.0	0.0	0.0	22.8	36.4
Brazil	245	302	432	369	849	167	148	105	55	60	40.1	7.1	2.1	0.7	0.1
Bulgaria	2	3	2	3	118					36	0.0	0.0	0.0	0.0	15.1
Chile	206	299	322	348	551	190	208	143	61	17	61.2	14.7	3.4	0.7	0.3
China	513	3964	3358	817	20	513	3959	3338	801	20	28.3	46.9	21.5	5.0	0.2
Colombia	35	93	117	105	288	22	40	22	5	6	66.4	28.7	19.6	4.5	1.2
Cyprus	13	28	61	130	397			39	74	84	0.0	0.0	20.2	9.9	3.9
Czech Republic	26	21	70	65	115			30	24	28	0.0	0.0	15.7	4.8	1.0
Egypt	16	78	99	163	313		68	78	132	244	0.0	38.5	15.1	9.0	3.6
Hong Kong	515	708	1183	1627	1881	507	683	1088	1362	1300	85.2	7.2	3.5	1.6	0.5
Hungary	31	34	51	56	130		15	37	30	59	0.0	18.1	7.8	3.3	0.8
India	389	685	1172	1860	5760	378	662	1137	1772	4481	61.4	17.4	9.8	5.5	2.8
Indonesia	165	247	362	564	1301	146	200	237	348	581	60.0	15.8	7.0	4.1	2.1
Israel	113	212	326	673	2745	112	212	315	593	1541	55.3	21.4	9.7	6.1	4.2
Kenya		17	55	88	288		5	28	58	89	0.0	59.6	41.6	25.3	7.9
Lithuania	1	8	24	40	195			5	18	80	0.0	0.0	55.4	16.7	8.5
Malaysia	520	938	1300	1515	2554	517	927	1274	1439	2269	58.8	21.3	10.6	5.1	4.5
Mexico	265	248	216	175	250	202	167	96	39	27	59.1	9.7	2.5	0.5	0.2
Morocco	32	97	62	109	109	13	73	38	39	28	61.2	43.2	12.5	3.4	1.6
Pakistan	25	67	204	293	1890	5	46	165	204	787	49.2	20.9	21.7	8.9	7.7
Peru	42	72	79	104	274	12	29	12	11	25	48.2	15.8	4.8	3.5	0.5
Philippines	126	163	266	334	1036	124	129	175	158	325	62.0	15.6	8.1	2.4	1.2
Poland	44	74	111	171	664	31	72	100	165	627	62.3	25.2	9.2	6.3	4.1
Romania	3	4	12	28	352				22	254	0.0	0.0	0.0	12.7	22.6
Singapore	302	450	727	915	1070	289	422	672	835	764	79.9	8.6	4.5	2.3	0.8
South Africa	572	698	754	728	1980	502	532	558	489	731	68.1	14.5	5.3	1.5	0.6
Sri Lanka		4	45	138	1970			32	119	673	0.0	0.0	32.1	26.2	25.5
Taiwan	864	1556	1845	1767	1409	859	1544	1822	1746	1345	70.3	18.3	7.5	2.9	0.9
Thailand	267	436	669	935	1823	250	376	554	701	1123	54.8	19.6	11.1	5.1	2.4
Turkey	127	246	434	627	1067	110	218	380	580	1016	50.5	21.3	11.1	6.2	2.8
Venezuela	19	35	46	57	127	5	11	11	5		88.2	56.5	24.5	6.5	0.0
Zimbabwe	3	19	69	106	334			53	78	251	0.0	0.0	31.6	16.2	15.7

Appendix Table B
Firm-Year Counts and Percent of Market

The left most panel presents firm-year counts for each USD-US Market break-point quintile portfolio. The break points are calculated each June by sorting all stocks listed on NSADAQ, AMEX and NYSE into quintiles. The dollar market cap breakpoints are converted to local currency using the prevailing exchange rate. The middle panel presents the count of the firm-years that remain after requiring stocks have non-zero price changes for at least 30% of all trading days. The last panel present the average over the 11 year sample of the June-end market capitalizations as a percent of total market cap.

Panel A: Developed Countries

	Firm-Year Count (no screens)					Firm-Year Count (with trading screens)					Percent of Market (%)				
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Austria	9	38	87	151	834		15	79	133	477	0.0	18.7	25.8	14.4	8.6
Belgium	35	93	106	121	1226	23	66	85	107	803	69.4	34.6	14.5	6.8	7.0
Canada	1172	1388	1865	2736	22670	1143	1336	1761	2521	15585	79.7	10.3	4.2	2.1	1.6
Denmark	254	322	457	544	899	234	290	327	310	229	70.5	12.3	4.4	1.6	0.4
Finland	45	92	257	308	850	11	81	248	272	585	55.2	14.5	14.2	5.5	2.3
France	600	743	894	1185	6355	510	545	670	927	4148	67.5	11.2	4.2	2.1	1.5
Germany	961	1171	1510	1736	4503	854	870	1087	1098	2427	70.9	6.0	2.3	0.8	0.4
Ireland	15	23	12	9	18	137	111	59	30	11	83.0	8.5	1.8	0.6	0.2
Italy	142	152	145	103	134	23	46	40	19	2865	76.7	7.5	3.5	0.6	47.2
Japan	42	58	63	54	3147	6980	7091	7634	6109	3680	85.1	7.9	3.1	1.0	0.2
Luxembourg	7094	7470	8461	7518	5006				11	46	0.0	0.0	0.0	12.7	4.8
Netherlands	6	3	19	37	178	316	331	352	311	420	88.4	5.5	2.0	0.6	0.2
New Zealand	334	359	371	342	626	32	128	151	206	183	74.7	24.7	9.2	4.7	1.1
Norway	54	135	159	247	420	176	343	387	317	245	60.9	17.8	6.8	1.9	0.5
Portugal	200	393	502	494	546					593	0.0	0.0	0.0	0.0	43.3
South Korea	3	5	5	34	1098	416	988	1738	2753	5412	61.4	17.7	10.1	6.1	3.2
Spain	422	1004	1772	2839	5803		26	25	78	1078	0.0	30.0	38.7	12.8	17.4
Sweden	12	42	54	84	1182	552	494	509	699	963	79.2	7.8	2.4	1.2	0.4
Switzerland	600	529	568	744	1248	622	649	516	290	172	88.9	4.2	1.1	0.2	0.0
United Kingdom	667	738	643	514	532	2537	2328	2209	1816	1446	83.5	4.5	1.4	0.4	0.1
United States	2640	2663	3223	3541	5906	13492	13473	13670	13517	12619	89.1	5.3	1.7	0.6	0.2

Continued

Appendix Table B – *Continued*

Panel B: Emerging Countries															
	Firm-Year Count (no screens)					Firm-Year Count (with trading screens)					Percent of Market (%)				
Country	Large	4	3	2	Small	Large	4	3	2	Small	Large	4	3	2	Small
Argentina	128	119	143	157	293	108	86	106	51	71	79.3	11.2	4.1	1.1	1.4
Bangladesh	1	9	20	95	1931				74	1411	0.0	0.0	0.0	22.8	36.4
Brazil	245	302	432	369	849	167	148	105	55	60	40.1	7.1	2.1	0.7	0.1
Bulgaria	2	3	2	3	118					36	0.0	0.0	0.0	0.0	15.1
Chile	206	299	322	348	551	190	208	143	61	17	61.2	14.7	3.4	0.7	0.3
China	513	3964	3358	817	20	513	3959	3338	801	20	28.3	46.9	21.5	5.0	0.2
Colombia	35	93	117	105	288	22	40	22	5	6	66.4	28.7	19.6	4.5	1.2
Cyprus	13	28	61	130	397			39	74	84	0.0	0.0	20.2	9.9	3.9
Czech Republic	26	21	70	65	115			30	24	28	0.0	0.0	15.7	4.8	1.0
Egypt	16	78	99	163	313		68	78	132	244	0.0	38.5	15.1	9.0	3.6
Hong Kong	515	708	1183	1627	1881	507	683	1088	1362	1300	85.2	7.2	3.5	1.6	0.5
Hungary	31	34	51	56	130		15	37	30	59	0.0	18.1	7.8	3.3	0.8
India	389	685	1172	1860	5760	378	662	1137	1772	4481	61.4	17.4	9.8	5.5	2.8
Indonesia	165	247	362	564	1301	146	200	237	348	581	60.0	15.8	7.0	4.1	2.1
Israel	113	212	326	673	2745	112	212	315	593	1541	55.3	21.4	9.7	6.1	4.2
Kenya		17	55	88	288		5	28	58	89	0.0	59.6	41.6	25.3	7.9
Lithuania	1	8	24	40	195			5	18	80	0.0	0.0	55.4	16.7	8.5
Malaysia	520	938	1300	1515	2554	517	927	1274	1439	2269	58.8	21.3	10.6	5.1	4.5
Mexico	265	248	216	175	250	202	167	96	39	27	59.1	9.7	2.5	0.5	0.2
Morocco	32	97	62	109	109	13	73	38	39	28	61.2	43.2	12.5	3.4	1.6
Pakistan	25	67	204	293	1890	5	46	165	204	787	49.2	20.9	21.7	8.9	7.7
Peru	42	72	79	104	274	12	29	12	11	25	48.2	15.8	4.8	3.5	0.5
Philippines	126	163	266	334	1036	124	129	175	158	325	62.0	15.6	8.1	2.4	1.2
Poland	44	74	111	171	664	31	72	100	165	627	62.3	25.2	9.2	6.3	4.1
Romania	3	4	12	28	352				22	254	0.0	0.0	0.0	12.7	22.6
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Thailand	267	436	669	935	1823	250	376	554	701	1123	54.8	19.6	11.1	5.1	2.4
Turkey	127	246	434	627	1067	110	218	380	580	1016	50.5	21.3	11.1	6.2	2.8
Venezuela	19	35	46	57	127	5	11	11	5		88.2	56.5	24.5	6.5	0.0
Zimbabwe	3	19	69	106	334			53	78	251	0.0	0.0	31.6	16.2	15.7