Asian Journal of Business and Accounting, 3(2), 2010, 1-29 ISSN 1985-4064

The Impact of Information Intermediaries on Stock Price Synchronicity

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Abstract

This paper investigates the extent to which information intermediaries, represented by financial analysts, influence the relative amount of firm-specific and market-level information being impounded into stock prices, as measured by stock price synchronicity. Using a sample of fifteen thousand and one hundred twenty (15,120) stocks from forty (40) countries, we find that stock price synchronicity is positively associated with analysts' forecasting activities, which is consistent with analysts increasing the amount of market level information in prices through intra-industry information transfers. We also find that increased disclosure, represented by the level of frequent reporting, moderates the relationship between analysts' forecasting activity and stock price synchronicity, and facilitates the firm-specific component of future earnings. Together, the results suggest that price-relevant information conveyed by financial analysts' activities is a function of the relative information advantage they have.

Keywords: Financial Analysts, Firm-Specific Information, Frequent Reporting, Stock Price Synchronicity

JEL classification: G12, G14, G15, M4

1. Introduction

Stock prices covary with both market and industry returns (King, 1966). The residual factor, which is not explained by industry or market earnings, is likely to be explained by events unique to the firm (Cyert, Moyer, & Chapman, 1967; Williams, 1967). This was affirmed by Roll (1988), who finds that the weak association between individual stock return, and market

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and industry returns in stock price movements is the result of firm-specific information embodied in the stock price.

Using stock price synchronicity, or the (R^2), as a proxy for stock price informativeness, Morck, Yeung, and Yu (2000) provide empirical support for the findings of Roll (1988). According to Piotroski and Roulstone (2004), stock price synchronicity is a reasonable benchmark for measuring firm-specific information embodied in the stock price versus industry and market level information. Stock price synchronicity has been used in several empirical studies as a measure of price informativeness and serves as a proxy for private information flow into stock prices (Ferreira & Laux, 2007).

The relationship between public information disclosure and the private information processing and gathering activities of the investor has been recognised as an important determinant of information allocation in economy (Verrecchia, 1982). Lang and Lundholm (1996) argue that if analysts are merely intermediaries in the financial market, they are mainly responsible for spreading firm information to the mass market. The literature suggests that analysts are prominent information intermediaries in the capital market (Beaver, 1998; Clement, 1999; Jacob, Lys, & Neale, 1999; Gilson, Healy, Noe, & Palepu, 2001; Ramnath, 2002; Bushman, Piotroski, Smith, & Building, 2004; Liu, 2007; Crawford, Darren, & So, 2009). Grossman and Stiglitiz (1980) argue that the informational role of analysts can be based on the assumption that a better cost-benefit trade off on information collection leads to more informed trading and more informative prices.

Previous research establishes that financial analysts play an informational role. However, the extent to which that role influences the impounding of market, industry and firm-level information is not well understood (Piotroski & Roulstone, 2004). Briefly, this paper aims to: (1) test whether analysts' following is associated with stock price synchronicity; (2) investigate the relationship between timeliness of firm financial reporting and stock price synchronicity; and (3) examine whether reporting timeliness moderates the relationship between analysts' following and stock price synchronicity.

Prior studies show mixed results concerning the role of financial analysts in communicating firm-specific information to the market. For example, Piotroski and Roulstone (2004) suggest that analysts are outsiders and have less access to firm private information than insiders and institutional investors and therefore, analysts have less competitive advantage to access inside information. Thus, they are more motivated to collect, to process and to communicate market and industry information. Chan and Hameed (2006) show similar results as Piotroski and Roulstone

(2004) but suggest that due to weak private property protection, arbitragers are less motivated to trade on private information because analysts focus on collecting, processing and communicating market and industry information.

Other studies (e.g. Liu, 2007; Kelly & Ljungqvist, 2007) report that analysts communicate firm-specific information. Our argument is that if firm-specific information is highly demanded, specifically in emerging markets (Chan & Hameed, 2006), and if financial analysts have a competitive advantage in accessing information, they will be more likely to communicate firm-specific information to the market. We propose that extended disclosure represented by interim reporting improves financial analysts' competitive advantage in accessing firm private information and therefore, they are more likely to process and communicate firm-specific information to the market. Thus, this process represents a noteworthy issue that has yet to be studied (to extend the knowledge of the effects of financial analysts and firm reported information on stock price synchronicity).

This paper contributes to the extant literature in the following ways. Firstly, while most prior studies on financial analysts' role focus on firm level characteristics (e.g. Piotroski & Roulstone, 2004; Ferreira & Laux, 2007), this study focuses on cross-country scope and mainly, emerging markets. Secondly, it focuses on the complementary role between public information disclosure and private information processing and gathering activities of investors in affecting stock price synchronicity. Thirdly, this paper, to the best of our knowledge, is the first study that tests the moderating effects of the frequency of firms' disclosure (i.e., the number of interim reports) on the relationship between financial analysts and stock price synchronicity in cross-country settings.

The remainder of this paper is structured as follows. In section 2, our research hypotheses are developed. In section 3, the measurement of variables is explained and our empirical models are presented. Section 4 describes our sample and data sources and section 5 reports the results of our findings. In section 6, the results of various robustness checks are discussed and section 7 concludes this paper.

2. Hypotheses development

2.1 Analysts following

A financial analyst who specialises in processing and interpreting financial information reported by firms has been considered as an important

component of the private information system by many researchers (e.g. Verrecchia, 1982; Bushman et al., 2004). Empirical studies on the role of financial analysts can be classified into two (2) major streams: *firm level* and *country level*. At the firm-level, empirical evidence supports that better analysts' coverage improves forecasts (Hong, Lim, & Stein, 2000), helps the price discovery process (Gleason & Lee, 2003), serves adverse selection practice (Brennan,1999; Bhattacharya, 2001) and affects synchronous stock price movements (Piotroski & Roulstone, 2004; Liu, 2007; Kelly & Ljungqvist, 2007; Crawford et al., 2009). For cross-country, Chang, Khanna, and Palepu (2000) find empirical evidence to support the association of financial analysts' accuracy and the following country market size as well as private protection level. Furthermore, several studies also find that financial analysts' accuracy increases stock synchronous movements (Chan & Hameed, 2006; Fernandes & Ferreira, 2008).

Prior research provides some guidelines to link stock price synchronicity as a proxy for private information flow, and financial analysts following activity. However, existing findings do not provide concrete evidence on the extent of the role of financial analysts in affecting the levels of systematic and unsystematic risk in stock returns (Piotroski & Roulstone, 2004). Financial analysts are outsiders who have relatively less competitive advantage in accessing firm-specific information compared to insiders and big institutional investors. Chan and Hameed (2006) provide additional evidence that supports the argument that analysts' coverage spreads more market and industry information. Chan and Hameed (2006) suggest that, intuitively, the lack of publicly available firm-specific information and less stringent disclosure requirements in emerging markets leads to greater investor demand for analysts who produce firm-specific information. Nonetheless, because of the weak private property protection in these countries, risk arbitragers are not motivated to trade on firm-specific information. Hence, in emerging markets, analysts are less motivated to collect and process firm-specific information; rather, they tend to focus on communicating systematic risk. Therefore, in accordance with this argument, analyst-forecasting activities should cause stock prices and returns to reflect systematic risk resulting in more stock price synchronicity. For these reasons, we state the first hypothesis as follows (stated in alternative form):

Hypothesis 1: Analyst following is positively associated with stock price synchronicity, ceteris paribus.

2.2 Reporting timeliness

Ferreira and Laux (2007) state that a firm's accounting information disclosure is a major factor in the flow of firm-specific information. They also argue that the cost-benefit payoff for obtaining firm private information determines whether more transparent disclosure encourages the collection of private information. Frequent reporting, namely, interim reporting is seen as a practice for increased disclosure by firms (Butler, Kraft, & Weiss, 2007). Existing evidence supports the argument that a firm's annual report contains information disclosed in its interim reports and that interim reports improve the firm's annual earnings forecasts (Brown & Niederhoffer, 1968; Brown & Rozeff, 1979; McNichols & Manegold, 1983). Increased firm disclosure has been linked to better capital market functioning. Prior research has established a role for increased disclosure in improving market liquidity, reducing the cost of capital and reducing information asymmetry (e.g., Welker, 1995; Healy et al., 1999; Leuz & Verrecchia, 2000; Botosan, 1997; Sengupta, 1998; Piotroski, 2003; Botosan & Plumlee, 2002; Brown et al., 2004; Othman, 2010).

In order to link stock price synchronicity and reporting frequency, prior research has produced certain guidelines. Grossman and Stiglitz (1980) document that better cost-benefit payoff of private information collection leads to more informed trade or higher informative stock prices. Durnev, Morck, and Yeung (2004) extend their reasoning and argue that higher firm specific variation (lower stock price synchronicity) is driven by more informed trade induced by feasible private information collection cost. Durnev, Morck, Yeung, and Zarowin (2003) report that more future earnings information is contained in stock prices that incorporate more firm-specific information. Jin and Myers (2006) argue that a lack of transparency leads outside investors to trade on market and industry information leading to the higher explanatory power of systematic risk in the total stock return. Ferreira and Laux (2007), and Hutton et al. (2009) also find that transparency of financial reporting is positively correlated with idiosyncratic volatility.

According to Veldkamp (2006), if obtaining firm private information is costly, investors are likely to focus on information that is common to many stocks. He argues that when information is costly, rational investors will not buy information about all assets; instead, they will learn about a subset and, thus, a shock to one "signal" is passed on as a common shock to many asset prices, which induces stock price co-movement (Synchronicity). This argument is consistent with the view that higher stock price synchronicity is associated with less information on firms

fundamentals in stock prices. Consistent with the previous information cost argument (Grossman & Stiglitz, 1980; Durnev et al., 2004; Veldkamp, 2006), this paper suggests that increased accounting information disclosure provided by the firm, namely, higher reporting frequency, will lead to a lower information risk and lower information cost (Francis et al., 2004). It will also induce better private information collection by risk arbitragers and, hence, lead to more informative prices (measured by low stock price synchronicity). For the above reasons, we state the second hypothesis as follows (stated in alternative form):

Hypothesis 2: Reporting timeliness is negatively associated with stock price synchronicity, ceteris paribus.

2.3 Reporting timeliness, analyst following and stock price synchronicity

Financial analysts are outsiders who generally have less access to firm level or idiosyncratic information than insiders or main institutional investors (Piotroski & Roulstone, 2004). As such, the analysts could focus their efforts on obtaining and impounding industry and market level information into prices. If the analysts are mainly intermediaries in the financial market (Lang & Lundholm, 1996), they are mainly responsible for spreading firm information to the mass market. Further, the analysts can increase the speed and efficiency of diffusion of a firm's information across market participants (Hong et al., 2000; Brennan, 1999; Walther, 1997; Bhattacharya, 2001; Liu, 2007; Kelly & Ljungqvist, 2007; Crawford et al., 2009). The accounting information disclosed in interim reports can quickly reach a broader market. In other words, the number of investors using this information in their investment decisions will increase. This will have an effect on stock price synchronicity (proxy for stock price informativeness) because investors' investment decisions will be reflected in stock prices.

At one extreme, if no one uses accounting information then the reporting timeliness of this information (interim reporting/frequent reporting) will not matter, and we should expect no moderating effect of reporting frequency on the relationship between financial analysts' following and stock price synchronicity. When the usage of the financial analysts' reports increases, it can be argued that the importance of the frequent reporting of such information will increase firm-specific information. Therefore, with more (less) level of frequent financial reporting, the relationship between financial analysts' following and stock price informativeness will be stronger (weaker). Consequently, the relationship between financial analysts' following and stock price synchronicity is

affected by the frequency of reporting. For the above reasons, we state the third hypothesis as follows (stated in alternative form).

Hypothesis 3: Reporting timeliness moderates the relationship between financial analysts and stock price synchronicity, ceteris paribus.

3. Measurement of variables and model specifications

3.1 Stock price synchronicity measurement

Empirical results and strategic models (e.g., Roll, 1988; Morck et al., 2000; Wurgler, 2000; Durnev et al., 2003; Piotroski & Roulstone, 2004; Chan & Hameed, 2006; Chen, Goldstein, & Jiang, 2007; Gul, Kim, & Qiu, 2009) support the use of stock price synchronicity as a measure of firm-specific information being incorporated in stock prices. The lower the stock price synchronicity, the more firm-specific information is reflected in the stock price.

Following the methodology outlined in Morck et al. (2000), and based on French and Roll (1986), and Roll (1988), the firm's bi-weekly return, regressed against country market index return and the US market index, is as shown in equation (1).

$$r_{it} = \alpha i + \beta_{1,i} r_{m,\,jt} + \beta_{2,i}[r_{us} + e_{jt}] + \varepsilon it, \qquad (1)$$

Where r_{it} is the return for a single stock or firm, r_m is the country market index for the same week, and r_{us} is the US market return. Since most economies are at least partially open to foreign capital, the US market was included in the above regression. The purpose of including the value ($r_{us} + e_{jt}$) is to translate the US stock market into local currency units.

The regression statistics of the equation (1) $R^2_{i,j,}$ measures the per cent variation in the bi-weekly return of stock i in country j explained by the variation in country j's market return and the US return. Therefore, given the statistics, stock price synchronicity is defined according to prior literature (i.e., Morck et al., 2000; Piotroski & Roulstone, 2004), as follows:

$$\gamma_j = \log \frac{R^2_j}{1 - R^2_j} \qquad (2)$$

3.2 Financial analysts

Financial analysts' following (*ANALYST*) is measured based on prior studies (e.g., Chang et al., 2000; Bushman et al., 2004), as the average number of financial analysts in a country following the largest thirty (30) firms in the same country. The higher the average number of analysts' following a firm in a country has, the higher is the coverage of financial analysis in this particular country. Analyst's following is a widely used proxy to measure the level of analysts' activities in a country.

3.3 Reporting timeliness

The measure of the financial reporting timeliness, *TIME*, increases with the frequency and comprehensiveness of interim reports. Reporting timeliness is measured using the average ranking of the number or frequency of reports per year, the number of disclosed items in each interim report and the consolidation of interim reports based on the study conducted by the Center for International Financial Analysis and Research (CIFAR) in 1995.

3.4 Control variables

Following the methodology outlined in Morck et al. (2000), and Jin and Myers (2006), a number of control variables are included in our model to control for economic fundamentals and country institutional developments. If the empirical results show that stock price synchronicity is not an artefact of the structural characteristics of economies, such as market size, fundamentals volatility, country size or economy diversification, or other institutional developments, then we can conclude that differences in the level of financial analysts' following coverage explain the variation in stock price synchronicity. The control variables are Logarithm of per capita GDP (*Logy*), Logarithm of number of listed stocks (*Logn*), Logarithm of geographical size (*Loggs*), Variance in GDP growth (*Vgdpg*), Industry Herfndahl index (*InzHerf*), Firm Herfndahl index (*Fherf*), Earnings Co-Movement index (*SyncROA*), Good government index (*Gov*) and Anti-director rights index (*Adr*). The definitions of the control variables and their measurement are summarised in Appendix 'A'.

3.5 Empirical models for testing hypotheses

3.5.1 Model specification

In order to test the relationship between stock price synchronicity (*SYNC*) and the independent and control variables in the model, this study follows the approach proposed by Jin and Myers (2006), and Morck et al. (2000). We first control for GDP per capita as a general measure of economic development and as a plausible proxy for any development characteristics that might be related to synchronicity. We also control for market size as a proxy for other financial development characteristics in a country. We then add the independent variables and control variables that are hypothesised to be correlated with synchronicity. As discussed above, variables that show significant results with synchronicity and render GDP per capita insignificant in the multivariate analysis are claimed to explain the variation in synchronicity. Based on this approach, the associations between financial analysts, frequent reporting and their interaction and stock price synchronicity are tested using standard multiple regression controlling for GDP, market size and other control variables. Our empirical model can be shown as follows:

Equation (3)

$$SYNCH = \alpha_i + \beta_1 logy_j + \beta_2 logn_j + \beta_3 logANALYST + \beta_4 logTime + \beta_5 loggs_j + \beta_6 vgdpg_j + \beta_7 InzHerf_j + \beta_8 fHerf_j + \beta_9 SyncROA_j + \beta_{10\ 7} g_j + \beta_{11} adr_j + \mu_j$$

Where:

Logy	:	Logarithm of per capita GDP,
Logn	:	Logarithm of number listed stocks,
LogANALYST	:	Financial analysts,
LogTime	:	Reporting timeliness,
Loggs	:	Logarithm of geographical size,
Vgdpg	:	Variance in GDP growth,
InzHerf	:	Industry Herfndahl index,
Fherf	:	Firm Herfndahl index,
SyncROA	:	Earnings Co-Movement index,
Gov	:	Good government index,
Adr	:	Anti-director rights index.

To test the effects of the interaction variable, our extended model can be shown as follows:

Equation (4)

$$SYNCH = \alpha_i + \beta_1 logy_j + \beta_2 logn_j + \beta_3 logANALYST + \beta_4 logTime + \beta_5 loggs_j + \beta_6 vgdpg_j + \beta_7 InzHerf_j + \beta_8 fHerf_j + \beta_9 SyncROA_j + \beta_{10\,7} g_j + \beta_{11} adr_j + \beta_{12} Timanly + \beta_{12} Timaudt + \mu_j$$

Where:

Logy	:	Logarithm of per capita GDP,
Logn	:	Logarithm of number listed stocks,
LogANALYST	:	Financial analysts,
LogTime	:	Reporting timeliness,
Loggs	:	Logarithm of geographical size,
Vgdpg	:	Variance in GDP growth,
InzHerf	:	Industry Herfndahl index,
Fherf	:	Firm Herfndahl index,
SyncROA	:	Earnings Co-Movement index,
Gov	:	Good government index,
Adr	:	Anti-director rights index,
Timanly	:	Reporting timeliness and analysts' interaction,
Timaudt	:	Reporting timeliness and audit interaction.

4. Sample and data sources

The data needed to construct the measure of the dependent variable of this study, stock price synchronicity, consists of bi-weekly returns for all firms listed in 1995 for forty (40) countries. To obtain the data for 1995, the *DataStream* database which covers all firms is used. Therefore, our sample selection starts by accessing all firms covered by *DataStream,* as at December 2007 and going back to 1995.[1] Since the data needed for the construction of stock price synchronicity of this study is the same as that of Morck et al. (2000), this study used the data from Morck et al. for this variable as it is more reliable, published, and similar to the data we extracted from the *DataStream* database.

Table 1, panel (A), shows the number of firms accessed by us as of December 2007 from *DataStream.* Table 1, panel (B), shows the number of firms collected by Morck et al. (2000). The *DataStream* database was also

[1] December 2007, the date of accessing *DataStream* to collect the data for this study.

used to collect the rest of the control variables for 1995 such as Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earnings Co-Movement index *(SyncROA)* and the two (2) noise control variables, namely, *market volatility* using the variance (*Mvv*) and *market volatility* using the Standard deviation (*Mvsd).*

This study tests the phenomena of the global stock price synchronicity, requiring the analysis of the whole world population of securities. As the study also requires a comprehensive data set for corporate transparency, it is found that the data required is only available in the survey conducted by CIFAR in 1995. Thus, although the data from 1995 may be considered to be outdated, we have no alternative but to either proceed with the study using the 1995 data or defer the study until more recent data is available. This study takes the position of Miller (2004) and Bushman et al. (2004) who argue that studying the issue with the limited data with the acknowledgment of the limitation is better than leaving the issue aside until enough data is available. Using the 1995 data is also justified as the empirical regularities of this study should be interpreted as hypothesised relations as suggested by Levine and Zervos (1993). The results of this study should also be interpreted in accordance with Levine and Zervos (1993) who suggest that "not finding hypothesised relations would shed 'meaningful doubt' on the hypothesised relations". Therefore, this study may provide some guidance for further extensive research. Furthermore, this study will also expand the limited international research database in the area of the effect of financial analysts' following.

5. Findings

5.1 Descriptive statistics

Table 2 provides the descriptive statistics for the total sample of forty (40) countries for the measures of stock price synchronicity, financial analysts, timeliness of reporting, the interaction variable and control variables. The basic calculation was performed on the raw figures and transformed figures. The normality tests of Jarque-Bera and Kolmogorov-Smirnov Z were both employed to check for the normality of the variables. Both tests use asymptotic tests and assume normality when accepting the null hypothesis, and otherwise when rejecting the null hypothesis.

The descriptive analysis for the R^2 of the market model based on the weekly data for the country (*j*) measure shows a mean (median) value of 0.19 (0.17), and a standard deviation of 0.12. Of the forty (40) countries,

Table 1: Number of stocks from each country to construct stock price synchronicity measure

Panel A				Panel B			
Country	No of listed stocks	Country	No of listed stocks	Country	No of listed stocks	Country	No of listed stocks
Japan	3992	Taiwan	1261	Japan	2276	Taiwan	353
Denmark	205	Portugal	70	Denmark	264	Portugal	90
Norway	N/A	Korea	1931	Norway	138	Korea	461
Germany	N/A	Greece	323	Germany	1232	Greece	248
United States	N/A	Mexico	162	United States	7241	Mexico	187
Austria	130	Chile	226	Austria	139	Chile	190
Sweden	520	Malaysia	1043	Sweden	264	Malaysia	362
France	1031	Brazil	163	France	982	Brazil	398
Belgium	246	Czech	98	Belgium	283	Czech	87
Holland	159	South Africa	349	Holland	100	South Africa	93
Singapore	745	Turkey	326	Singapore	381	Turkey	188
Hong Kong	1097	Poland	344	Hong Kong	502	Poland	45
Canada	N/A	Thailand	564	Canada	815	Thailand	368
Finland	149	Peru	208	Finland	104	Peru	81
Italy	332	Columbia	77	Italy	312	Columbia	48
Australia	1977	Philippines	297	Australia	654	Philippines	171
U.K.	2130	Indonesia	364	U.K.	1628	Indonesia	218
Ireland	59	China	1773	Ireland	70	China	323
New Zealand	149	Pakistan	259	New Zealand	137	Pakistan	120
Spain	144	India	1144	Spain	144	India	467

thirty eight (38) are under the 95 percentile. Twenty (20) countries or 50 per cent of the sample are under the 75 percentile, which makes it a little skewed to the right (skewness = 1.355). However, it is not necessary for any further transformation for this variable, as stock price synchronicity is measured using the logistic transformation of the R^2, based on observation made from prior studies (e.g. Morck et al., 2000; Piotroski & Roulstone, 2004; Jin & Myers, 2006).

As for reporting timeliness (*Time)*, the raw figures or the transformed figures for this measure show a p value < 0.05 for normality. However, both the skewness and kurtosis of this measure, as well as the test of normality, improve significantly if the observations of a few countries in the sample, namely, Greece, Korea, Turkey and Taiwan are dropped as they are outliers. These four (4) countries score very low in their reporting timeliness

Table 2: Descriptive statistics

Variables	N	Mean	Median	Standard deviation	Minimum	Maximum
Stock co-movements indices						
Logistic transformation of *ff* for country *j* (f_i)	40	-0.66	-0.69	0.49	-1.67	0.65
R^2 of market model based on for country(R^2)	40	0.19	0.17	0.12	0.02	0.57
Logistic transformation of R^2 for country *j* (γ)	40	-1.89	-1.78	0.68	-3.86	-0.56
Logarithm of Timeliness of disclosure *(TIME)*	36	4.17	4.31	0.50	2.86	4.60
Logarithm of Fin. Analyst *(ANALYST*)	36	2.52	2.55	0.61	1.20	3.48
Timeliness analyst interaction (*Timanly)*	36	10.62	11.29	3.19	4.82	15.62
Control variables						
Logarithm of per capita GDP(*Logy*)	40	8.82	9.37	1.34	5.71	10.41
Logarithm of number listed stocks (*Logn*)	40	5.57	5.54	1.06	3.81	8.89
Logarithm of geographical size (*Logs*)	40	11.80	11.81	2.12	5.59	15.16
Variance in GDP growth (*Vgdpg)*	40	8.16	4.95	9.68	0.42	38.85
Industry Herfndahl index (*InzHerf*)	36	0.59	0.53	0.21	0.33	1.00
Firm Herfndahl index (*Fherf*)	37	0.10	0.07	0.13	0.01	0.83
Earnings Co-Movement index *(SyncROA)*	38	0.37	0.36	0.13	0.15	0.77
Good government index (*Gov*)	37	23.81	25.30	5.07	12.94	29.59
Anti-director rights index (*Adr)*	37	3.19	3.00	1.37	0.00	5.00
Market volatility variable (*Mvv*)	40	6.56	6.32	2.35	1.88	13.83

Note: Descriptive statistics of stock price synchronicity indices, timeliness of disclosures, financial analyst, and structural and institutional variables. Sample includes 40 countries, but the data on corporate transparancy variables (Timeliness of reporting and Financial analyst) is only available for 36 countries.

disclosure practices.[2] Nevertheless, these countries will not be removed from the sample as the study already suffers from a limited degree of freedom. However, a further check for the normality assumption is conducted using the final model residual. The descriptive statistics result for timeliness of reporting is consistent with previous studies (e.g. Alford et al., 1993; Jaggi & Low, 2000; Francis et al., 2002; Hope, 2003; Bhattacharya et al., 2003).

5.2 Pearson correlation between transparency measures and all independent variables

Table 3 displays the sample correlation for stock price synchronicity, logarithm of GDP per capita, logarithm of the number of listed stock, the independent variables, the interaction variables and the structural and institutional lists of control variables. The directions of reporting timeliness (*Time*) with stock price synchronicity show a negative relationship as expected. This is consistent with prior findings (e.g., Morck et al., 2000; Durnev et al., 2004; Jin & Myers, 2006; Ferreira & Laux, 2007).

Financial analysts' following (*ANALYST*) shows a negative insignificant correlation with our measure of synchronicity. This is not consistent with the study's predictions.[3] One interpretation for this insignificant coefficient is that this study assumes there is a complementary role between financial reporting and analysts' following. This result implies that a significant association is not likely to exist between synchronicity and financial analysts' following in the absence of firm financial reporting. Therefore, the association of financial analysts' following and synchronicity is expected to show a significant positive association in the multivariate analysis, as reporting timeliness (*Time*) is added in the regressions.

The dependent variable (*SYNCH*) shows no significant correlation with the control variables in general except for income per capita GDP,

[2]Reporting Timeliness (*Time)* is measured using the average ranking to number ranking of interim reporting, number of disclosed items in interim reports, and consolidation of interim reports. The four (4) items were selected based on the methodology of Bushman et al. (2004) and data obtained from CIFAR 1995. According to raw figures, each one of the above countries scores only 17.39/100. This represents the minimum score out of the thirty six (36) countries in the sample. The maximum score was for Canada (99.28/100) followed by the U.S. (97.23/100). Their mean (median) score are 70.60 and (74.64) respectively. The Univariate outlier also shows a Mahalanobis distance of 5.42 for each of the four (4) countries (the benchmark for Mahalanobis is 3.29).

[3]This study proposes a positive significant association between financial analysts' following and stock price synchronicity measured by (log R^2) following prior evidence by Piotroski and Roulstone (2004), and Chan and Hameed (2006).

Table 3: Pearson product moment correlation coefficients

Variables	a	b	c	d	e	f	g	h	i	j	k	l	m
a. Log. R^2	1.00	-0.53**	-0.37*	-0.05	0.24	0.27	-0.01	0.34**	-0.53***	-0.23	-0.33**	-0.40	-0.23
		(0.00)	(0.02)	(0.78)	(0.13)	(0.11)	(0.93)	(0.04)	(0.00)	(0.17)	(0.05)	(0.02)	(0.19)
b. *Logy*		1.00	0.35**	-0.40**	-0.18	-0.22	-0.06	-0.36**	0.90***	-0.12	0.53***	0.23	0.55***
			(0.03)	(0.01)	(0.26)	(0.20)	(0.71)	(0.03)	(0.00)	(0.49)	(0.00)	(0.19)	(0.00)
c. *Logn*			1.00	0.17	-0.29*	-0.13	-0.47***	0.18	0.30*	0.17	0.50***	0.09	0.56***
				(0.29)	(0.07)	(0.44)	(0.00)	(0.27)	(0.07)	(0.30)	(0.00)	(0.58)	(0.00)
d. *Logs*				1.00	0.10	0.09	-0.18	0.12	-0.28*	0.15	0.03	0.24	-0.08
					(0.56)	(0.59)	(0.30)	(0.47)	(0.09)	(0.36)	(0.86)	(0.16)	(0.66)
e. *Vgdpg*					1.00	-0.14	0.18	-0.01	-0.20	-0.06	-0.15	-0.16	-0.11
						(0.41)	(0.30)	(0.95)	(0.23)	(0.71)	(0.39a)	(0.34)	(0.54)
f. *InzHerf*						1.00	-0.10	-0.08	-0.16	-0.05	-0.07	-0.11	-0.05
							(0.57)	(0.65)	(0.36)	(0.77)	(0.69)	(0.53)	(0.80)
g. *Fherf*							1.00	-0.01	0.07	-0.01	-0.22	-0.06	-0.25
								(0.95)	(0.68)	(0.94)	(0.20)	(0.74)	(0.15)
h. *SyncROA*								1.00	-0.30*	-0.30*	-0.09	-0.26	-0.01
									(0.08)	(0.07)	(0.60)	(0.14)	(0.96)
i. *Gov*									1.00	0.04	0.55	0.34**	0.52
										(0.79)	(0.00)	(0.04)	(0.00)
j. *Adr*										1.00	0.00	0.25	-0.11
											(0.99)	(0.13)	(0.52)
k. *Timanly*											1.00	0.65***	0.95
												(0.00)	(0.00)
l. *TIME*												1.00	0.39**
													(0.02)
m. A*NLYST*													1.00

Note: ***Significant at 0.01 level; **Significant at 0.05 level; *Significant at 0.1 level. Simple correlation coefficients between stock price synchronicity indices, corporate attribute and structural and institutional variables. Sample is 40 but only available for 36 countries for (*Time)* and (*ANALYST*). (*Logy*) Logarithm of per capita GDP, (*Logn*) Logarithm of number listed stocks, (*Logs*) Logarithm of geographical size, (*Vgdpg)* Variance in GDP growth, (*InzHerf*) Industry Herfndahl index, (*Fherf*) Firm Herfndahl index, *(SyncROA)* Earnings Co-Movement index (*Gov*) Good government index, (*Adr)* Anti-director rights index, (*Timanly)* Timeliness analyst interaction, *(TIME)* Logarithm of Timeliness of disclosure, *(ANALYST*) Logarithm of Fin. Analyst. Numbers in parenthesis are probability levels at which the Null hypothesis of zero correlation can be rejected in two- tailed tests.

market size, earnings co-movement index and good government index (*Gov*). These correlations are expected and are consistent with the results documented by Morck et al. (2000), and Jin and Myers (2006). Per capita GDP *(Logy)* is a general measure of economic development (Morck et al., 2000). Therefore, it is expected to show a significant relationship either in a simple correlation or in a bivariate analysis; however, we do not expect this result in the multivariate analysis.

Market size *(Logn*), a measure of the general financial development in a country, shows a negative correlation with stock price synchronicity. This is consistent with Chang et al. (2000) who find a strong positive association between the size of stock market to GDP, the average size of the firm, the quality of accounting disclosures and the country's legal origin and both firm-specific information and analyst's forecast accuracy. Moreover, Stulz (2005) argues that market size and financial globalisation, according to neoclassical models, will lead to market efficiency and economic benefits. This implies that a bigger market size is likely to be associated with more firm-specific information flow. Earnings co-movement *(SyncROA)* index shows a positive correlation with synchronicity, which is expected, as it represents the synchronous movements of earnings while stock price synchronicity is a proxy for the synchronous movements of returns.[4]

The results show that there is a strong correlation between GDP and good government index (over 90 per cent), which may lead to severe multicollinearity. As indicated previously, GDP per capita is a general measure of economic development and is expected to be a proxy for particular institutional development characteristics, such as respect for private property rights. Therefore, we expect per capita GDP to be rendered insignificant in the multivariate analysis when the variables, private property protection and GDP per capita, are inserted into the model simultaneously.

Reporting timeliness (*Time)* is correlated with financial analysts (*ANALYST*). One interpretation of this association is that the development of the financial system in a country may include particular characteristics that exist together. In other words, countries with developed financial systems are likely to practice interim reporting and have more financial analysts. In conclusion, results of the Pearson correlation statistics generally show that the directions of the correlations are with the study assumptions and hypotheses. The results also show that there are no severe multicollinearity concerns among the variables.

[4]High earnings quality narrows the difference between returns and earnings.

5.3 Multiple regression results

This part of the analysis discusses the tests that have been performed to evaluate the three (3) hypotheses of this study. The focus is on the association measures and the coefficient estimates of the regressions. The tests are conducted on cross sectional data. One of the problems with cross sectional regressions is the existence of multicollinearity and singularity. Other problems involved with multiple regressions are the violation of the normality, linearity and homoscedasticity of the residuals. Examination of the residuals scatter plots provides a test for the above assumptions. In addition, Jarque-Bera statistics are utilised to test the normality of the residuals. The Breuch-Pagon-Godfery (BPG) test is used in this study to test heteroscedasticity.

A standard multiple regression (OLS) was run to examine the association between stock price synchronicity as the dependent variable and financial analysts and reporting timeliness as the independent variables, controlling for the structural and institutional variables. For the final model (Model 5) in Table 4, the *F* value at the 5 per cent significance level is 3.81. The total variation explained in the dependent variable (adjusted R square and R square) is 71 per cent and 87 per cent respectively. Both are higher than the percentages cited in prior studies. For example, Morck et al. (2000) report 64 per cent for R square, and Jin and Myers' (2006) study report 68 per cent for the adjusted R square.

5.3.1 Financial analysts' following and stock price synchronicity

Table 4 (Model 5) shows a positive relationship between analysts' following (*ANALYST)* and stock price synchronicity (significant at 5 per cent one-tail level, t-statistic = 2.14). This result is consistent with the extant research, which establishes an informational role for financial analysts (Beaver, 1998; Clement, 1999; Jacob et al., 1999; Gilson et al., 2001; Ramnath, 2002; Bushman et al., 2004). It is also consistent with the extant literature that suggests analysts are prominent information intermediaries in the capital market (Healy & Palepu, 2001; Lang & Lundholm, 1996).

Prior evidence provides some guidelines to link stock price synchronicity, as a proxy for private information flow, and financial analysts' following activities. However, the available evidence provides mixed results relative to the extent that influences the impounding of market, industry and firm-level information in stock prices. The literature supports three (3) streams of evidence about the direction of the relationships between financial analysts and stock price synchronicity. The first stream of research (Piotroski & Roulstone, 2004; Chan & Hameed,

2006) finds that analysts' coverage is positively associated with synchronicity. Piotroski and Roulstone (2004), and Chan and Hameed (2006) argue that the evidence is consistent with analysts primarily acting to gather and interpret industry and market information.

The results also confirm the complementary role between firm reported information and financial analysts' activities. Table 4 (Models 2, 4, 5) shows significant results for financial analysts when both timeliness of reporting and financial analysts are simultaneously included in the model. However, when timeliness of reporting is removed from the regression in (Model 3), the variable financial analysts is rendered insignificant. This supports the evidence that the role of analysts is complementary in the spread of firm information to the mass markets, as claimed by Lang and Lundholm (1996).

5.3.2 Reporting timeliness and Stock price synchronicity

Table 4 (Model 5) shows there is a negative relationship between reporting timeliness (*Time*) and stock price synchronicity, which is significant at the 5 per cent one-tail level (t-statistic = -2.67). This negative relationship is consistent with the assumption that the nature of the private information processing requires timely information in order to be incorporated into the stock price (e.g., Ross, 1989; Glosten & Milgrom, 1985). The results are generally consistent with the efficient market hypothesis, that is, a fully informed market will bring stock prices to equilibrium. If interim reporting affects stock price synchronicity, then it should have an informative value or information value that can facilitate the flow of private information of the firm.[5] The results suggest that firms with more frequent disclosure (i.e., interim reporting) are more likely to have more private information disseminated and less stock price synchronicity, and consequently, more informed trade. The findings of this study are consistent with recent evidence by Jin and Myers (2006), Ferreira and Laux (2007), and Hutton et al. (2009). The findings are also consistent with earlier studies that establish an information role for interim reporting (Leuz & Verrecchia, 2000; Piotroski, 2003; Botosan & Plumlee, 2002; Brown et al., 2004).

Nonetheless, some other studies report results that contradict these findings. For example, Morck et al. (2000) document only marginal significance for accounting standards with stock price synchronicity. Morck

[5]Fama and Miller (1972, p.335) state that "at any point of time market prices of securities provide accurate signals of resource allocation and consumers can choose among the securities under the presumption that security prices at any time "fully reflect" all available information. A market in which prices fully reflect available information is called efficient".

Table 4: Multiple regression results – Basic model

$$SYNCH = \alpha_i + \beta_1 logy_j + \beta_2 logn_j + \beta_3 logANALYST + \beta_4 logTime + \beta_5 loggs_j + \beta_6 vgdpg_j + \beta_7 InzHerf_j + \beta_8 fHerf_j + \beta_9 SyncROA_j + \beta_{10\ 7} g_j + \beta_{11} adr_j + \mu_j$$

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	-1.96	-1.20	-2.18	2.97	1.45
	(0.23)	(0.46)	(0.25)	(0.10)	(0.50)
Logarithm of per capita GDP (*Logy*)	0.19	0.26	0.20	0.02	0.11
	(0.34)	(0.18)	(0.37)	(0.91)	(0.59)
Logarithm of geographical size (*Logs*)	0.15		-0.06	-0.05	-0.10
	(0.41)		(0.66)	(0.68)	(0.41)
Reporting Timeliness (*Time)*		-0.14		-0.95**	-0.84**
		(0.29)		(0.01)	(0.02)
Credibility of disclosures (*Audit)*			-0.08	0.86**	0.69*
			(0.78)	(0.03)	(0.09)
Fin. Analyst *(ANALYST)*		0.32**	0.15	0.39**	0.40**
		(0.10)	(0.42)	(0.05)	(0.05)
Control variables					
Logarithm of geographical size (*Logs*)	-0.03	0.01	-0.03	-0.01	0.01
	(0.55)	(0.87)	(0.66)	(0.90)	(0.83)
Variance in GDP growth (*Vgdpg*)	0.01	0.00	0.00	0.00	0.00
	(0.52)	(0.94)	(0.80)	(1.00)	(0.90)
Industry Herfndahl index (*InzHerf*)	1.22	1.10	1.25	0.75	0.92
	(0.01)	(0.01)	(0.01)	(0.06)	(0.03)
Firm Herfndahl index (*Fherf)*	-1.47	-1.55	-1.46	-2.28	-1.91
	(0.45)	(0.40)	(0.48)	(0.21)	(0.29)
Earnings Co-Movement index (*SyncROA)*	1.68*	1.69*	1.76*		1.11
	(0.08)	(0.07)	(0.09)		(0.23)
Institutional variables					
Good government index (*Gov*)	-0.11**	-0.12**	-0.10**	-0.12**	-0.12**
	(0.02)	(0.01)	(0.04)	(0.01)	(0.01)
Anti-director rights index (*Adr)*	0.01	0.06	0.02	-0.02	0.02
	(0.85)	(0.41)	(0.80)	(0.77)	(0.76)
F- Statistics	3.42	3.72	2.68	2.70	3.81
	(0.01)	(0.00)	(0.03)	(0.03)	(0.00)
Sample size	32.00	32.00	31.00	31.00	31.00
R^2	0.61	0.66	0.60	0.56	0.71

Note: ***Significant at 0.01 level; **Significant at 0.05 level; *Significant at 0.1 level.
Ordinary least squares regressions of the logarithm of systematic stock return variation, log (γ), on the logarithm of per capita GDP, structural variables and timeliness of reporting, financial analysts. To control for market size, log (number of stocks), is included in all regressions. The structural variables are log (geographical size), variance of GDP growth, industry Herfndahl index and the Firm Herfndahl index. Regressions include, as an additional structural variable, the earnings co-movement index. The sample consists of the 32 countries. Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed *t*-test.

et al. use the *CIFAR* (90 items) disclosure index adopted from La Porta et al. (1998). Miller (2004) argues that *CIFAR* (90 items) is not an appropriate measure of transparency. Another study, by Butler et al. (2007), found little evidence of a difference in timeliness between firms reporting quarterly and those reporting semi-annually. However, a sub-sample of firms that voluntarily increased reporting frequency from semi-annual to quarterly reporting experienced increased timeliness, while firms whose increase was mandatorily imposed by the SEC experienced no significant improvement in timeliness. Our result is consistent with the findings of Butler et al. (2007) for firms that voluntarily increased reporting frequency from semi-annual to quarterly reporting. The difference in the findings between our study and the above two (2) studies are mainly because of the measurement used and the data set. Our study uses interim reporting while Morck et al. (2000) used the CIFAR (90 items) index, which might be a flawed measure (Morck et al., 2000; Miller, 2004). Butler et al. use a different set of data in firm basis (the US data) while we use cross-country data that includes emerging markets.

5.3.3 Reporting timeliness, analysts' following and stock price synchronicity

Table 5 (Model 3) shows the results of the moderating effects of reporting timeliness on the relationship between financial analysts and stock price synchronicity. The results show a negative significant relationship at the 5 per cent one-tail level. Following the argument made by Tabachnick & Fidell (2007, p.157), the levels of the moderating variable (*Time*) affect the relationship between analysts' following and stock price synchronicity. The results are consistent with Lang and Lundholm (1996) who suggest that analysts are mainly responsible for spreading firm information to the mass market.[6] The results are also consistent with prior evidence that supports the analysts' role in increasing the speed and efficiency of diffusion of firm information across market participants (Hong et al., 2000; Brennan, 1999; Walther, 1997; Bhattacharya, 2001, Liu, 2007; Crawford et al., 2009).

Hence, our results are consistent with the prior studies concerning financial analysts and firm disclosure that examine whether there is any relationship between the management's disclosure decisions and analysts' decisions to cover firms. Bhushan (1989a, b) and Lang and Lundholm (1996) argue that voluntary disclosure lowers the cost of information

[6]This is according to the "complementary" assumption between firm financial disclosure and financial analysts' activities.

Table 5: Multiple regression results – Interaction variable

$$SYNCH = \alpha_i + \beta_1 logy_j + \beta_2 logn_j + \beta_3 logANALYST + \beta_4 logTime + \beta_5 loggs_j + \beta_6 vgdpg_j + \beta_7 InzHerf_j + \beta_8 fHerf_j + \beta_9 SyncROA_j + \beta_{10}\, \gamma g_j + \beta_{11} adr_j + \beta_{12} Timanly + \beta_{12} Timaudt + \mu_j$$

Variables	Model 1	Model 2	Model 3
Intercept	-14.55	2.30	-13.78
	(0.12)	(0.45)	(0.17)
Logarithm of per capita GDP (*Logy*)	0.45	0.06	0.42
	(0.10)	(0.78)	(0.17)
Logarithm of geographical size *(Logs*)	-0.19	-0.10	-0.18
	(0.15)	(0.44)	(0.17)
Transparency variables			
Reporting Timeliness *(Time)*	2.24	-0.95	2.13
	(0.20)	(0.03)	(0.25)
Credibility of disclosures *(Audit)*	0.58	-0.18	0.03
	(0.12)	(0.94)	(0.99)
Fin. Analyst *(ANALYST)*	7.18*	0.39*	7.08*
	(0.07)	(0.06)	(0.08)
Control variables			
Logarithm of geographical size (*Logs*)	0.11	0.00	0.10
	(0.15)	(0.96)	(0.25)
Variance in GDP growth (*Vgdpg)*	-0.01	0.00	-0.01
	(0.28)	(0.83)	(0.28)
Industry Herfndahl index (*InzHerf)*	1.07**	0.91**	1.06**
	(0.01)	(0.04)	(0.02)
Firm Herfndahl index (*Fherf)*	-1.09	-2.10	-1.22
	(0.54)	(0.27)	(0.51)
Earnings Co-Movement index (*SyncROA)*	1.72*	1.00	1.64
	(0.08)	(0.31)	(0.11)
Institutional variables			
Good government index *(Gov)*	-0.17***	-0.11**	-0.17**
	(0.00)	(0.02)	(0.01)
Anti-director rights index (*Adr)*	0.09	0.01	0.09
	(0.24)	(0.90)	(0.33)
Timeliness * Fin. analyst (*Timanly*)	-1.57*		-1.55*
	(0.08)		(0.09)
Timeliness * Audit credibility (*Timaudt*)		0.21	0.14
		(0.69)	(0.78)
F- Statistics	4.23	3.37	3.73
	(0.00)	(0.01)	(0.01)
Sample size	31	31	31
R^2	0.75	0.71	0.75

Note: ***Significant at 0.01 level; **Significant at 0.05 level; *Significant at 0.1 level.
Ordinary least squares regressions of the logarithm of systematic stock return variation, log (γ), on the logarithm of per capita GDP, structural variables and reporting timeliness, financial analyst and their interactions. A control for market size, log (number of stocks), is included in all regressions. The structural variables are log (geographical size), variance of GDP growth, industry Herfndahl index and the Firm Herfndahl index. Regressions include, as an additional structural variable, the earnings co-movement index. The sample consists of the 31 countries. Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed *t*-test.

acquisition for analysts and, hence, increases their supply. This negative association is consistent with the findings of Liu (2007), Kelly and Ljungqvist (2007), and Crawford et al. (2009). It indicates that timelier reporting will enhance the competitive advantage of analysts relative to insiders and institutional investors and, therefore, will motivate them to direct their activities towards communicating more firm-specific information to the capital market. To conclude this argument, if financial analysts have access to interim reporting, they will be able to process and communicate more information. This will lead to financial analysts having a greater effect on stock price synchronicity, i.e. there will be a decrease in the stock price synchronicity.

6. Robustness check

In general, our robustness checks follow Morck et al. (2000). These include: (1) using an alternative measure for stock price synchronicity; (2) adding a new variable to control for market noise, as per Jin and Myers (2006); (3) controlling for market size effects by excluding the US market; (4) controlling for time period effects by excluding Latin American countries due to the depreciation of the Mexican Peso in 1995; (5) using an alternative data set by testing high-income and low-income countries separately; and, finally, (6) testing the statistical fit of the model.[7] The results of our robustness checks show qualitatively similar results for our basic model. Thus, our results hold.

Outliers do not drive the results of this study. Diagnostic checks were conducted on the residuals and no outliers were found using *Cook's D* measure. Testing the final model fit shows that the multiple regression assumptions of normality, linearity and homoscedasticity of the residuals have been met. Examination of the residuals, scatter plots and the statistics of Jarque-Bera show a normal distribution of residuals. Breuch-Pagon-Godfery(BPG) statistics show that residuals are significantly free of heteroscedasticity concerns.

7. Summary and conclusion

Our empirical results provide evidence that financial analysts' following activities affect the relative flow of market and firm information into stock

[7]Market model residual is supposed to represent firm-specific variation if we assume perfect efficiency.

prices. The results indicate that this effect is dependent on the timing and the volume of information reported by the firm. We also show that the results are not an artefact of structural characteristics of economies such as market size, gross domestic product, fundamental volatility, country size, economic diversification or the co-movements of firm level fundamentals. The results are consistent with analysts increasing the amount of market level information in prices through intra-industry information transfers. The results suggest that price-relevant information, conveyed by financial analysts' activities, is directed to firm specific-information and market as well as industry information depending on the extent of financial analysts' access to the private information of a firm.

The findings show significant support for the current debate regarding stock price synchronicity as a measure of share price informativeness. This study also shows that reporting timeliness is significant in the incorporation of firm-specific information into stock prices. Furthermore, financial analysts' following activities spread more industry and market information than private firm-specific information. Importantly, this study draws on the efficient market hypothesis in explaining the role of public information in facilitating private information flow into stock prices.

The findings could have significant implications for standards setters; regulators, such as securities commissions; and corporate executives. Regulators, as well as standards setters and corporate executives in emerging markets, may have more incentive in extending voluntary interim reporting if these markets experience a high cost of capital due to the risks involved with less effective institutions and low private property protection.

Further to the practical implications, this study is beneficial as it extends prior accounting empirical research in capital market research concerning accounting in emerging markets. In particular, this study has contributed to the limited database and research concerning the value relevance of interim reporting and financial analysts' activities. Further research is invited to extend our understanding in this important area.

It is recognised that the interpretation, although supported by the study results, is still conjecture. Further studies are needed to provide alternative explanations for the econometric findings of this study. The study can be extended in terms of methodology and design. Specifically, additional research questions can be investigated, such as the effects of interim reporting in developed markets versus emerging ones. It can also be developed on a regional basis similar to the study carried by Ball, Robin, and Wu (2003). Further studies can also be extended to explore new dimensions in the design. Politically connected firms, government owned, capital structure and family ownership could have some effects on both

corporate transparency and stock price informativeness. The incorporation of these variables in the research design is likely to provide a better understanding of the underlying relationships of the determinants of stock price synchronicity.

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Appendix A : Description and measurement of variables

Concept	Abstract	Type	Definition	Measurement
Price informativeness	Stock price Synchronicity	DV	Reasonable benchmark for measuring the relative amount of firm – specific vs market and industry information incorporated in the price market and industry	Log of (R^2), based on CAPM or market models. Or average percentage of shares moving together in a week in a country in 1995
Economic variables	GDP per capita Market size	CVs	GDP per capita No of PLCs in the market	(log) GDP per capita for 1995 (log) no of listed companies for 1995
Structural variables	Geographic size GDP growth variance Industry Herfindal Index Firm Herfindal Index Earning co-movement index	CVs	Area/population Change in GDP (90-94) Industry to market sale Firm to country sales Percentage of firm return to market.	(log) country size (log) GDP v. growth (log) industry to makt sales 1995 (log) firm/country sales ROA firm/country
Institutional Variables	Good government index Anti-director index	CVs	Measure of legal, judicial system Measuring stockholder rights	Score 3 indexes 5 points scale
Financial analyst	ANALYST	IV	Number of financial analyst following the largest 30 companies in 1996	Average numbers of analyst
Reporting timelines	TIME	IV	Average ranking of the answers to the following interim reporting questions: Ea (frequency of reports), Ed-Ef (count of disclosed items), and Eb (consolidation of interim reports).	Internally constructed from data contained in CIFAR
Audit	AUDIT	CV	Variable indicating the percentage of firms in the country audited by the Big 5 accounting firms. AUDIT equals 1, 2, 3, or 4 if the percentage ranges between (0, 25%), (25%, 50%), (50%, 75%), and (75%, 100%), respectively.	International Accounting and Auditing Trends, CIFAR