CHAPTER FIVE

EMPIRICAL RESULTS AND DISCUSSION

5.1 INTRODUCTION

The objective of this chapter is to report and discuss the findings of this study. The chapter is structured as follows. Section 5.2 presents the descriptive statistics of the study variables. Section 5.3 shows the Pearson product moment correlation between stock price synchronicity and the list of the transparency attributes, interaction variables and control variables. Section 5.4 reports the association measures and the coefficient estimates of the regression results. Section 5.5 presents the tests for the robustness of the results. Section 5.6 discusses the overall findings of the study. Finally, Section 5.7 provides a summary and conclusion of the chapter.

5.2 DESCRIPTIVE STATISTICS

Table 5.1 provides descriptive statistics for the whole sample of forty countries for the measures of stock price synchronicity, corporate transparency, interaction variables, logarithm of GDP per capita, logarithm of number of listed stock, and structural and institutional control variables. Basic calculations were performed on the raw figures and transformed figures. Results for evaluation of assumptions of multiple regressions led to the transformation of the variables to reduce skewness, the number of outliers and improve normality, linearity and homoscedasticity. Logarithmic transformation was used on all transparency variables and geographical country size. Variables reported on table 5.1 are the transformed figures.

Table 5.1
Descriptive Statistics

Variables	Mean	Median	Standard deviation	Minimum	Maximum
Stock co-movements indices					
Average fraction of stocks moving same direction (*fj*)	67.41	66.75	5.32	57.90	82.90
R^2 of market model based on weekly data for country(*j)*	0.19	0.17	0.12	0.02	0.57
Logistic transformation of *fj* for country *j* (Ψ)	-0.66	-0.69	0.49	-1.67	0.65
Logistic transformation of R^2 for country *j* (ψ)	-1.89	-1.78	0.68	-3.86	-0.56
Logarithm of firm-specific variation $\log(\sigma_\varepsilon^2)$	-2.35	-2.32	0.51	-4.52	-1.52
Logarithm of market-wide variation log (σ_m^2)	-3.96	-3.86	0.92	-5.52	-1.86

Table 5.1
(Continued)

Variables	Mean	Median	Standard deviation	Minimum	Maximum
Corporate reporting transparency					
Logarithm Disclosure intensity (*CIFAR)*	4.26	4.29	0.12	4.03	4.44
Logarithm Financial Disclosure (*DISCL)*	4.36	4.48	0.37	2.67	4.61
Logarithm Governance Disclosure *(GOVERN)*	4.36	4.34	0.15	4.18	4.61
Logarithm of Accounting Principles (*MEASURE)*	4.12	4.23	0.46	3.13	4.61
Logarithm of Reporting Timeliness *(TIME)*	4.17	4.31	0.50	2.86	4.60
Logarithm of Credibility of disclosures *(AUDIT)*[45]	1.10	1.39	0.44	0.00	1.39
Logarithm of Credibility of disclosures *(100 AUDIT)*[46]	3.49	3.64	1.66	0.00	6.29

[45] AUDIT equals 1, 2, 3, or 4 if the percentage ranges between (0, 25%), (25%, 50%), (50%, 75%), and (75%, 100%) based on CIFAR 1995 as per Bushman et al (2004)
[46] Number of auditors per 100,000 population as per Bhattacharaya et al. (2002)

Table 5.1
(Continued)

Variables	Mean	Median	Standard deviation	Minimum	Maximum
Private Information					
Logarithm of Fin. Analyst *(ANALYST*)	2.52	2.55	0.61	1.20	3.48
Inside Trading *(IT_ ENF)*	-2.24	-2.27	0.73	-3.41	-0.99
Information dissemination					
Logarithm of Media Channels *(MEDIA)*	4.27	4.42	0.31	3.38	4.57
Interaction variables					
Timeliness analyst interaction (*Timanly)*	10.62	11.29	3.19	4.82	15.62
Timeliness auditor interaction (*TimAudt*)	15.31	16.02	7.51	0.00	28.24
Control variables					
Logarithm of per capita GDP(*LogGDP*)	8.82	9.37	1.34	5.71	10.41
Logarithm of number listed stocks (*Logn*)	5.57	5.54	1.06	3.81	8.89
Logarithm of geographical size (*Logs*)	11.80	11.81	2.12	5.59	15.16

Table 5.1
(Continued)

Variables	Mean	Median	Standard deviation	Min.	Max.
Variance in GDP growth (*Vgdpg)*	8.16	4.95	9.68	0.42	38.85
Industry Herfndahl index (*InzHerf*)	0.59	0.53	0.21	0.33	1.00
Firm Herfndahl index (*Fherf*)	0.10	0.07	0.13	0.01	0.83
Earning Co-Movement index *(SyncROA)*	0.37	0.36	0.13	0.15	0.77
Good government index (*Gov*)	23.81	25.30	5.07	12.94	29.59
Accounting standards index (*Actdx*)	63.41	64.00	11.08	36.00	83.00
Anti-director rights index (*Adr)*	3.19	3.00	1.37	0.00	5.00
Other control variables					
Market volatility variable (*Mvv*)	6.56	6.32	2.35	1.88	13.83
Market volatility variable (*Mvsd)*	63.96	22.62	161.53	2.54	999.11

Note:

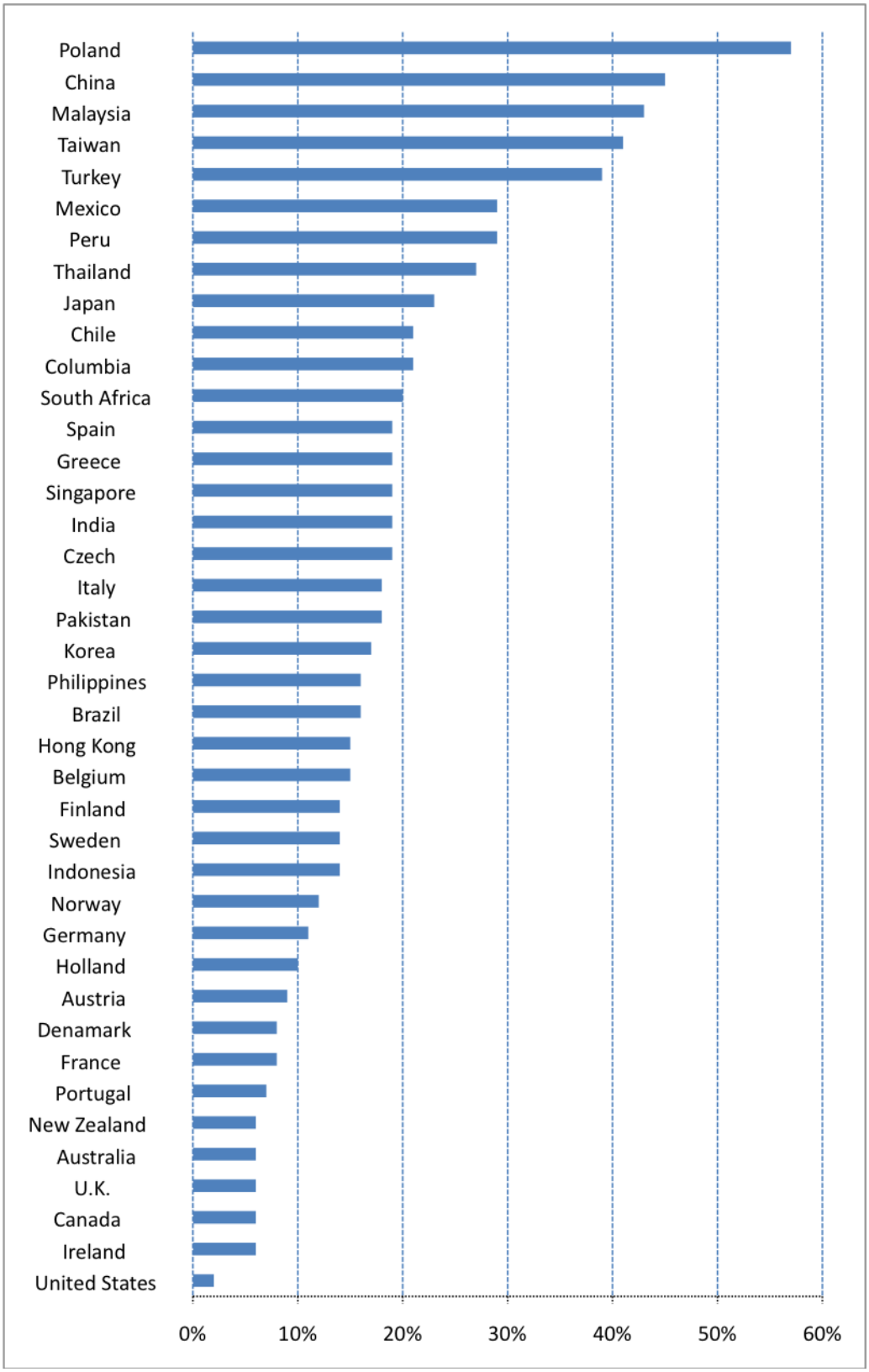
Descriptive statistics of stock price synchronicity indices, stock variance decomposition variables $\log(\sigma_{\varepsilon}^{2})$ and $\log(\sigma_{\varepsilon}^{2})$, corporate transparency variables, and structural and institutional variables. Sample is 40 countries for all control variables, but available only for 36 countries for corporate transparency variables except for credibility of disclosures, which is available for 35 countries and accounting standards index, which is available for 34 countries.

Both normality tests of Jarque-Bera and Kolmogorov-Smirnov Z were employed to check for normality of the variables. Both tests use asymptotic tests and assume normality when accepting the null hypothesis and otherwise when rejecting the null. Pearson product moment correlation and empirical tests use the ranks of the variables to avoid outliers and normality concerns.

R^2 Descriptive analysis for R^2 of market model based on weekly data for country (j) measure in Table 5.1 shows a mean (median) value of 0.19 (0.17) and standard deviation of 0.12. As shown in figure 5.1, the United States shows the lowest stock synchronous movements (R^2 = 0.02) and the highest is Poland (R^2 = 0.57). Around 38 of the 40 countries are under the 95 percentile. Twenty countries or 50 percent of the sample are under the 75 percentile, which makes it a little skewed to the right (skewness =1.355). However, there is no need for any further transformation for this measure since stock price synchronicity will be measured using the logistic transformation of the R^2 which is already normally distributed. This measure has been used by previous studies (e.g., Morck et al., 2000; Piotroski and Roulstone, 2004; Jin and Myers, 2006).

Our main measure for synchronicity in Table 5.1, logarithm transformation of R^2 of market model based on weekly data for country (j), reports a mean (median) value of -1.89 (-1.78) and standard deviation 0.68 with skewness of 0.75 and kurtosis of 3.97. The p value for this variable is >0.05, indicating normality for this measure based on both Jarque-Bera and Kolmogorov-Smirnov Z tests of normality.

Figure 5.1
Percent of Returns Variation Explained by Market



Adapted from Morck et al. (2000, p.227)

Note:
Figure 5.1 shows Stock price synchronicity in various countries measured by the average percent of total bi-weekly firm-level return variation in 1995 explained by local and US value weighted market (R^2).

The ten corporate transparency measures were all transformed to their natural logarithm to reduce any possible outliers, skewness, and kurtosis and to achieve better distribution for these variables. In general, developed markets score higher in the ten transparency attributes compared to emerging markets. For example in the *CIFAR* 90 items scale, out of the maximum scoring of 100 points, United Kingdom scores the highest (85/100) and Brazil the lowest (56/100). This is likely to be consistent with prior studies on opacity and disclosures (e.g., Alford et al., 1993; Jaggi et al., 2000; Francis et al., 2001; Hope, 2003; Bhattacharya et al., 2006).[47]

The corporate transparency measures above satisfy the multiple regression assumptions showing accepted levels of skewness, kurtosis and normality except for logarithm of financial disclosure (*Discl*), logarithm of timeliness of disclosure (*Time*) and logarithm of credibility of disclosures (*Audit*). The above three attributes in both forms, raw and transformed figures, report p value <0.05 for both Jarque-Bera and Kolmogorov-Smirnov Z indicating non-normality. By eliminating the observations of one country (Columbia) as an outlier from the financial disclosure (*Discl*) variable, skewness decreases from -2.814 to -0.730 and normality for this measure is maintained.[48] However, knowing that only one observation is causing the difference in skewness, there is no intention to drop this observation since the study is already suffering from a limited degree of freedom. Instead, that will be dealt with when testing for the Multivariate outliers using Cook's distance in the final model.[49]

[47] Alford et al. (1993) used disclosures developed by Saudagaran and Biddle(S&B 1991) where higher numbers indicate more disclosures. Bhattacharya et al. (2006) used the overall earning of opacity that is a time-series variable per country consists of earning aggressiveness, loss avoidance and earning smoothing

[48] Columbia scored only (14.50/ 100) on disclosures items. The mean (median) and standard deviation of this item using the raw figure are 82.11 (87.86) and 20.82 respectively. Using Mahalanobis distance to check for Univariate outlier this observation score 20.73 where the benchmark is (3.29) according to (Tabachnick 2007,p.73)

[49] Morck et al. (2000) used Cook's distance to check for outlier as robustness for results. Cook's distance assesses for change in regression coefficients when a case is deleted. (Tabachnick 2007,p. 75)

As for the credibility of disclosures (*Audit*) measure, the interval scale of this item, which is between 1 to 4, depends on the percentage of firms audited by the big 5 audit firms in a country where 1 represents 25 percent or less of total companies and 4 represents 75 percent or above of total companies audited by Big 5 audit firms. By eliminating "1" as an outlier, normality can be maintained and improvement in skewness can be achieved, however, this will involve excluding a considerable number of observations. Therefore, the sample of this item is kept as it is, as we already have a limited degree of freedom (35 observations) for this variable.

As for reporting timeliness (*Time)*, the raw or the transformed figure of this measure shows *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 some countries in the sample (Greece, Korea, Turkey, and Taiwan) are removed from the sample as outliers. The four countries score very low in their reporting timeliness disclosure practices.[50] However, applying that will limit the degree of freedom to 32 observations. Moreover, these four mentioned countries represent a significant part of the emerging market group of the study sample. Therefore, the above observations will be maintained in the sample. Again, this problem will be dealt with when testing the Multivariate outliers in the final model using the Cook's distance, as per Morck et al. (2000).[51]

[50] 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 items were selected based Bushman et al. (2004) methodology and data obtained from CIFAR 1995. According to raw figures each country of the above countries scores only (17.39/100). This represents the minimum score out of the 36 countries in the sample. The maximum score was for was Canada (99.28/100) followed by US (97.23/100). The mean (median) score are 70.60 and (74.64). The Univariate outlier shows Mahalanobis distance 5.42 for each of the four countries (the benchmark for Mahalanobis is 3.29)

[51] Please refer to (Tabachnick 2007, p. 75) for more details on Univariate and Multivariate outliers.

The first group of the control variables, GDP per capita (*LogGDP*) and market size (*Logn*), was transformed based on the models of Morck et al. (2000) and Jin and Myers (2006). GDP per capita (*LogGDP*) and market size (*Logn*) show mean (median) values of 8.82, 5.82 (9.37, 5.55) and standard deviation of 1.34 and 1.06, respectively. GDP per capita was tested to be free of extreme outliers concerns with *p* value >0.05. The highest GDP per capita in the sample is Japan, while the lowest is in India.[52] Around twenty-five percent of the sample are developed countries that enjoy an income per capita of over 20,000 USD/per capita.

The market size *(Logn*) measure does not meet the normality benchmark and reports *p* value = 0.04 only. When excluding the American market with 7,241 stocks, *p* value increases to 0.57. However, the American market will not be excluded as an outlier and will be kept in the sample consistent with prior studies (Morck et al. 2000; Jin and Myers, 2006) but will be considered in the final model's multivariate outlier test as well as in the robustness check for market size effects. In general, it can be seen that higher GDP per capita and bigger market size in terms of stock listed are associated with developed markets. This is consistent with prior studies (e.g., Guenther et al., 2000; Francis et al., 2001; Frost et al., 2005). For example, Guenther et al. (2000) found that differences in the legal system, differences in investor protection and differences in tax conformity in France, Germany, Japan, the UK and US affect the relationship between financial accounting earnings and real economic value (measured by change in real GDP). Similarly, Francis et al. (2001) found that financial markets are more developed in common law countries. Frost et al. (2005) demonstrate strong support for the hypothesis that strength of disclosure systems (disclosure rules, monitoring and enforcement) is positively associated with market development.

[52] GDP per capita in Japan is 33,190 USD. However, the lowest is in India, only 303 USD/ per capita.

Checking structural control variables, logarithm of geographical size (*Loggs*) show a mean (median) value of 11.80 (11.81) and standard deviation of 2.12. Variance in GDP growth *(Vgdpg*) shows a mean (median) value of 8.16 (4.95) and standard deviation of 2.12. Industry herfndahl index (*InzHerf*) shows a mean (median) value of 0.59 (0.53) and standard deviation of 0.21. Firm Herfndahl (*Fherf*) index shows a mean (median) value 0.59 (0.53) and standard deviation of 0.13. Earning Co-movement index (*SyncROA*) shows a mean of 0.37, median of 0.36 and standard deviation of 0.13.

All structural variables show accepted levels of kurtosis, skewness and normality except for the logarithm of geographical size (*Loggs*) where this measure's skewness and kurtosis improve when eliminating the outlier observation of (Singapore).[53] However, maintaining the observation in the sample keeps the distribution of this variable normal.[54] Therefore, this observation will be kept in the sample.

Institutional control variables group consists of three measures. Good government index (*Gov*), which shows a mean (median) value of 23.81(25.30) and standard deviation of 5.07, anti-director rights index (*Adr),* which shows a mean (median) value of 3.19 (3.00) and standard deviation of 1.37, and, finally, accounting standards index (*Adr*), which shows a mean (median) value of 63.41 (64.00) and standard deviation of 11.08. All institutional variables report accepted levels of skewness, kurtosis and *p* value for normality >0.05 (0.15, 0.44 and 0.51, respectively). The descriptive statistics of the institutional variables, especially those related to investor's protection are highly scored in developed counties,[55] especially those related to investor's protection are

[53] Singapore's geographical size (country area) reports as an outlier either in the normal or transformed figure. Geographic size control variable uses natural log of a country geographical size.

[54] Kolmogorov-Smirnov Z's normality p value >0.05

[55] Investor's protection measures in this study are Good government index and Anti- director rights index.

highly scored in developed counties.[56] This result is consistent with the findings of Morck et al. (2000).

The descriptive analysis in general for all dependent, independent, control variables meet the benchmark of the prior studies of Morck et al. (2000), Bushman et al. (2004) and Jin and Myers (2006).

5.3 CORRELATION ANALYSIS

Section 5.3 reports Product moment correlation coefficients for (i) the correlation between synchronicity measures and all independent variables including the control variables, (ii) the correlation between transparency attributes and the control variables, and (iii) the correlation between the transparency attributes themselves. The following sections discuss the Pearson moment correlation coefficients results reported in Tables 5.2 (panel A, B and C).

5.3.1 Pearson correlation between transparency measures and all independent variables

Table 5.2 panel (A) displays sample correlation of the stock price synchronicity measures, logarithm of GDP per capita, logarithm of number of listed stock, the transparency attributes, the interaction variables and the structural and institutional lists of variables.[57]

[56] Investor's protection measures in this study are Good government index and Anti- director rights index.

[57] Stock price synchronicity measures are (R^2), fraction of stocks move together(γ) , variation in the return of firm i in country j explained by market actors($\sigma^2_{m,i,j}$)and the residual return in firm i' s return($\sigma^2_{\delta,i,j}$)

Prior literature findings establish that accounting disclosures is a central element of information flow and that stock price synchronicity is directly related to the rate of information arrival.[58] Thus, the Pearson correlation results in table 5-2 panel A between stock price synchronicity and reporting timeliness show consistency with prior findings (e.g., Morck et al., 2000; Durnev et al., 2004; Jin and Myers, 2006; Ferreira and Laux, 2008; Gul et al., 2009). However, Butler et al. (2007) found that mandatory frequent reporting does not have value relevance, but they found a market reaction for voluntary interim reporting.[59]

Financial analysts following (*ANALYST*) shows a negative insignificant correlation with our measure of synchronicity (insignificant). This is not consistent with the study predictions.[60] However, one interpretation for the insignificant coefficient for Pearson correlation is that the study assumes a complementary role between financial reporting and analysts following. This result implies that the significant association is not likely to exist between synchronicity and financial analysts following in the absence of firm financial reporting.[61] Therefore, the association of financial analysts following and synchronicity is expected to show a significant positive association in the multivariate analysis since financial reporting attributes of annual or interim reporting (*Disclosure*, *Timeliness*) are included in the regressions. Moreover, given this argument, it is expected that the interaction variable of interim reporting and financial analysts will be

[58] Prior literature findings establish that volatility is directly related to the rate of information arrival as "an important consequence of arbitrage free economies (Ross 1989). Ferreira and Laux (2008) state that accounting disclosures is a central element of information flow.

[59] Bulter et al. (2007) used US data from 1950 to 1973. They find firms that voluntarily increased reporting frequency from semiannual to quarterly experienced increased timeliness, while firms whose increase was mandated by the SEC did not

[60] This study proposes a positive significant association between Financial analyst following and stock price synchronicity measured by ($\log R^2$) following prior evidence by Piotroski et al. (2004) and Chan and Hameed (2006).

[61] Analysts are mainly intermediaries in the financial market (Lang and Lundholm 1996). They only responsible mainly of spreading firm information to the mass market.

significantly correlated with stock price synchronicity.[62] Prior studies show a positive relationship between financial analysts and stock price synchronicity (e.g., Chang et al., 2000; Piotroski and Roulstone, 2004; Chan and Hameed, 2006; Ferreira and Laux, 2008).[63]

Governance disclosure (*Govern*) shows an insignificant correlation with stock price synchronicity. This attribute measures the annual disclosures in the annual reports of (i) range of shareholdings, (ii) major shareholders, (iii) management information, list of board members and their affiliations, (iv) remuneration of directors and officers, and (v) shares owned by directors and employees.[64] This insignificant correlation is consistent with the interpretation of stock price synchronicity as the reverse measure of private information flow that requires timely information (Morck et al., 2000; Ferreira and Laux, 2007). Disclosures provided by (*Govern)* are not likely to provide timely information to arbitragers or informed traders that facilitates the flow of private information. This is because this information is disclosed annually and had probably been released in announcements during the year, especially if there was a major change in shareholdings or board of directors.

Accounting principles, (*Measure*) is insignificantly correlated with stock price synchronicity. This is expected since the nature of this measure is related to the average ranking of disclosing items in annual reports such as consolidation and discretionary

[62] The interaction variable time analyst interaction *(Timlyst)* in table 5-2, Panel A reports significant relationship with stock price synchronicity.

[63] The above studies are in both country- level and cross- country level

[64] This study measurement is internally constructed by Bushman (2004) based on data contained in *CIFAR* 1995. It contains average ranking of the answers to the following questions: (1) range of shareholdings (2) major shareholders, (3) management information, list of board members and their affiliations, (4) remuneration of directors and officers, and (5) shares owned by directors and employees.

reserves in the annual financial reports.[65] Stock price synchronicity reflects the flow of private information and the incorporation of that information in stock prices by informed traders (e.g Morck et al., 2000; Piotroski and Roulstone, 2004; Ferreira and Laux, 2007), which is more likely not to be affected by annual disclosures of consolidation and discretionary reserves in the financial reports. Morck et al. (2000) use another measure of accounting information and found insignificant statistical results.[66] Morck et al. (2000) conclude that either the effect is unimportant in explaining the findings or the measure of transparency is flawed.

The dependent variables show no significant correlation with the control variables in general except for income per capita GDP, market size, earning co-movement index and private property protection index (*Gov*). These correlations are expected and consistent with results documented by Morck et al., (2000) and Jin Myers (2006).

Per capita GDP *(LogGDP)* is a general measure of economic development (Morck et al., 2000). Therefore, it is expected to show a significant relationship either in simple correlation or in bivariate analysis, however, we do not expect the results in multivariate analysis. The argument brought by Morck et al. (2000, p. 227) is that "particular economy characteristics or dimensions of economic developments might plausibly be

[65] The measure adopted by this study is internally constructed by Bushman (2004) from data contained in *CIFAR* 1995 representing average ranking of the answers to the following questions: A3 (consolidation) and A6p (discretionary reserves).

[66] Morck et al. (2000) find accounting standards are negatively correlated with stock price synchronicity but the significance in the area of 20% indicating only marginal significance.

Table 5.2 Panel (A)
Pearson Product Moment Correlation Coefficients – Synchronicity Measures and All Independent Variables

Variables	Logistic transformation of fj for country j (Ψ)	Logistic transformation of R^2 for country (ψ)	Logarithm of firm-specific variation $\log(\sigma_\varepsilon^2)$	Logarithm of market-wide variation log (σ_m^2)
Logarithm of per capita GDP *(LogGDP)*	-0.512*** (0.00)	-0.526*** (0.00)	-0.147 (0.36)	-0.611*** (0.00)
Logarithm of number listed stocks *(Logn)*	-0.473*** (0.00)	-0.373** (0.02)	0.100 (0.54)	-0.246 (0.13)
Corporate Reporting Transparency				
Logarithm Disclosure intensity *(CIFAR)*	-0.300* (0.08)	-0.361** (0.03)	-0.029 (0.87)	-0.373** (0.03)
Financial Disclosure (*Discl)*	-0.439** (0.01)	-0.362** (0.03)	0.002 (0.99)	-0.401** (0.02)
Governance Disclosure *(Govern)*	0.000 (1.00)	-0.187 (0.28)	-0.039 (0.82)	-0.263 (0.12)
Accounting Principles *(Measure)*	-0.080 (0.64)	-0.166 (0.33)	0.257 (0.13)	-0.145 (0.40)
Reporting Timeliness *(Time)*	-0.535*** (0.00)	-0.398*** (0.00)	-0.242 (0.16)	-0.464*** (0.00)

Table 5.2 Panel (A)
(Continued)

Credibility of disclosures (*Audit)*	-0.443** (0.01)	0.406** (0.02)	-0.261 (0.13)	-0.528*** (0.00)
Credibility of disclosures *(Audit 100)*	-0.388** (0.04)	-0.518*** (0.00)	0.048 (0.81)	-0.570*** (0.00)
Private Information				
Fin. Analyst (Analyst)	-0.325* (0.06)	-0.226 (0.19)	-0.045 (0.80)	-0.250 (0.14)
Institutional investors (*Pool_ inv*)	-0.392* (0.08)	-0.409* (0.07)	0.250 (0.27)	-0.244 (0.29)
Media Channels *(MEDIA)*	-0.444** (0.01)	-0.525*** (0.00)	-0.105 (0.55)	-0.600*** (0.00)
Structural Variables				
Logarithm of geographical size *(Loggs)*	-0.119 (0.47)	-0.046 (0.78)	0.274* (0.09)	0.135 (0.41)
Variance in GDP growth (*Vgdpg*)	0.255 (0.11)	0.241 (0.13)	0.279* (0.08)	0.378** (0.02)
Industry Herfndahl index (*InzHerf*)	0.338** (0.04)	0.276* (0.10)	0.192 (0.26)	0.275 (0.10)
Firm Herfndahl index (*Fherf*)	0.124 (0.46)	0.026 (0.88)	0.106 (0.52)	0.041 (0.81)
Earning Co-movement index *(SyncROA)*	0.323** (0.05)	0.339** (0.04)	-0.334** (0.04)	0.336** (0.04)

Table 5.2 Panel (A)
(Continued)

Institutional variables				
Good government index (*Gov*)	-0.477*** (0.00)	-0.531*** (0.00)	-0.260 (0.12)	-0.674*** (0.00)
Accounting standards index (*Actdx*)	-0.191 (0.28)	-0.240 (0.17)	-0.047 (0.79)	-0.230 (0.19)
Anti-director rights index (*Adr)*	-0.165 (0.33)	-0.233 (0.17)	0.306* (0.07)	-0.064 (0.71)
Other control variables				
Market volatility variable (*Mvv*)	0.083 (0.61)	0.124 (0.45)	0.013 (0.93)	0.161 (0.32)
Market volatility variable (*Mvsd*)	0.198 (0.22)	0.233 (0.15)	0.240 (0.14)	0.350** (0.03)

Note:

*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level. Simple correlation coefficients between stock price synchronicity indices, corporate attribute and structural and institutional variables. Sample is 40 countries for all innate variables but available only for 36 countries for corporate transparency variables except for credibility for disclosures, which is available for 35 countries and Accounting standards index, which is available for 34 countries.
Numbers in parenthesis are probability levels at which the Null hypothesis of zero correlation can be rejected in two-tailed tests.

related to stock price synchronicity and that per capita GDP might serve as a proxy for these characteristics". Market size *(Logn)* is a measure of the general financial development in a country, which shows a negative correlation with stock price synchronicity. This is consistent with Chang et al. (2000) who found a strong positive association between 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 analysts forecast accuracy. Stulz (2005) argues that market size and financial globalization, according to neoclassical models, will lead to market efficiency and economic benefits. This implies that bigger market size is likely to be associated with more firm-specific information flow.

However, Campbell et al. (2000) noticed a material decline in the time series of stock price synchronicity for the US market during the twentieth-century. This finding supports the hypothesis that synchronicity as a measure of firm private information flow is not related to the size of the market or the economy. This result supports the assumption of this study that market size serves as proxy for other economy characteristics and financial developments. Therefore, it is expected to show a significant coefficient in Pearson correlation or bivariate analysis but not in the multivariate analysis, which will be discussed later in the multiple regression results section.

Earnings co-movement *(SyncROA)* index shows a positive correlation with synchronicity and this is expected since it represents the synchronous movements of earnings while stock price synchronicity is a proxy for the synchronous movements of

returns. Therefore, we should expect this positive significant correlation, especially if the earnings quality score is high in the country sample.[67]

The interaction variables of timeliness and financial analysts interaction *(Timlyst)* and timeliness and auditor interaction *(Timadt)* show a higher significant negative correlation with synchronicity. The correlations for the two variables are -0.327, -0.587, respectively, at the 0.05 significance level. The study only predicts these negative associations for timeliness and analyst interaction. The main reason for these statistical results is likely to be related to non-orthogonality. In multivariate analysis, orthogonality refers to the perfect non-association of the independent variables. When variables are correlated they have shared or overlapping variance. Due to this property, bivariate association and correlation results are usually different from multivariate analysis results because only one independent variable is tested with the dependent variable. Therefore, the overlapping variance in multivariate analysis is eliminated in these analyses (Tabachnick 2007, p.8).[68]

5.3.2 Pearson product moment correlation between main independent variables

Table 5.2 panel (B) reports the Pearson correlation between the lists of the transparency attributes including the interaction variables and logarithm of GDP per capita, logarithm of number of listed stock and the list of structural and institutional and control variables.[69] The results show that there is a strong correlation between GDP and good government index (over 90%), 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 economic development characteristics, such as

[67] High earning quality narrows the differences between returns and earnings.

[68] Interaction variables of this study have high correlation with independent variable in the empirical model. See Table 5.2 Panel (B) Univariate statistics and simple correlation for Pearson correlation of the study variables.

[69] Most of the innate variables list is used by Morck et al. (2000), Jin and Myers (2006) and Habib (2007).

respect for private property rights.[70] Therefore, we expect per capita GDP to render insignificant in the multivariate analysis.

Similarly, media channels (*MEDIA*) attribute is also highly correlated with good government index and per capita GDP (over 80%). Morck et al. (2000), and Jin and Myers (2006) include GDP per capita and good government index in their models as control variables. This study will follow closely the same methodology but will control for GDP per capita by additional restricted model and remove media channels (*MEDIA*) to avoid any multicollinearity concerns. No other concerns of multicollinearity exist in the list of the above variables and, therefore, will be included in the regression models.

5.3.3 Pearson product moment correlation between transparency attributes

The purpose of Pearson correlation between transparency attributes in Table 5.2 panel (C) is to reveal any high correlations among the corporate transparency measures to avoid multicollinearity problems.[71] The correlation among the corporate transparency attributes are generally positive (greater than 0.1) and significant ($p < 0.05$), but does not exceed the multicollinearity benchmark of 80 percent according to Gujarati (2003) and Hair (2006).

Disclosure intensity (*CIFAR*) has 90 disclosure items so it is correlated with the rest of the attributes. *CIFAR*'s highest correlation is with financial disclosures attribute (71%) and the lowest with accounting principles (31%).

Financial disclosure (*Discl)* has significant correlation with the rest of the attributes. The highest is 56 percent with financial analysts (*ANALYST*) and the lowest is 36

[70] The basic argument and findings of Morck et al. (2000) are related to the issue of good government or the good respect for private property rights in high income countries comparing to less income per capita GDP countries.

[71] This study uses the benchmark of 80 percent according to Guguarati (2003) and Hair (2006).

percent with disclosure credibility (*Audit)* and timeliness (*Time*). This is expected since (*ANALYST*) activities commence generally after issuing financial reports assuming the complementary role of financial reporting and financial analysts following activities (Lang and Lundholm, 1996).[72]

Governance disclosure (*Govern)* has no significant correlation with the rest of the attributes except with credibility of disclosures (43%); this may explain why companies disclose more corporate governance issues when they are audited by one of the (Big 5) auditors.[73]

[72] As indicated earlier , this study assumes complementary role of financial reporting and financial analyst.

[73] Governance disclosures include: range of shareholdings, major shareholders, management information, list of board members and their affiliations, remuneration of directors and officers, and shares owned by directors and employees.

Table 5.2 Panel (B)
Pearson Product Moment Correlation Coefficients - Corporate Transparency Variables and Control variables

Variables	Per capita GDP	Number of listed stocks	Geog. area	Variance in GDP growth	Industry herfindal index	Firm herfindal index	Earning co-movement	Private Property Protection	Actg. standard index	Anti director index
Corporate Reporting										
Logarithm disclosure intensity *(CIFAR)*	0.39** (0.02)	0.16 (0.35)	-0.06 (0.75)	-0.08 (0.66)	0.04 (0.84)	0.03 (0.85)	-0.22 (0.20)	0.47** (0.00)	0.80*** (0.00)	0.41** *(0.01)*
Financial disclosure (*Discl)*	0.47*** (0.00)	0.34** (0.04)	-0.13 (0.43)	-0.07 (0.69)	-0.18 (0.32)	-0.19 (0.28)	-0.29 (0.09)	0.52*** (0.00)	0.50*** (0.00)	*0.18 (0.29)*
Governance disclosure (*Govern)*	0.26 (0.13)	-0.02 (0.89)	-0.32** (0.05)	-0.20 (0.24)	0.27 (0.13)	0.25 (0.16)	-0.27 (0.12)	0.41** (0.01)	0.65*** (0.00)	0.48*** (0.00)
Accounting principles *(Measure)*	0.27 (0.12)	0.00 (0.98)	-0.10 (0.58)	0.09 (0.60)	-0.23 (0.18)	0.09 (0.62)	-0.18 (0.30)	0.26 (0.13)	0.14 (0.42)	0.27 (0.12)
Reporting Timeliness *(Time)*	0.23 (0.19)	0.09 (0.58)	0.24 (0.16)	-0.16 (0.34)	-0.11 (0.53)	-0.06 (0.74)	-0.26 (0.14)	0.34** (0.04)	0.35** (0.04)	0.25 (0.13)
Credibility of disclosures *(Audit 100)*	0.65*** (0.00)	0.15 (0.39)	-0.10 (0.56)	-0.23 (0.17)	-0.10 (0.60)	0.05 (0.79)	-0.15 (0.40)	0.66*** (0.00)	0.37** (0.03)	0.14 (0.42)

Table 5.2 Panel (B)
(Continued)

Private Information										
Fin. analyst (*Analyst*)	0.55*** (0.00)	0.56*** (0.00)	-0.08 (0.66)	-0.11 (0.54)	-0.05 (0.80)	-0.25 (0.15)	-0.01 (0.96)	0.52*** (0.00)	0.59*** (0.00)	-0.11 (0.52)
Institutional investors*(Pool_ inv)*	0.22 (0.33)	0.25 (0.28)	0.20 (0.38)	0.44** (0.05)	-0.04 (0.87)	-0.18 (0.47)	-0.03 (0.91)	0.24 (0.29)	0.18 (0.44)	0.10 (0.67)
Info. Dissemination										
Media Channels *(MEDIA)*	0.97*** (0.00)	0.33** (0.05)	-0.32** (0.06)	-0.20 (0.26)	-0.16 (0.37)	0.05 (0.77)	-0.09 (0.63)	0.87*** (0.00)	0.48*** (0.00)	-0.14 (0.42)
Interaction variables										
Timeliness * Fin. analyst *(Timlyst)*	0.53*** (0.00)	0.50*** (0.00)	0.03 (0.86)	-0.15 (0.39)	-0.07 (0.69)	-0.22 (0.20)	-0.09 (0.60)	0.55*** (0.00)	0.61*** (0.00)	0.00 (0.99)
Timeliness * auditor *(Timadt)*	0.54** (0.00)	0.23 (0.23)	-0.09 (0.64)	-0.06 (0.75)	-0.30 (0.13)	0.11 (0.58)	-0.30 (0.13)	0.61*** (0.00)	0.57*** (0.00)	0.27 (0.16)

Note:
*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level.
Simple correlation coefficients between corporate transparency attributes and structural and institutional variables. Sample is 37 countries except for accounting standards, Credibility of disclosures, and Institutional investors, which have only 34, 34, and 21 countries, respectively. Numbers in parenthesis are probability levels at which the Null hypothesis of zero correlation can be rejected in two-tailed tests

Timeliness of reporting (*Time)* is only correlated with financial analysts (*ANALYST*) and credibility of disclosures (*Audit*). One interpretation of these correlations is that the development of financial systems in a country may include particular characteristics that exist together. In other words, countries with developed financial systems are likely to report more interim reporting, have more financial analysts and a large proportion of listed companies audited by the "Big 5" audit firms.[74]

In conclusion, the results of the Pearson correlation statistics show that most directions of the transparency variables go with the study assumptions and hypotheses. Control variables inclusion in the correlation tests with synchronicity closely follow the argument brought by Morck et al. (2000). The tests also show that there are no severe multicollinearity concerns between transparency variables.

Following Bushman et al. (2004), institutional investor and internal trading variables are excluded from the regression models due to the limited degrees of freedom. Information dissemination (*MEDIA*) is highly correlated with private property protection variable (87%) and, therefore, will be restricted in the final model.[75]

[74] Currently Big 4 firms.

[75] The correlation between *(Media)* and private property protection (Gov) exceeds the benchmark of 80 percent according to Gujarati (2003) and Hair (2006).

Table 5.2 Panel (C)
Product Moment Correlation Coefficients - Corporate Transparency Attributes

	a	b	c	d	e	f	g	h
a. Disclosure intensity *(CIFAR)*	1.00	0.61***	0.71***	0.31*	0.50***	0.58***	0.38	0.44**
	.	(0.00)	(0.00)	(0.07)	(0.00)	(0.00)	(0.03)**	(0.01)
b. Financial disclosure (*Discl)*		1.00	0.47***	0.38**	0.36**	0.36**	0.56***	0.40**
		.	(0.00)	(0.02)	(0.03)	(0.03)	(0.00)	(0.02)
c. Gov. Disclosure *(Govern)*			1.00	0.27	0.23	0.43**	0.15	0.28*
			.	(0.11)	(0.17)	(0.01)	(0.39)	(0.10)
d. Accounting principles *(Measure*)				1.00	0.07	0.20	0.16	0.24
				.	(0.69)	(0.26)	(0.34)	(0.17)
e. Timeliness of disclosure *(Time)*					1.00	0.65***	0.39**	0.20
					.	(0.00)	(0.02)	(0.24)
f. Credibility of disclosures *((Audi big 5)*						1.00	0.37**	0.67
						.	(0.03)**	(0.00)
g. Fin. Analyst *(Analyst)*							1.00	0.50***
							.	(0.00)
h. Media Chanel *(MEDIA)*								1.00

Note:
*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level.
Simple correlation coefficient among corporate transparency attributes. Sample is 37 countries except for accounting standards, Credibility of disclosures and Institutional investors which have only 34, 34, and 21 countries, respectively. Numbers in parenthesis are probability levels at which the Null hypothesis of zero correlation can be rejected in two-tailed tests

5.4 MULTIPLE REGRESSION RESULTS

This part of the analysis discusses the tests that have been performed to evaluate the research hypotheses. The focus is on the association measures and the coefficient estimates of the regressions. Regressions are estimated in cross-sectional sample. Cross-sectional regressions are likely to lead to econometric problems concerning the estimation of the standard errors of the coefficients because multiple observations are included for a given country. One of these problems is the existence of multicollinearity and singularity. Either of these problems can occur because the independent variables themselves are highly correlated or because of the inclusion of the interactions among the independent variables or their powers.

To identify these problems, screening runs will be carried out for perfect or highly squared multiple correlations (SMC) among independent variables where each independent variable, in turn, serves as the dependent variable and the others serve as independent variables (Tabachnick, 2007, p.90). The very low tolerance (1-SMC) is a good tool for multicollinearity diagnosis. Berry (1993) reports that when r is 0.9, the standard errors of the regression coefficient are doubled. When multicollinearity is present, none of the regression coefficients may be significant because of the large error of standard errors (Tabachnick, 2007, p.90).

Other problems involved with multiple regressions are the violation of normality, linearity and homoscedasticity of the residuals. Examination of the residuals scatter plots provides a test for the above assumptions. In addition, significance tests for normality, linearity and homoscedasticity will be carried out. Jarque-Bera statistics will be utilized to test the normality of the residuals. Breuch-Pagon-Godfery test will be used to test heteroscedasticity. BPG regresses the squared residual on the original regressor

by default. Non-independance of errors or autocorrelation assumes the correlation of errors and this causes one more problem that violates the assumption of the multiple regressions. Durbin-Watson statistics will be used to test for autocorrelation in the model. Finally, test of outliers of cases that may cause poor fit of the regression equation will be checked. Outliers lower the multiple correlations. The statistical criterion for identifying multivariate outliers is $_p$ =.001. This $_p$ is associated with standardized residuals in excess of +/- 3.3[76].

A standard multiple regressions (OLS) is run to examine the association between stock price synchronicity measures as the dependent variable and corporate transparency attributes as the independent variables controlling for the structural and institutional variables. The underlying regression assumptions are evaluated. This study's regression results are not driven by outliers. Diagnostic checks are conducted on the residuals obtained in Tables 5.3 and 5.4. No outliers were found using *Cook's D* measure.[77] Cook's distance assesses the regression coefficients when the case is deleted; cases with Cook's distance scores larger than 1 are suspected of being outliers (Tabachnick, 2007, p.75).

5.4.1 Regression results for H1, H2 and H3

Table 5.3 (Model 1-9) presents results of the association between corporate transparency attributes and stock price synchronicity. As stated in the previous sections, except for the positive relationship that financial analysts following *(ANALYST*) and credibility of disclosures *(Audit)* have with stock price synchronicity, countries that score higher in transparency attributes are likely to be associated with less stock price

[76] (Tabachnick, 2007)

[77] Morck et al. (2000) conducted Cook's D test for outliers. A large Cook's D indicates that excluding a case from computation of the regression statistics and changes the coefficients substantially.

synchronicity. Therefore, I expected a negative relationship between the scores of corporate financial reporting transparency attributes and stock price synchronicity measures based on data collected from CIFAR 1995.[78]

For the final model (Model 9) in Table 5.3, the *F* value at the 5 percent significance level is (2.85). The total explained in the dependent variable (adjusted R^2) is 75 percent. The statistics for adjusted R^2 in this study are higher than prior studies. For example, Morck et al. (2000) report 64 percent for R^2.[79] Jin and Myers (2006) report 68 percent for adjusted R^2.

Similar to this study, Morck et al. (2000) use cross-sectional data and measure transparency using accounting standards index adopted from La Porta et al. (1998a).[80] Jin and Myers (2006) replicated the study of Morck et al. (2000) but used pool data from 1991-2000 and general transparency measurement.[81] Ferreira and Laux (2007) use pool data from 1991-2001 but in a firm-level within country basis and measure transparency using Francis et al. (2005) abnormal accruals.[82] These differences in methodology and data sets may explain the differences of the results between this study and the prior studies mentioned above.

[78] Financial analyst following *(ANALYST*) and credibility of disclosures *(Audit)* variables are argued in the hypotheses development section of this study to have positive relationship with stock price synchronicity. Please refer to hypotheses development part in Chapter 4 section 4.2 for more details.

[79] Morck et al. (2000) report R^2. This study reports adjusted R^2. The R^2 of this study is 87 percent.

[80] Morck et al. (2000) use *CIFAR* (90 items) disclosure index. This study uses the same item as one of the corporate transparency framework.

[81] Jin and Myers (2006) measure corporate transparency using (i) Transparency measure from Global Competitiveness Report, (ii) Number of auditors per 100,000 population, (iii) Diversity of analyst forecasts.

[82] Ferreira and Laux (2007) report only 7.7 percent R^2 but their study is bases on firm level within country basis.

5.4.1.1 Reporting timeliness and Stock price synchronicity

Table 5.3 presents the regression results of stock price synchronicity and each of the corporate transparency attributes controlling for the GDP per capita, market size and the list of structural and institutional variables introduced by Morck et al. (2000), and Jin and Myers (2006). The final model (Model 9) shows a significant negative relationship between Timeliness of disclosures (*Time*) and Stock price synchronicity. The results show a coefficient mean of -0.97, significant at the 5% one-tail level (t-statistic = -2.62). This attribute is extracted from *CIFAR* 1995 data to measure average ranking of a country on the answers to: (i) frequency of reports, (ii) count of disclosed items, and (iii) consolidation of interim reports. 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.[83]

The results are generally consistent with the efficient market hypotheses, that is, a fully informed market will bring stock price to equilibrium. If interim reporting affects stock price synchronicity, (or idiosyncratic volatility), then it should have an informative value or information value that can facilitate the flow of private information of the firm.[84] The results suggest that firms with more disclosures (i.e., interim reporting) are more likely to have more private information disseminated and less stock price synchronicity, and, consequently, more informed trade.

[83] This is in accordance with prior studies that show volatility in share prices is directly related to the rate of information arrival and informed trade as an important consequence of arbitrage free economies (e.g., Ross 1989; Golsten and Milgrom,1985; French and Roll,1986). Other studies (e.g., Wurgler 2000, Durnev et al., 2003; Piotroski and Roulstone, 2004; Chan and Hameed, 2006; Chan et al., 2006). For details, see the literature review in Section 2.2.1. The above studies document that stock price synchronicity is the extent of capitalization of information about firm fundamentals into stock prices. On the other hand accounting disclosures is defined as central element of information flow (Ferreira and Laux, 2007), and interim reporting can be viewed more generally as one form of disclosures (Butler et al., 2007).

[84] 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"

The findings of this study are consistent with recent evidence by Hutton et al. (2009), Jin and Myers (2006), Ferreira and Laux (2007) and Hutton et al. (2009). These studies provide evidence concerning the negative relationship of corporate transparency and stock price synchronicity. The findings are also consistent with earlier studies that establish an information role for interim reporting.[85] For example, McNichols and Mangold (1983) show that interim financial reports have some information in annual reports. Brown and Niederhoffer (1968) and Brown and Rozeff, (1979) provide evidence on the role of interim reporting in improving forecasts of annual earning. Other researchers have documented the role of increased disclosures in improving liquidity (e.g. Welker, 1995; Healy et al., 1999; Leuz and Verrecchia, 2000), reduce the cost of capital (e.g. Botosan, 1997; Sengupta, 1998; Piotroski, 2003; Botosan and Plumlee, 2002), and reduce information asymmetry (Welker, 1995; Healy et al., 1999; Brown et al., 2005).

However, other studies report divergent results to these findings, for example, Morck et al. (2000) document only marginal significance for accounting standards with stock price synchronicity.[86] Morck et al. (2000) use *CIFAR* (90 items) disclosure index adopted from La Porta et al. (1998a). Morck et al. (2000) conclude that either accounting standards effects on stock price synchronicity is unimportant in explaining the findings or their measure of accounting standards is flawed. It is likely that the measure of Morck et al. (2000) is unsound. Miller (2004) argues that *CIFAR* 90 items is not an appropriate measure of transparency.[87]

[85] It is worth noting that the above studies use different measurement of transparency but still report significant negative relationship between corporate transparency and stock price synchronicity.

[86] The p value is in the neighborhood of 20 percent.

[87] Miller (2004) stated that CIFAR is a general measure of transparency that includes over 90 items some of which are not related to accounting information.

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 subsample 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 improvements in timeliness.[88] The result of this study is inconsistent with the findings of Butler et al. (2007) for firms that voluntarily increased reporting frequency from semi-annual to quarterly reporting.

In general, the study findings are supported by the theory and the extant literature. Competing evidence on the effects of reporting frequency on stock price synchronicity is limited and more likely to be a result of methodology and different data sets.[89] Therefore, the first hypothesis of this study is supported.

5.4.1.2 Financial analyst following and Stock price synchronicity

Table 5.3 (Model 9) shows a significant positive relationship between analyst following (*ANALYST)* and stock price synchronicity. The results show a coefficient mean of (0.49) significance at the 5% one-tail level (t-statistic = 2.29). Analysts following was measured using the number of analysts following the largest 30 companies in each country in 1996.[90]

This result, in general, is consistent with the extant research that establishes an informational role for financial analysts (Beaver, 1998; Clement, 1999; Jacob, 2001;

[88] Butler et al. (2007) findings are based on a sample of 28,824 reporting-frequency observations from 1950 to 1973 before SEC regulations in USA. The SEC took an active role in regulating reporting frequency for exchange-listed firms by mandating annual reporting in 1934, semiannual reporting in 1955, and quarterly reporting in 1970.

[89] Particularly Morck et al. (2000), and Butler et al. (2007) studies.

[90] Source: Chang, Khanna, and Palepu (2000). This measure is also used by Bushman et al. (2004).

Gilson et al., 2001; Ramnath, 2002; Bushman et al., 2004; Piotroski and Roulstone, 2004; Chan and Hameed, 2006; Liu, 2007; Kelly and Ljungqvist, 2007; Crawford et al., 2009). It is also consistent with extant literature that suggests analysts are prominent information intermediaries in the capital market (Healy et al., 2000; Lang and Lundholm, 1996).[91]

Prior evidence provides some guidelines to link stock price synchronicity, as a proxy for private information flow and financial analysts following activity. However, 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 streams of evidence about the direction of the relationships between financial analysts and stock price synchronicity.

First stream of research (Piotroski and Roulstone, 2004; Chan and Hameed, 2006) found that analysts coverage is positively correlated with synchronicity. Both papers argue that the evidence is consistent with analysts primarily acting to gather and interpret industry and market information.[92]

Second, in contrast to the evidence in the above two papers, Liu's (2007) model shows how specific analysts incentives affect the type of information analysts provide. The model predicts that analysts are most likely to produce firm-specific information given their

[91] Lang and Lundholm (1996) identify two roles analysts play in the capital market (i) financial intermediaries where the rate of information flow from firm to analyst who determines volume of processed information transferred to the capital market or, (ii) financial analyst serves as information providers. Literature refers to these two roles as 'substitutes' or 'complements'. This study assumes the "complements" role.

[92] Piotroski and Roulstone (2004) argue that because analysts lack access to inside information (relative to institutions and insiders) they are likely to focus their efforts on collecting and interpreting industry- and market-wide information as it relates to the firms they cover. Chan and Hameed (2006) argue that due the lack of publicly available company specific news in emerging markets due to less stringent requirements for information disclosures in these markets, the benefits to be gained from collecting firm-specific information might be high so that there are more incentives for analyst to collect such information. However, the weak property rights in these markets discourage informed risk arbitrage based on firm-specific information. Therefore, analysts are more likely to focus on communicating market and industry information.

incentives to create information with investment value.[93] Liu (2007) found that the firm-specific component of stock returns is much larger than the market and industry components. He investigates the cross-sectional properties of the components of these returns and found that the firm (industry) component varies negatively (positively) with synchronicity (the industry beta). Liu's (2007) study is important because it employs a different methodology from prior studies and provides evidence that analysts are heavily involved in generating firm-specific information (Crawford et al., 2009).

Similar to the findings of Liu (2007), Kelly and Ljungqvist (2007) support analysts role in communicating firm-specific information. They examine the value of analysts research using exogenous coverage terminations (terminations due to brokerage firms scaling back their research activities). They show that firm-specific volatility (a measure inversely related to synchronicity) falls after coverage terminations. This suggests that the loss of analysts coverage increases the amount of industry-and market-information contained in prices.

The third stream of research in the area of analysts and stock price synchronicity is the paper of Crawford et al. (2009).[94] It is closely related to Piotroski and Roulstone (2004), Chan and Hameed (2006) and Liu (2007), as it investigates whether analysts provide firm-specific or industry-and market-related information about the firms they cover. Crawford et al. (2009) examined how the "*initiation"* of coverage affects synchronicity.

[93] Liu (2007) examines short-window returns surrounding the release of recommendation revisions (i.e., recommendation upgrades and downgrades). To measure the amount of firm, industry, and market information contained in these revisions he estimates each firm's market and industry beta using daily trading data from the year prior to the revision. He then calculates the amount of market (industry) information in the revision by multiplying the estimated market (industry) beta by the value-weighted market (industry) daily return in days -1, 0, and +1 relative to the release of the recommendation. The amount of firm-specific information contained in revisions is simply the difference between the firm's total return in the three days surrounding the revision and the return attributable to the market and industry.

[94] Crawford et al.(2009) use stock return synchronicity as a measure of the mix of information available about a particular firm, with more industry and market information being associated with higher levels of synchronicity. They show that coverage initiations of firms with no prior analyst coverage increase stock return synchronicity.

The result suggests that an analyst who begins to cover a firm with no existing coverage largely produces industry- and market-wide information for that firm. However, analysts initiating coverage on firms with existing coverage appear to focus on producing firm-specific information, as these initiations lead to reductions in synchronicity.

In terms of the direction of the relationship between financial analysts and stock price synchronicity, this study found a positive relationship between analysts and synchronicity. This result is consistent with the first stream of research (Piotroski and Roulstone, 2004; Chan and Hameed, 2006) and only partly consistent with the third stream (Crawford et al., 2009). However, it is not completely in contrast with the second stream (Liu, 2007; Kelly and Ljungqvist (2007). This is because Liu's (2007) findings indicate some market and industry information in the stock returns although it is largely affected by firm-specific information. According to the above discussions, the results of this study are consistent with the theory and findings and, therefore, the second hypothesis of this study is supported.

5.4.1.3 Audit credibility and Stock price synchronicity

Table 5.3 (Model 9) shows a significant positive relationship between audit credibility (*Audit)* and stock price synchronicity. The results show a coefficient mean of (0.75) significance at the 10% one-tail level (t-statistic = 1.82). Audit credibility is measured based on the percentage of firms in the country audited by the "Big 5" accounting firms.[95]

[95] Source: World Development Indicators & *CIFAR*- 1995. "*Audit"* equals 1, 2, 3, or 4 if the percentage of firms in the country audited by the "Big 5" ranges between (0, 25%), (25%,50%), (50%, 75%), and (75%, 100%), respectively.

According to the agency theory, the demand for accounting arises from its use to reduce the firm's agency cost but the contract terms are of less use if they are not monitored and enforced (Jensen and Meckling, 1976). "Auditing is one of the monitoring and enforcing tools" (Watts and Zimmerman, 1986, p.312). The demand for the auditor services depends on the assessment of nonzero probabilities of reporting a breach; the higher the probability, the more effective the contract, the lower the agency cost, the higher the issue price (Watts and Zimmerman, 1982). Therefore, the demand for "Big 5" audit firms is driven by the probability of discovering a breach and the probability of reporting that breach.[96] However, the auditor work is not only driven by the contracting theory but also by the regulation theory.[97]

Contrary to the agency theory, the results predict a significant positive relationship between audit credibility and stock synchronicity. However, given that stock price synchronicity is a measure of private information flow (Ferreira and Laux, 2007), prior studies have stated that stock prices react to earnings announcements, which suggests that overall investors regard accounting information as credible (Kothari, 2001). Therefore, the results of this study are consistent with available evidence suggesting that auditor qualifications do not provide timely signals to the capital market because they can be anticipated (Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987). These findings suggest that, at best, audit qualifications confirm information already available to investors (Healy et al., 2000).

[96] According to Watts and Zimmerman (1986,p.312- 337), the portability that the auditor *discovers* and *reports* a breach refers to the auditor **competence** (to discover) and **dependence** (to report) and therefore "Big 5" audit firms are likely to possess both.

[97] The political process affects auditing through regulations (e.g., securities act, state licensing of certified public accountants and SEC rules) or through threatened regulations; regulations and threatened regulation affect audit. They let auditors do additional work and may reduce the amount of contract monitoring involved in the audit (Watts and Zimmerman 1986,p.322)

Therefore, audit credibility in itself does not affect stock price synchronicity directly; however, it increases the credibility of the firm frequent reporting and is more likely to motivate analysts to follow firms that hire one of the Big 5 audit firms. In other words, information released in interim reports for firms audited by one of the Big 5 firms will be seen as more credible by informed traders and will be expected to have a greater effect on the flow of private information. Similarly, it will help analysts disseminate more market and industry information, as predicted in this study.[98] In other words, if a firm is audited by one of the Big 5 financial analysts it will be motivated to follow this firm and, therefore, disseminate more industry and market information. This is consistent with Lang and Lundholm (1996) who argue that analysts have more incentives to follow firms with more credible reporting. Therefore, higher stock price synchronicity is expected to be associated with more firms audited by Big 5 auditors. The results in table 5.3 (Models 5-7) support this conclusion.[99] In general, the study's findings concerning audit credibility effects on stock price synchronicity are supported by the theory and by prior studies. Therefore, the third hypothesis of this study is also supported.

5.4.2 Regression results for H4 and H5

Interaction between continuous independent variables is of interest if we want to test whether the regression coefficient or importance of one independent variable varies over a range of another independent variable (Tabachnick, 2007, p.157). According to this study, timeliness of reporting (*Time*) is expected to moderate the relationship between each of: (i) financial analysts (*ANALYST*), and (ii) credibility of disclosure and stock price synchronicity.

[98] This study assumes "complementary role for firm financial reporting and analyst following activities as per Lang and Lundholm (1996). This study also predicts that financial analyst activities will lead to incorporate market and industry information in stock prices.

[99] For example, in table 5.3 , Reporting timeliness significance increased from 10 percent in model (5)to 5 percent in model(6) due to adding "Audit". Please review table 5.3, Panel A for more details.

In other words, is the variation in stock price synchronicity explained by financial analysts following the same over the range or different levels of frequent reporting? Similarly, is the variation in stock price synchronicity explained by the credibility of disclosures the same over the range or the different levels of frequent reporting? If there is a moderating effect of frequent reporting, the relationships between the above variables and stock price synchronicity will vary based on the number of frequent reporting. In other words, if there is an interaction, the regression coefficients for financial analysts and credibility of disclosures will depend on the number of frequent reporting a firm issues annually (*Time*).

According to Tabachnick (2007, p.158), "in discrete variables, the moderating variable could be divided into (low, middle, high), then we plot separate line for each level and at each level the line would have a different slope". However, with continuous variables, as in our case, if interaction is significant, plots are generated by solving the regression at chosen levels for the financial analysts following variable. Cohen (2003) suggests using levels corresponding to the mean, one standard deviation above and one standard deviation below.

TABLE 5.3
MULTIPLE REGRESSION RESULTS – BASIC MODEL

MODEL 1- 9

$$SYNCH = \alpha_i + \beta_1 logGDP_j + \beta_2 logn_j + \beta_3 logTime_j + \beta_4 Analyst_j + \beta_5 Audit_j + \beta_6 CIFAR_j + \beta_7 Discl_j + \beta_8 Govern_j + \beta_9 Measure_j + \beta_{10} Media_j + \beta_{11} loggs_j + \beta_{12} vgdpg_j + \beta_{13} InzHerf_j + \beta_{14} fHerf_j + \beta_{15} SyncROA_j + \beta_{16} g_j + \beta_{17} adr_j + \mu$$

VARIABLES	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6	MODEL 7	MODEL 8	MODEL 9
Intercept	-0.64 (0.59)	1.04 (0.49)	2.82* (0.08)	0.133 (0.97)	-1.37 (0.29)	-3.36 (0.26)	-1.80 (0.12)	0.94 (0.79)	-0.02 (0.997)
Logarithm of per capita GDP (*LogGDP*)	0.24 (0.13)	0.15 (0.35)	0.05 (0.74)	0.224 (0.19)	0.24 (0.15)	0.27 (0.12)	0.25 (0.14)	-0.06 (0.86)	0.27 (0.256)
Logarithm of number listed stocks (*Logn*)	0.02 (0.85)	0.05 (0.67)	-0.06 (0.56)	0.048 (0.67)	0.05 (0.63)	0.04 (0.70)	0.04 (0.70)	-0.04 (0.69)	-0.14 (0.337)
Corporate Transparency									
Reporting Timeliness*(Time)*	-0.29* (0.10)	-0.65** (0.02)	-0.97*** (0.00)					-0.81** (0.04)	-0.97** (0.019)
Credibility of disclosures*(Audit)*		0.59* (0.11)	0.85** (0.02)					0.73* (0.07)	0.75* (0.088)
Fin. Analyst *(ANALYST)*			0.41** (0.02)					0.42** (0.03)	0.49** (0.037)
Logarithm Discl. intensity *(CIFAR)*				-0.526 (0.67)					-0.94 (0.411)
Financial Disclosure *(Discl.)*					-0.17 (0.52)				-0.01 (0.987)
Governance Disclosure *(Govern)*						0.34 (0.61)			1.39 (0.269)
Accounting Principles *(Measure)*							-0.04 (0.83)		-0.24 (0.274)
Media Channels(MEDIA)								0.50 (0.68)	-

Table 5.3
(Continued)

Control Variables									
Logarithm of geographical size (*Logs*)									0.06 (0.361)
Variance in GDP growth (*Vgdpg)*	0.00 (0.80)	0.00 (0.92)	0.00 (0.94)	0.002 (0.85)	0.00 (0.62)	0.00 (0.64)	0.00 (0.66)	0.00 (0.95)	-0.001 (0.923)
Industry Herfndahl index (*InzHerf)*	0.98** (0.02)	0.93** (0.03)	0.75** (0.05)	1.110** (0.02)	1.02** (0.02)	1.01** (0.03)	1.05** (0.02)	0.75* (0.06)	0.55 (0.332)
Firm Herfndahl index (*Fherf)*	-1.88 (0.31)	-2.24 (0.22)	-2.25 (0.17)	-1.342 (0.48)	-1.53 (0.42)	-1.64 (0.41)	-1.34 (0.48)	-1.70 (0.37)	-2.43 (0.250)
Earning Co-Movement index (*SyncROA)*				-					1.05 (0.348)
Good government index *(Gov)*	-0.11** (0.01)	-0.12** (0.01)	-0.12*** (0.00)	0.108** (0.02)	-0.11** (0.01)	-0.13** (0.01)	-0.12** (0.01)	-0.12*** (0.00)	-0.16** (0.007)
Anti-director rights index (*Adr)*									0.03 (0.742)
F- Statistics	**4.49*** (0.00)**	**4.24*** (0.00)**	**5.23*** (0.00)**	**3.40** (0.01)**	**3.79** (0.01)**	**3.75** (0.01)**	**3.68** (0.01)**	**3.77** (0.01)**	**2.85** 0.02**
Sample size	**32.00**	**31.00**	**31.00**	**31.00**	**32.00**	**32.00**	**32.00**	**30.00**	**31.00**
R^2	**0.56**	**0.60**	**0.68**	**0.50**	**0.52**	**0.51**	**0.51**	**0.65**	**0.75**

Note:
*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level

Ordinary least squares regressions of the logarithm of systematic stock return variation, log (ψ) , on the logarithm of per capita GDP(*LogGDP)*, logarithm of number of listed stocks *(Logn)*,Reporting timeliness *(Time)*, Credibility of disclosures*(Audit)*, Financial analyst(*ANALYST)*, Annual reporting control variables(Logarithm Disclosure intensity *(CIFAR)*, Financial Disclosure (*Discl.)*, Governance Disclosure *(Govern)*, Accounting Principles *(Measure)*, Media Channels*(MEDIA)*structural and institutional control variables (Logarithm of geographical size (*Logs*), Variance in GDP growth (*Vgdpg)*, Industry Herfndahl index (*InzHerf)*, Firm Herfndahl index (*Fherf)*, Earning Co-Movement index (*SyncROA)*, Good government index *(Gov)*, Anti-director rights index (*Adr)*.The sample consists of the 32 observations(countries). Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed t-tests.

One of the problems with including interaction variables or their powers in the prediction equation is the multicollinearity problem. To solve this problem, according to Aiken and West (1991), is to centre all the variables included, i.e., convert all variables to z-scores. This will not affect the simple correlation of the independent variables but will mitigate the multicollinearity problem with the interaction variable. Friedrich's (1982) strategy is to convert all variables including the dependent variable and the interaction variable to z-scores and then use the standardized coefficient instead of the unstandardized coefficients in the solution. The following sub-sections discuss the regression results for the moderating effects of reporting timeliness on the relationship between (i) analysts following and stock price synchronicity, and (ii) credibility of disclosures and stock price synchronicity.

5.4.2.1 Reporting timeliness, Analyst following and Stock price synchronicity

Regression results for the interaction variable (*TimLyst)*, timeliness and analysts interaction and stock price synchronicity are shown in Table 5.4 (Model 10). The results show a coefficient mean of (-1.84), significant at the 5% one-tail level (t-statistic = 2.16). Following the argument above by Tabachnick (2007, p.157), the levels of the moderating variable (*Time*) affect the relationship between analysts following (*ANALYST*) and stock price synchronicity. Statistically, this means the regression coefficient of the interaction variable will vary over a different range of interim financial reporting.

The results in general are consistent with the agency theory. The agency problem arises because savers that invest in a business venture do not typically intend to play an active role in its management, as discussed by Healy et al. (2001). Contracting theory suggests

an optimal contract between entrepreneurs and investors, such as compensation agreements and debt contracts to align the interests of the entrepreneur with those of external equity and debt claimants.[100] One of the mechanisms for reducing agency problems is information intermediaries, such as financial analysts and rating agencies who engage in private information production to uncover any manager misuse of firm resources (Healy 2001).

The findings are also consistent with the role of financial analysts in bringing prices to equilibrium according to the efficient market hypotheses. If analysts are mainly intermediaries in the financial market (Lang and Lundholm 1996), they are mainly responsible for spreading firm information out to the mass market.[101] Analysts can increase the speed and efficiency of diffusion of firm information across market participants (Hong et al., 2000; Brennan et al., 1999; Walther, 1997; Bhattacharya 2001, Liu, 2007; Crawford et al., 2009). Research on the role of financial analysts in capital markets indicates that they play a valuable role in improving market efficiency (e.g., Brennan et al., 1999; Hong et al., 2000; Bhattacharya, 2001; Gleason and Lee, 2003; Piotroski and Roulstone, 2004). Existing evidence suggests that stock prices for firms with higher analysts following incorporate information on accruals and cash flows more rapidly than prices of less followed firms (Barth and Hutton, 2000).

Information and incentive problems impede the efficient allocation of resources in a capital market economy; disclosures and the institutions created to facilitate the efficient allocation of resources in a capital market (Healy et al. 2001). Earlier studies established an information role for interim reporting (e.g., McNichols and Mangold 1983; Welker, 1995; Healy et al., 1999; Leuz and Verrecchia, 2000; Botosan, 1997; Sengupta, 1998;

[100] Please review Jensen and Meckling (1976).
[101] This is according to the "complementary" assumption between firm financial disclosures and financial analyst activities.

Piotroski, 2003; Botosan and Plumlee, 2002; Butler 2007;), and reduced information asymmetry (Welker, 1995; Healy et al., 2000).

Therefore, the study results are consistent with prior research on financial analysts and firm disclosures that examine whether there is any relationship between management's disclosure decisions, and analysts decisions to cover firms. Bhushan (1989a, b), and Lang and Lundholm (1993) argue that voluntary disclosure lowers the cost of information acquisition for analysts and, hence, increases their supply.

In terms of the direction of the relationship of the interaction variable (*TimLyst*), prior research provides mixed results. For example, Piotroski and Roulstone (2004) and Chan and Hameed (2006) found that analysts' coverage is positively correlated with synchronicity. Crawford et al. (2009) found that analysts can serve to communicate both market and firm-specific information. However, Liu (2007) and Kelly and Ljungqvist (2007) predict that analysts are most likely to produce firm-specific information given their incentives to create information with investment value.[102]

The results are strongly consistent with prior studies of the role of financial analysts in processing private information (Beaver, 1998; Clement, 1999; Jacob, 2001; Gilson et al., 2001; Ramnath, 2002; Piotroski and Roulstone, 2004; Chan and Hameed, 2006, Liu, 2007). However, the negative direction result of the relationship between timeliness and analysts interaction variable, and stock price synchronicity is consistent with the findings of Liu (2007), Kelly and Ljungqvist (2007), and Crawford et al. (2009). The study findings are supported by the theory and prior studies. Therefore, the fourth hypothesis of this study is supported.

[102] Refer to section 5.4.1.2 for more details.

5.4.2.2 Reporting timeliness, Audit credibility and Stock price synchronicity

Table 5.4 (Model 12) shows an insignificant relationship between reporting timeliness and audit credibility interaction variable **(***TimAud),* and stock price synchronicity. The results show a coefficient mean of (0.36) with p value = (0.528) and (t-statistic = 0.647).[103]

Studies of audit effectiveness examine whether audit qualifications add value for investors (Healy et al., 2000). The OLS results for the fifth hypothesis are consistent with available evidence that suggests auditor qualifications do not provide timely signals to the capital market. The results are also consistent with prior studies that argue that, at best, audit qualifications confirm information already available to investors (Healy et al., 2001) and that stock prices reaction to earnings announcements by overall investors regard accounting information as credible (Kothari, 2001). Prior studies of the stock market reaction to audit qualifications show that qualified opinions do not provide new information to investors, in part because they can be anticipated (Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987).

Prior researches have linked financial reporting disclosures to better functioning stock markets (Morck et al., 2000; Wurgler, 2000; Bushman et al., 2004; Ferreira and Laux, 2008). However, auditors only issue their reports annually and, therefore, the range of interim reporting as the moderating variable is likely to have no effect since auditors are not using that information and, hence, not issuing interim audit reports (Heally et al, 2001). In other words, the credibility of audit reports to investors will not be affected by interim reporting, simply because there is not any audit qualification for interim

[103] As explained in pervious sections, Reporting timeliness is measured using CIFAR- 1995 to measures average ranking of a country on the answers to (1) frequency of reports, (2) count of disclosed items and (3) consolidation of interim reports. "*Audit"* equals 1, 2, 3, or 4 if the percentage of firms in the country audited by the "Big 5" ranges between (0, 25%), (25%, 50%), (50%, 75%), and (75%, 100%), respectively.

reporting. Therefore, the effects on private information flow and usefulness to arbitragers is not likely to be changed due to the range of interim reporting. In contrast, investors would perceive interim reporting information reported by firms hiring one of the (Big 5) more useful and that will enhance the negative relationship of interim reporting with synchronicity.

Although some previous research has shown that interim financial report has some information (McNichols and Mangold, 1983; Botosan, 1997; Sengupta, 1998; Piotroski, 2003; Botosan and Plumlee, 2002), the audit credibility relationship with stock price synchronicity is not affected by the number of times a firm issues interim reports. This is because audit qualification does not signal any new information to the market and because audit reports are issued annually.

Therefore, the relationship between audit credibility and stock price synchronicity is not likely to be affected by the number of interim reports during the year. This is consistent with the insignificant result of the moderating effects of reporting timeliness on the relationship between audit credibility and stock price synchronicity in this study. In general, this study's findings are supported by prior studies. Therefore, the fifth hypothesis of this study is supported.

Table 5.4
Multiple Regression Results – Interaction Variables

MODEL 10-12

$$SYNCH = \alpha_i + \beta_1 logGDP_j + \beta_2 logn_j + \beta_3 logTime_j + \beta_4 Analyst_j + \beta_5 Audit_j$$
$$+ \beta_6 Timanly_j + \beta_7 Timaudt_j + \beta_8 CIFAR_j + \beta_9 Discl_j + \beta_{10} Govern_j + \beta_{11} Measure_j$$
$$\beta_{12} loggs_j + \beta_{13} vgdpg_j + \beta_{14} InzHerf_j + \beta_{15} flHerf_j + \beta_{16} SyncROA_j + \beta_{17} g_j + \beta_{18} adr_j +$$

VARIABLES	MODEL 10	MODEL 11	MODEL 12
Intercept	-18.83	1.95	-16.89
	(0.073)	(0.742)	(0.131)
Logarithm of per capita GDP (*LogGDP)*	0.68**	0.20	0.62*
	(0.028)	(0.436)	(0.062)
Logarithm of number listed stocks (*Logn*)	-0.24*	-0.14	-0.24
	(0.090)	(0.352)	(0.103)
Corporate Transparency			
Reporting Timeliness *(Time)*	2.57	-1.16**	2.36
	(0.147)	(0.028)	(0.201)
Credibility of disclosures *(Audit)*	0.67*	-0.68	-0.51
	(0.092)	(0.767)	(0.806)
Fin. Analyst *(ANALYST)*	8.45**	0.48**	8.31**
	(0.038)	(0.045)	(0.047)
Timeliness * Fin. analyst (*Timanly*)	-1.84**		-1.81*
	(0.049)		(0.059)
Timeliness* Audit credibility (*Timaudt*)		0.36	0.30
		(0.528)	(0.564)
Logarithm Discl. intensity *(CIFAR)*	-0.83	-1.02	-0.88
	(0.422)	(0.386)	(0.400)
Financial Disclosure *(Discl.)*	-0.04	0.02	-0.02
	(0.909)	(0.968)	(0.953)
Governance Disclosure *(Govern)*	1.46	1.35	1.42
	(0.202)	(0.295)	(0.225)
Accounting Principles *(Measure)*	-0.32	-0.27	-0.34
	(0.123)	(0.242)	(0.116)

Table 5.4
(Continued)

Control variables			
Logarithm of geographical size (*Logs*)	0.18*	0.04	0.15
	(0.041)	(0.631)	(0.102)
Logarithm of geographical size (*Logs*)	-0.02	-0.003	-0.02
	(0.241)	(0.812)	(0.223)
Variance in GDP growth (*Vgdpg)*	0.63	0.55	0.62
	(0.224)	(0.350)	(0.242)
Industry Herfndahl index *(InzHerf)*	-1.57	-2.70	-1.80
	(0.415)	(0.223)	(0.373)
Firm Herfndahl index *(Fherf)*	1.66	0.90	1.52
	(0.123)	(0.442)	(0.176)
Earning Co-Movement index *(SyncROA)*	-0.23***	-0.15**	-0.22***
	(0.001)	(0.014)	(0.002)
Anti-director rights index *(Adr)*	0.12	0.02	0.11
	(0.231)	(0.828)	(0.290)
F- Statistics	**3.62****	**2.61****	**3.28****
	0.01	**0.04**	**0.02**
Sample size	**31.00**	**31.00**	**31**
R^2	**0.81**	**0.76**	**0.82**

Note:

*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level

Ordinary least squares regressions of the logarithm of systematic stock return variation, log (ψ) , on the logarithm of per capita GDP(*LogGDP),* logarithm of number of listed stocks *(Logn),*Reporting timeliness *(Time),* Credibility of disclosures*(Audit),* Financial analyst(*ANALYST),* Timeliness analyst interaction (*Timanly*), Timeliness Audit interaction (*Timaudt*)Annual reporting control variables(Logarithm Disclosure intensity *(CIFAR),* Financial Disclosure (*Discl.),* Governance Disclosure *(Govern),* Accounting Principles *(Measure))* ,structural and institutional control variables (Logarithm of geographical size (*Logs*), Variance in GDP growth (*Vgdpg),* Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earning Co-Movement index (*SyncROA),* Good government index *(Gov),* Anti-director rights index (*Adr).*The sample consists of the 32 observations(countries). Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed t-tests.

5.5 ROBUSTNESS CHECK

At this stage of the analysis, it is appropriate to address some of the issues of the results of this study. Morck et al. (2000) argue that: (i) as a category, structural variables cannot in total be rejected because additional structural variables can always be found, (ii) some of the structural variables may be noisy, and (iii) earning co-movements is not necessarily able to capture fundamentals as stock prices (returns) reflect current earnings and future cash. The robustness checks in the current study expand the study of Morck et al. (2000) by introducing a new variable to capture market noise as per Jin and Myers (2006).[104] Morck et al. (2000, p.337) commented that "relating price fundamentals to accounting numbers and historical economic fundamentals can be complicated". The current study assumes that corporate transparency, in particular, frequent reporting and financial analysts following reports, are able to communicate some private information that involves future cash flows.

The sample size of this study is limited and, therefore, adding new variables with the current degree of freedom may lead to a violation of multiple regression assumptions and inflate the standard error of the regressions. The robustness checks in the current study, in general, follow Morck et al. (2000). They include: (i) using alternative measure for stock price synchronicity, (ii) adding new variable to control for market noise, as per Jin and Myers (2006), (iii) controlling for market size effects by excluding the US market, (iv) controlling for time period effects by excluding Latin American countries due to the depreciation of the Mexican Peso in 1995, (v) alternative data set by testing high-income and low-income countries separately, (vi) using stock wide market

[104] This variable is adopted by Jin and Myers (2006)

variation and market model residual as alternative synchronicity measures, and, finally, (vii) testing the statistical fit of the model.[105]

5.5.1 Alternate stock price synchronicity measure

Morck et al. (2000) extended the work of Roll (1988) and introduced two measures for cross-country stock synchronous movement, one of which uses the classical pricing model used by French and Roll (1986), and Roll (1988), and is applied in the regression analysis of this study. The other is a simple and direct measure representing the percentage of stocks moving together of the total stocks in the market. The following is a brief mathematical structure of the two models.

5.5.1.1 Market Model

Following the methodology outlined in Morck et al. (2000), and based on French and Roll (1986) and Roll (1988), both of which used US data, firms' biweekly return is regressed against country market index return and US.[106]

$$r_{it} = \alpha_i + \beta_{1,i} r_{m,jt} + \beta_{2,i}[r_{us} + e_{jt}] + \varepsilon_{it},$$

Where r_{it} a return in a single r_m a country market index for the same week and r_{us} is the US market return. Since most economies are at least partially opened to foreign capital, the US market was included. 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 above equation, $R^2_{i,j,}$ measures the percent of variation in the bi-weekly return of stock i in country j explained by the variation in country j 's

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

[106] Please refer to chapter two, section 2.1.1(equation 7) for more details.

market return and the US market return. Therefore, given the statistics, stock price synchronicity can be defined as:

$$R^2 j = \frac{\sum_i R^2_{ij} \mathbf{X} SST_{i,j}}{\sum_i SST_{i,j}} \quad (12)$$

Where $SST_{i,j}$ is the sum of squared total variations.

5.5.1.2 Percentage of stock moving together

The second measure based on the methodology of Morck et al. (2000), for each country, the percentage of stocks moving together up or down to the total moving stocks during single week can be calculated according to equation (1) discussed in chapter two section 2.1.1 as follows:

$$f_{jt} = \frac{\max \left[n_{jt}^{up}, n_{jt}^{down} \right]}{n_{jt}^{up} + n_{jt}^{down}}, \quad (9)$$

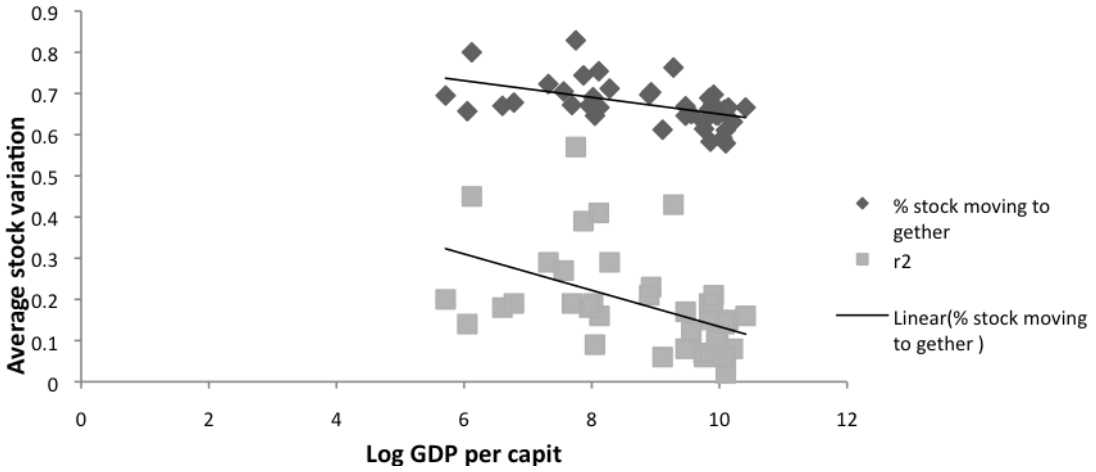
Where n_{jt}^{up} is the number of stocks in country j whose prices rise in week t, and n_{jt}^{down} is the number of stocks whose prices fall in the same week. f_j is the average value of f_{jt}, as discussed in Chapter two section 2.3 equation (5) and redefined below:

$$f_j = \frac{1}{T} \sum_t \frac{\left[max n_{jt}^{up}, n_{jt}^{down} \right]}{n_{jt}^{up} + n_{jt}^{down}} = \frac{1}{T} \sum_t f_{jt} \quad (10)$$

Where n_{jt}^{up} is the number of stocks in country (j) whose prices rise in week t and n_{jt}^{down} is the number of stocks whose prices fall, and T is the number of periods.

The values of f_i are between 0.5 and 1.0. Figure 5.2 plots the two measures against gross domestic products for each country in 1995.

Figure 5.2
Stock Price Synchronicity and Gross Domestic Product.



Note:
Figure 5.2 plots gross domestic products against stock price synchronicity measured by both the market model and percentage of stock moving together

For the robustness check, I use average stock moving together in the same week for 1995. If the assumption is true, the results of the new regression should be qualitatively similar to the results obtained using R^2 calculated using the market model. As reported in table 5.5. (Models 1-5), the overall results as the individual results do not change from the basic model reported in tables 5.3 and 5.4 (model 9 and model 12). Hence, the study results hold.

5.5.2 Market noise effects

Jin and Myers (2006) introduced a local market volatility proxy measured either by the variance or the standard deviation of market returns to control for differences in market risk. Contrary to Morck et al. (2000) who interpreted high market volatility and high R^2 as a result of poor investor protection, Jin and Myers (2006) argue that Morck et al. (2000) concentrate on market noise trading on the market portfolio and not on the individual stock. Jin and Myers (2006) aimed to concentrate on firm-specific information and, thus, introduced a market noise control to ensure that changes in stock price synchronicity are not a proxy for differences in market risk or (noise). Similar to

Jin and Myers (2006), the variable of interest in this study is firm-specific information. If the addition of local market volatility control does not change the sign or the significance of this study's transparency variables, particularly, timeliness of reporting, credibility of disclosures, financial analyst following and the two interaction variables, then this study's results hold.

Table 5.6 shows the results of adding noise variables introduced by Jin and Myers (2006), namely, Variance market volatility (*Mvv*) and SD market volatility (*Mvsd*). The results reported in table 5.6 (Models 1-7) show similar results to our basic models (model 9 and model 12). None of the coefficients of the transparency variables or the control variables show significantly different results from those in the earlier models. Therefore, the result of this study holds.

5.5.3 Alternative methods of controlling for market size effects and model specifications

The model construction of calculating synchronicity in this study follows Morck et al. (2000) and based basically on the classical market model applied by French and Roll (1986) and Roll (1988), as follows:

$$r_{it} = \alpha_i + \beta_{1,i} r_{m,jt} + \beta_{2,i}[r_{us} + e_{jt}] + \varepsilon_{it},$$

Where r_{it} a return in a single r_m a country market index for the same week and r_{us} is the US market return. Since most economies are at least partially opened to

Table 5.5
Multiple Regression Results – Using Alternate Stock Price Synchronicity Measure

$$SYNCH = \alpha_i + \beta_1 logGDP_j + \beta_2 logn_j + \beta_3 logTime_j + \beta_4 Analyst_j + \beta_5 Audit_j + \beta_6 Timanly_j + \beta_7 Timaudt_j + \beta_8 CIFAR_j + \beta_9 Discl_j + \beta_{10} Govern_j + \beta_{11} Measure_j + \beta_{12} loggs_j + \beta_{13} vgdpg_j + \beta_{14} InzHerf_j + \beta_{15} fHerf_j + \beta_{16} SyncROA_j + \beta_{17} g_j + \beta_{18} adr_j + \mu$$

VARIABLES	MODEL 1	MODEL 2	MODEL 3	MODEL 4
Intercept	-1.83	-14.13*	-2.30	-14.97*
	(0.59)	(0.06)	(0.58)	(0.07)
Logarithm of per capita GDP (*LogGDP*)	0.12	0.39	0.14	0.42
	(0.44)	(0.06)	(0.44)	(0.07)
Logarithm of number listed stocks (*Logn*)	-0.16	-0.23	-0.16	-0.23
	(0.12)	(0.03)	(0.13)	(0.03)
Corporate Transparency				
Reporting Timeliness *(Time)*	-0.44*	1.88	-0.4	1.97
	(0.11)	(0.13)	(0.25)	(0.14)
Credibility of disclosures *(Audit)*	-0.07	0.02	0.41	0.53
	(0.80)	(0.94)	(0.80)	(0.72)
Fin. Analyst *(ANALYST)*	0.07	5.44*	0.24	5.5*
	(0.80)	(0.05)	(0.15)	(0.06)
Timeliness * Fin. analyst (*Timanly*)		-1.2*		-1.22*
		(0.06)		(0.07)
Timeliness* Audit credibility (*Timaudt*)			-0.09	-0.13
			(0.83)	(0.72)
Logarithm Discl. intensity *(CIFAR)*	-0.37	-0.30	-0.35	-0.27
	(0.64)	(0.68)	(0.67)	(0.72)
Financial Disclosure *(Discl.)*	-0.32	-0.34	-0.32	-0.35
	(0.24)	(0.17)	(0.25)	(0.18)
Governance Disclosure *(Govern)*	1.39	1.43	1.4	1.45
	(0.12)	(0.08)	(0.13)	(0.09)
Accounting Principles *(Measure)*	0.04	-0.01	0.05	0.00
	(0.80)	(0.93)	(0.78)	(0.99)

Table 5.5
(Continued)

Control variables				
Logarithm of geographical size (*Logs*)	0.00 (0.96)	-0.30 (0.68)	0.00 (0.95)	0.08 (0.21)
Variance in GDP growth (*Vgdpg)*	0.00 (0.97)	-0.01 (0.32)	0.00 (0.94)	-0.01 (0.38)
Industry Herfndahl index (*InzHerf)*	0.45 (0.26)	0.5 (0.17)	0.45 (0.27)	0.51 (0.18)
Firm Herfndahl index (*Fherf)*	-2.09 (0.16)	-1.52 (0.27)	-2.03 (0.19)	-1.42 (0.32)
Earning Co-Movement index (*SyncROA)*	0.53 (0.49)	0.93 (0.21)	0.57 (0.48)	0.99 (0.21)
Good government index *(Gov)*	-0.06 (0.10)*	-0.11 (0.02)*	-0.06 (0.11)*	-0.11 (0.02)*
Anti-director rights index *(Adr)*	0.00 (0.96)	0.06 (0.38)	0.01 (0.93)	0.07 (0.37)
F- Statistics	**2.83** **0.03**	**3.44** **0.01**	**2.50** **0.04**	**3.06*** **0.02**
Sample size	**31.00**	**31.00**	**31.00**	**31.00**
R^2	**0.75**	**0.81**	**0.75**	**0.81**

Note:

*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level

Ordinary least squares regressions of the logarithm of systematic stock return variation, log (ψ) , on the logarithm of per capita GDP(*LogGDP),* logarithm of number of listed stocks *(Logn),*Reporting timeliness *(Time),* Credibility of disclosures*(Audit),* Financial analyst(*ANALYST),* Timeliness analyst interaction (*Timanly*), Timeliness Audit interaction (*Timaudt*)Annual reporting control variables(Logarithm Disclosure intensity *(CIFAR),* Financial Disclosure (*Discl.),* Governance Disclosure *(Govern),* Accounting Principles *(Measure))* ,structural and institutional control variables (Logarithm of geographical size (*Logs*), Variance in GDP growth (*Vgdpg),* Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earning Co-Movement index (*SyncROA),* Good government index *(Gov),* Anti-director rights index (*Adr).*The sample consists of the 32 observations(countries). Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed t-tests.

foreign capital, the US market was included; the purpose of including the value (r_{us} + e_{jt}) is to translate the US stock market into local currency units.[107]

As shown in the above regression model, in estimating $R^2 j$ for stock return regression, the model incorporates the possibility of market integration of the US with other markets, but it only assumes that the US market influences other markets and not the opposite. Therefore, the " $R^2 j$ " for the US is constructed without other markets. According to Morck et al. (2000), if the US market is influenced by other markets, $R^2 j$ estimating $R^2 j$ for the US could be downward biased. Therefore, the US observation was excluded from the sample. This check follows the methodology of Morck et al. (2000). However, the variables of interest of this study are the transparency variables.[108] The other reason for dropping US observations is the descriptive analysis results of this study, which shows the US market size observation as a univariate outlier case.

If dropping the US observation of local market size does not change the sign or the significance of these study transparency variables, specifically, timeliness of reporting, credibility of auditing and financial analyst and the two interaction variables, then this study's results hold.

Regressions in table 5.7 (odels 1-9) drop the US observation from the sample; the reported results are qualitatively similar to our basic models (model 9 and model 12). None of the coefficients of the transparency variables or the control variables show significantly different results from those in the earlier models. Therefore, the results of this study are robust.

[107] Morck et al. (2000) argument

[108] Morck et al. (2000) robustness check focused on private property protection.

Table 5.6
Multiple Regression Results – Controlling for Market Noise Effects

MODEL 1-7

$$\widehat{SYNCH} = \alpha_i + \beta_1 logGDP_j + \beta_2 logn_j + \beta_3 logTime_j + \beta_4 Analyst_j + \beta_5 Audit_j + \beta_6 Timanly_j + \beta_7 Timaudt_j + \beta_8 CIFAR_j + \beta_9 Discl_j + \beta_{10} Govern_j + \beta_{11} Measure_j + \beta_{12} loggs_j + \beta_{13} vgdpg_j + \beta_{14} InzHerf_j + \beta_{15} fHerf_j + \beta_{16} SyncROA_j + \beta_{17} g_j + \beta_{18} adr_j + \mu$$

VARIABLES	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6	MODEL 7
Intercept	-0.02	0.05	0.00	-20.01	-19.13*	-18.14	-17.20
	(1.00)	(0.99)	(1.00)	(0.08)	(0.09)	(0.12)	(0.14)
Logarithm of per capita GDP (*Logy*)	0.27	0.26	0.26	0.7*	0.69*	0.62*	0.62*
	(0.26)	(0.28)	(0.28)	(0.03)	(0.04)	(0.06)	(0.07)
Logarithm of number listed stocks (*Logn*)	-0.14	-0.14	-0.14	-0.24	-0.24	-0.24	-0.23
	(0.34)	(0.35)	(0.34)	(0.10)	(0.10)	(0.11)	(0.12)
Corporate Transparency							
Reporting Timeliness *(Time)*	-0.97**	-0.97**	-0.93**	2.69	2.61	2.45	2.40
	(0.02)	(0.03)	(0.04)	(0.15)	(0.16)	(0.19)	(0.21)
Credibility of disclosures *(Audit)*	0.75*	0.75*	0.72	0.68*	0.69	-1.71	-0.93
	(0.09)	(0.10)	(0.12)	(0.10)	(0.11)	(0.50)	(0.69)
Fin. Analyst *(ANALYST)*	0.49**	0.49*	0.48*	8.77*	8.58*	9.04*	8.72*
	(0.04)	(0.05)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)
Timeliness * Fin. analyst (*Timanly*)				-1.91*	-1.87*	-1.98*	-1.90*
				(0.05)	(0.06)	(0.05)	(0.06)
Logarithm Discl. intensity *(CIFAR)*	-0.94	-0.97	-1.00	-0.61	-0.80	-0.38	-0.82
	(0.41)	(0.46)	(0.40)	(0.61)	(0.46)	(0.75)	(0.46)
Financial Disclosure *(Discl.)*	-0.01	0.00	0.01	-0.08	-0.05	-0.12	-0.04
	(0.99)	(1.00)	(0.98)	(0.83)	(0.90)	(0.75)	(0.91)
Governance Disclosure *(Govern)*	1.39	1.39	1.37	1.47	1.47	1.43	1.44
	(0.27)	(0.29)	(0.29)	(0.21)	(0.22)	(0.23)	(0.23)
Accounting Principles *(Measure)*	-0.24	-0.24	-0.24	-0.32	-0.32	-0.37	-0.35

Table 5.6
(Continued)

Control Variables							
Logarithm of geographical size	0.06	0.06	0.06	0.18	0.18	0.14	0.15
(*Logs*)	(0.36)	(0.38)	(0.38)	(0.05)	(0.05)	(0.14)	(0.12)
Variance in GDP growth (*Vgdpg)*	0.00	0.00	0.00	-0.01	-0.01	-0.02	-0.01
	(0.92)	(0.92)	(0.79)	(0.30)	(0.38)	(0.28)	(0.44)
Industry Herfndahl index (*InzHerf)*	0.55	0.55	0.56	0.63	0.63	0.61	0.61
	(0.33)	(0.35)	(0.34)	(0.24)	(0.24)	(0.26)	(0.27)
Firm Herfndahl index *(Fherf)*	-2.43	-2.39	-2.38	-1.84	-1.58	-2.78	-1.92
	(0.25)	(0.31)	(0.28)	(0.39)	(0.43)	(0.24)	(0.36)
Earning Co-Movement index	1.05	1.06	1.15	1.61	1.63	1.23	1.34
(SyncROA)	(0.35)	(0.37)	(0.34)	(0.15)	(0.16)	(0.29)	0.27
Good government index *(Gov)*	-0.16**	-0.16**	-0.15**	-0.24***	-0.23***	-0.23***	-0.23***
	(0.01)	(0.01)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)
Anti-director rights index *(Adr)*	0.03	0.03	0.04	0.12	0.12	0.09	0.1
	(0.74)	(0.75)	(0.71)	(0.26)	(0.26)	(0.40)	(0.36)
Variance market volt (*Mvv*)		0.00		-0.02			
		(0.96)		(0.71)			
SD market volatility (Mvsd)			0.00		0.00		0.00
			(0.77)		(0.89)		(0.66)
F- Statistics	**2.85****	**2.51****	**2.53****	**3.22****	**3.18****	**3.09****	**2.92****
	0.02	**0.04**	**0.04**	**0.02**	**0.02**	**0.03**	**0.03**
Sample size	**31.00**	**31.00**	**31**	**31**	**31**	**31**	**31**
R^2	**0.75**	**0.75**	**0.75**	**0.82**	**0.81**	**0.83**	**0.82**

Note:

*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level

Ordinary least squares regressions of the logarithm of systematic stock return variation, log (ψ) , on the logarithm of per capita GDP(*LogGDP),* logarithm of number of listed stocks *(Logn),*Reporting timeliness *(Time),* Credibility of disclosures*(Audit),* Financial analyst(*ANALYST),* Timeliness analyst interaction (*Timanly*), Timeliness Audit interaction (*Timaudt*)Annual reporting control variables(Logarithm Disclosure intensity *(CIFAR),* Financial Disclosure (*Discl.),* Governance Disclosure *(Govern),* Accounting Principles *(Measure))* ,structural and institutional control variables (Logarithm of geographical size (*Logs*), Variance in GDP growth (*Vgdpg),* Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earning Co-Movement index (*SyncROA),* Good government index *(Gov),* Anti-director rights index (*Adr).*The sample consists of the 32 observations(countries). Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed t-tests.

5.5.4. Time period effects

The Mexican Peso crisis of December 1994 constituted the major transitory event in 1995 and had influences on the Latin American financial markets as well as other emerging markets (Sachs, 1995). According to Morck et al. (2000), this major macroeconomic event, represented by the depreciation of the Mexican Peso, may have affected the estimation of stock price synchronicity in the Latin American countries. Morck et al. (2000) dropped all the Latin American countries from the calculation of stock price synchronicity in his study. To check for the results of our transparency variables, this study follows Morck et al. (2000) and drops the four Latin American countries and repeats the regressions with the rest of the sample.[109]

If dropping the Latin American countries cases from this study sample does not qualitatively change the results obtained in our earlier models (model 9 and model 12), then this study's results hold.

Table 5.8 reports the results after dropping the four Latin American countries from the sample. The results are not qualitatively affected. The results reported in table 5.8 (Model 1-6) show similar results to our basic models (Model 9 and Model 12). None of the coefficients of the transparency variables or the control variables show significantly different results from those in the earlier models.

[109] The Latin American countries dropped from this study sample are Brazil, Peru, Columbia and Mexico

Table 5.7
Multiple Regression Results – Market Size Effects

MODEL 1-9

$$SYNCH = \alpha + \beta_1 LogGDP + \beta_2 Logn + \beta_3 LogTime + \beta_4 Analyst + \beta_5 Audit + \beta_6 Timanly + \beta_7 Timaudit + \beta_8 CIFAR + \beta_9 Discl + \beta_{10} Govern + \beta_{11} Measure + \beta_{12} [illegible] + \beta_{13} [illegible] + \beta_{14} [illegible] + \beta_{15} [illegible] + \beta_{16} SyncROM + \beta_{17} [illegible] + \beta_{18} [illegible] + \mu$$

VARIABLES	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6	MODEL 7	MODEL 8	MODEL 9
Intercept	-0.02	0.05	0.00	-18.83*	1.95	-16.89	-20.01*	-18.14	2.18
	(1.00)	(0.99)	(1.00)	(0.07)	(0.74)	(0.13)	(0.08)	(0.12)	(0.72)
Logarithm of per capita GDP (*LogGDP)*	0.27	0.26	0.26	0.68	0.20	0.62	0.70	0.62	0.27
	(0.26)	(0.28)	(0.28)	(0.03)	(0.44)	(0.06)	(0.03)	(0.06)	(0.26)
Logarithm of number listed stocks (*Logn*)	-0.14	-0.14	-0.14	-0.24	-0.14	-0.24	-0.24	-0.24	-0.13
	(0.34)	(0.35)	(0.34)	(0.09)	(0.35)	(0.10)	(0.10)	(0.11)	(0.39)
Corporate Transparency									
Reporting timeliness *(Time)*	-0.97**	-0.97**	-0.93**	2.57	-1.16**	2.36	2.69	2.45	-1.27**
	(0.02)	(0.03)	(0.04)	(0.15)	(0.03)	(0.20)	(0.15)	(0.19)	(0.04)
Credibility of disclosures *(Audit)*	0.75*	0.75*	0.72	0.67*	-0.68	-0.51	0.68*	-1.71	-1.26
	(0.09)	(0.10)	(0.12)	(0.09)	(0.77)	(0.81)	(0.10)	(0.50)	(0.66)
Fin. Analyst *(ANALYST)*	0.49**	0.49**	0.48**	8.45**	0.48**	8.31**	8.77**	9.04**	0.49**
	(0.04)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)
Timeliness * Fin. analyst (*Timanly*)				-1.84		-1.81	-1.91	-1.98	
				(0.05)*		(0.06)*	(0.05)*	(0.05)*	
Logarithm Discl. intensity *(CIFAR)*	-0.94	-0.97	-1.00	-0.83	-1.02	-0.89	-0.61	-0.38	-0.79
	(0.41)	(0.46)	(0.40)	(0.42)	(0.39)	(0.40)	(0.61)	(0.75)	(0.57)
Financial Disclosure *(Discl.)*	-0.01	0.00	0.01	-0.04	0.02	-0.02	-0.08	-0.12	-0.03
	(0.99)	(1.00)	(0.98)	(0.91)	(0.97)	(0.95)	(0.83)	(0.75)	(0.94)
Governance Disclosure *(Govern)*	1.39	1.39	1.37	1.46	1.35	1.42	1.47	1.43	1.35
	(0.27)	(0.29)	(0.29)	(0.20)	(0.29)	(0.23)	(0.21)	(0.23)	(0.31)
Accounting Principles *(Measure)*	-0.24	-0.24	-0.24	-0.32	-0.27	-0.34	-0.32	-0.37*	-0.28
	(0.27)	(0.29)	(0.29)	(0.12)	(0.24)	(0.12)	(0.13)	(0.10)	(0.24)

Control variables									
Logarithm of geographical size (*Logs*)	0.06	0.06	0.06	0.18	0.04	0.15	0.18	0.14	-0.13
	(0.36)	(0.38)	(0.38)	(0.04)	(0.63)	(0.10)	(0.05)	(0.14)	(0.39)
Variance in GDP growth (*Vgdpg)*	0.00	0.00	0.00	-0.02	0.00	-0.02	-0.01	-0.02	0.00
	(0.92)	(0.92)	(0.79)	(0.24)	(0.81)	(0.22)	(0.30)	(0.28)	(0.90)
Industry Herfndahl index (*InzHerf)*	0.55	0.55	0.56	0.63	0.55	0.62	0.63	0.61	0.53
	(0.33)	(0.35)	(0.34)	(0.22)	(0.35)	(0.24)	(0.24)	(0.26)	(0.38)
Firm Herfndahl index *(Fherf)*	-2.43	-2.39	-2.38	-1.57	-2.70	-1.80	-1.84	-2.78	-3.20
	(0.25)	(0.31)	(0.28)	(0.41)	(0.22)	(0.37)	(0.39)	(0.24)	(0.24)
Earning Co-Movement index (*SyncROA)*	1.05	1.06	1.15	1.66	0.90	1.52	1.61	1.23	0.73
	(0.35)	(0.37)	(0.34)	(0.12)	(0.44)	(0.18)	(0.15)	(0.29)	(0.57)
Good government index *(Gov)*	-0.16**	-0.16**	-0.15**	-0.23***	-0.15**	-0.22***	-0.24***	-0.23***	-0.15**
	(0.01)	(0.01)	(0.02)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.02)
Anti-director rights index (*Adr)*	0.03	0.03	0.04	0.12	0.02	0.11	0.12	0.09	0.01
	(0.74)	(0.75)	(0.71)	(0.23)	(0.83)	(0.29)	(0.26)	(0.40)	(0.94)
Variance market volt. *(Mvv)*		0.00					-0.02	-0.04	-0.02
		(0.96)					(0.71)	(0.40)	(0.72)
SD market volatility *(Mvsd)*			0.00						
			(0.77)						
F- statistics	**2.85****	**2.51****	**2.53****	**3.62****	**2.61****	**3.28****	**3.22****	**3.09****	**2.32****
	0.02	**0.04**	**0.04**	**0.01**	**0.04**	**0.02**	**0.02**	**0.03**	**0.06**
Sample size	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**	**31**
R^2	**0.75**	**0.75**	**0.75**	**0.81**	**0.76**	**0.82**	**0.82**	**0.83**	**0.76**

Note:

*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level

Ordinary least squares regressions of the logarithm of systematic stock return variation, log (ψ), on the logarithm of per capita GDP (*LogGDP),* logarithm of number of listed stocks *(Logn),* Reporting timeliness *(Time),* Credibility of disclosures *(Audit),* Financial analyst (*ANALYST),* Timeliness analyst interaction (*Timanly*), Timeliness Audit interaction (*Timaudt*) Annual reporting control variables (Logarithm Disclosure intensity *(CIFAR),* Financial Disclosure (*Discl.),* Governance Disclosure *(Govern),* Accounting Principles *(Measure)),* structural and institutional control variables (Logarithm of geographical size (*Logs*), Variance in GDP growth (*Vgdpg),* Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earning Co-Movement index (*SyncROA),* Good government index *(Gov),* Anti-director rights index (*Adr).*The sample consists of the 32 observations (countries). Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed t-tests.

5.5.5 Alternative data set by testing developed markets and emerging markets subsamples

Morck et al. (2000) and Chan and Hameed (2006) argued that firm-specific information is highly attractive to arbitragers in economies that provide better private property protection. However, Jin and Myers (2006) argue that less opaque firms provide lower R^2 as outsiders can see all the firm cash flow and can capitalize on firm-specific information on their investment decision regardless of low private property protection. Jin and Myers (2006) do not claim the insignificance of private property protection but they argue that private property protection concentrates on decreasing noise trading in market portfolios. The results of this study support the findings of Jin and Myers (2006). For a further robustness check of our results, this study repeats the methodology of Morck et al. (2000) by separating the study sample into two subsamples based on high and low income using the mean GDP income as the separating point. The dividing line shows a subsample of developed markets of 22 countries and a subsample of emerging markets of 18 countries.

If the results of the repeated regression with the two samples show this study transparency variables to be significant in both samples, then this study's results hold. Due to the limited degree of freedom and the large number of control variables, the degrees of freedom is completely exhausted in the emerging countries and regression analysis shows no results. As for the developed markets, high correlation is reported between timeliness of reporting and credibility of disclosures (80%). Therefore, credibility of disclosures was dropped.[110] To gain more degrees of freedom, other transparency attributes were also dropped as they show insignificant results in all earlier regressions.

[110] Both Gujarati (2003) and Hair (2006) bench mark for multicollineality is 80% correlation.

Table 5.8
Multiple Regression Results – Time Period Effects

MODEL 1-6

$$SYNCH_{it} = \alpha_i + \beta_1 LogGDP_{it} + \beta_2 Logn_{it} + \beta_3 LogTime_{it} + \beta_4 Analyst_{it} + \beta_5 Audit_{it}$$
$$+ \beta_6 Timanly_{it} + \beta_7 Timaudt_{it} + \beta_8 CIFAR_{it} + \beta_9 Discl_{it} + \beta_{1?} Govern_{it} + \beta_{1?} Measure_{it}$$
$$+ \beta_{1?} [illegible]_{it} + \beta_{1?} [illegible]_{it} + \beta_{1?} [illegible] + \beta_{1?} [illegible] + \beta_{1?} [illegible]_{it} + \beta_{1?} [illegible]_{it} + \beta_{1?} [illegible] + \mu$$

VARIABLES	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6
Intercept	1.62	1.57	1.60	-16.48	0.52	-16.65
	(0.79)	(0.81)	(0.81)	(0.25)	(0.95)	(0.28)
Logarithm of per capita GDP *(LogGDP)*	0.24	0.23	0.24	0.64	0.28	0.64
	(0.37)	(0.39)	(0.39)	(0.11)	(0.41)	(0.14)
Logarithm of number listed stocks *(Logn)*	-0.11	-0.10	-0.11	-0.20	-0.12	-0.20
	(0.48)	(0.54)	(0.53)	(0.26)	(0.53)	(0.29)
<u>Corporate Transparency</u>						
Reporting Timeliness *(Time)*	-0.86*	-0.88*	-0.85*	2.83	-0.65	2.86
	(0.06)	(0.07)	(0.11)	(0.28)	(0.52)	(0.31)
Credibility of disclosures *(Audit)*	0.78	0.80	0.77	0.93	1.76	1.20
	(0.14)	(0.15)	(0.21)	(0.13)	(0.66)	(0.76)
Fin. Analyst *(ANALYST)*	0.63**	0.64**	0.63**	8.93	0.63**	8.87
	(0.02)	(0.03)	(0.04)	(0.14)	(0.06)	(0.17)
Timeliness * Fin. analyst (*Timanly*)				-1.93		-1.92
				(0.16)		(0.20)
Timeliness* Audit credibility (*Timaudt*)					-0.25	-0.07
					(0.80)	(0.94)
Logarithm Discl. intensity *(CIFAR)*	-1.72	-1.60	-1.72	-0.93	-1.65	-0.92
	(0.25)	(0.33)	(0.28)	(0.56)	(0.34)	(0.59)
Financial Disclosure *(Discl.)*	-0.48	-0.60	-0.48	-0.77	-0.55	-0.79
	(0.55)	(0.53)	(0.61)		(0.60)	(0.44)
Governance Disclosure *(Govern)*	1.97	2.06	1.96	1.39	1.83	1.36
	(0.22)	(0.23)	(0.28)	(0.42)	(0.35)	(0.47)
Accounting Principles *(Measure)*	-0.13	-0.14	-0.13	-0.14	-0.07	-0.12
	(0.70)	(0.70)	(0.72)	(0.68)	(0.89)	(0.78)

Control variables

Logarithm of geographical size (*Logs)*	-0.11	0.08	0.08	0.18*	0.09	0.19
	(0.48)	(0.31)	(0.31)	(0.09)	(0.36)	(0.17)
Variance in GDP growth *(Vgdpg)*	0.24	0.00	0.00	-0.01	0.00	-0.01
	(0.37)	(0.90)	(0.98)	(0.76)	(0.91)	(0.77)
Industry Herfndahl index *(InzHerf)*	0.60	0.54	0.61	0.87	0.75	0.91
	(0.46)	(0.54)	(0.53)	(0.36)	(0.52)	(0.42)
Firm Herfndahl index *(Fherf)*	-2.55	-2.89	-2.54	-1.77	-2.25	-1.70
	(0.26)	(0.29)	(0.30)	(0.45)	(0.43)	(0.53)
Earning Co-Movement index	0.67	0.50	0.68	0.99	0.88	1.04
(SyncROA)	(0.62)	(0.75)	(0.69)	(0.55)	(0.66)	(0.58)
Good government index *(Gov)*	-0.15**	-0.16**	-0.15**	-0.24**	-0.15**	-0.24**
	(0.02)	(0.03)	(0.04)	(0.02)	(0.05)	(0.03)
Anti-director rights index *(Adr)*	-0.01	-0.02	-0.01	0.07	0.00	0.07
	(0.94)	(0.90)	(0.94)	(0.58)	(0.97)	(0.60)
Variance market volatility (*Mvv*)		-0.01				
		(0.79)				
SD market volatility *(Mvsd)*			0.00	0.00	0.00	0.00
			(0.99)	(0.76)	(0.87)	(0.85)
F- Statistics	**2.55***	**2.20***	**2.18***	**2.45***	**1.87**	**2.07**
	0.06	**0.10**	**0.11**	**0.09**	**0.17**	**0.15**
Sample size	**27**	**27**	**27**	**27**	**27**	**27**
R^2	**0.79**	**0.79**	**0.79**	**0.83**	**0.79**	**0.83**

Note:

*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level

Ordinary least squares regressions of the logarithm of systematic stock return variation, log (ψ) , on the logarithm of per capita GDP (*LogGDP),* logarithm of number of listed stocks *(Logn),* Reporting timeliness *(Time),* Credibility of disclosures *(Audit),* Financial analyst (*ANALYST),* Timeliness analyst interaction (*Timanly*), Timeliness Audit interaction (*Timaudt*) Annual reporting control variables (Logarithm Disclosure intensity *(CIFAR),* Financial Disclosure (*Discl.),* Governance Disclosure *(Govern),* Accounting Principles *(Measure)),* structural and institutional control variables (Logarithm of geographical size (*Logs*), Variance in GDP growth (*Vgdpg),* Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earning Co-Movement index (*SyncROA),* Good government index *(Gov),* Anti-director rights index (*Adr).*The sample consists of the 32 observations (countries). Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-ailed t-tests.

If the developed markets subsample results are qualitatively similar to our basic models, then this study's results are consistent with earlier studies, specifically, with Jin and Myers (2006) and this study's results are robust.[111]

Table 5.9 shows the results of the 22 developed markets subsample. The results are not qualitatively affected. The results reported in Table 5.8 (Model 1-6) show similar results to our basic models (Model 9). None of the coefficients of the transparency variables or the control variables show significantly different results from those in the earlier models. Therefore, the results of this study hold.

5.5.6 Multiple regressions results without control transparency attributes

Results reported in all earlier regression models suggest that other transparency attributes included in the Bushman et al. (2004) framework, namely, logarithm disclosure intensity *(CIFAR),* accounting principles *(Measure),* financial disclosure *(Discl.) and* governance disclosure *(Govern)* are not significant. Therefore, for the purpose of further robustness checks of this study's results, additional regressions were repeated without the five transparencies control variables. The reason for running this check is to avoid any effect of the correlation of these attributes with our tested attributes that may drive the results.

[111] Morck et al. (2000) argue only better private property protection can lower R^2.

Table 5.9
Multiple Regression Results – Developed Markets Subsample

MODEL 1-6

$$SYNCH_{i,t} = \alpha_i + \beta_1 LogGDP_{i,t} + \beta_2 Logn_{i,t} + \beta_3 LogTime_{i,t} + \beta_4 Analyst_{i,t} + \beta_5 Audit_{i,t} + \beta_6 Time_{i,t} + \beta_7 Time^2_{i,t} + \beta_8 CIFAR_{i,t} + \beta_9 Disc_{i,t} + \beta_{10} Closure_{i,t} + \beta_{11} Mcap_{i,t} + \beta_{12} Logs_{i,t} + \beta_{13} Vgdpg_{i,t} + \beta_{14} InstHerf_{i,t} + \beta_{15} FHerf_{i,t} + \beta_{16} SynchRM_{i,t} + \beta_{17} g_{i,t} + \beta_{18} adv + \mu$$

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-9.06	-9.07	-8.77	-16.89	-16.90	-16.59
	(0.13)	(0.16)	(0.17)	(0.04)	(0.05)	(0.05)
Logarithm of per capita GDP (*LogGDP*)	1.82**	1.80**	1.72*	2.97**	2.96**	2.87**
	(0.04)	(0.05)	(0.07)	(0.01)	(0.02)	(0.02)
Logarithm of number listed stocks (*Logn*)	-0.28	-0.29	-0.28	-0.30	-0.30	-0.30
	(0.16)	(0.18)	(0.19)	(0.22)	(0.25)	(0.26)
Corporate Transparency						
Reporting Timeliness *(Time)*	-1.17**	-1.14**	-1.07**	-2.04***	-2.02**	-1.93**
	(0.02)	(0.03)	(0.06)	(0.00)	(0.01)	(0.01)
Fin. Analyst *(ANALYST)*	0.34*	0.35*	0.34	0.42*	0.43	0.42
	(0.10)	(0.12)	(0.13)	(0.10)	(0.12)	(0.13)
Control variables						
Logarithm of geographical size (*Logs*)	0.16**	0.15**	0.14	0.27**	0.26**	0.25**
	(0.04)	(0.08)	(0.11)	(0.01)	(0.02)	(0.04)
Variance in GDP growth *(Vgdpg)*	-0.01	-0.01	-0.01	0.04	0.03	0.03
	(0.71)	(0.66)	(0.62)	(0.18)	(0.26)	(0.32)

Table 5.9 (Continued)

Industry Herfndahl index *(InzHerf)*	1.01*	1.03*	1.06*	0.65	0.66	0.69
	(0.08)	(0.09)	(0.09)	(0.33)	(0.35)	(0.34)
Firm Herfndahl index *(Fherf)*	2.97	2.55	2.39	5.55**	5.25	4.94
	(0.15)	(0.31)	(0.35)	(0.04)	(0.11)	(0.14)
Earning Co-Movement index *(SyncROA)*	2.76	2.74	2.87	3.37		3.49
	(0.26)	(0.29)	(0.27)	(0.26)		(0.28)
Good government index *(Gov)*	-0.33***	-0.32**	-0.31**	-0.49***	-0.49***	-0.48***
	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Anti-director rights index *(Adr)*	0.12	0.13	0.13	0.34**	0.35**	0.35**
	(0.16)	(0.18)	(0.17)	(0.01)	(0.01)	(0.01)
Variance market volatility *(Mvv)*		-0.02			-0.01	
		(0.74)			(0.85)	
SD market volatility *(Mvsd)*			0.00			0.00
			(0.69)			(0.73)
F- Statistics	**5.10****	**4.18****	**4.21****	**5.69****	**4.60****	**4.66****
	0.01	**0.03**	**0.03**	**0.01**	**0.03**	**0.03**
Sample size	**19**	**19**	**19**	**19.00**	**19.00**	**19.00**
R^2	**0.88**	**0.88**	**0.88**	**0.89**	**0.89**	**0.89**

*Note:*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level

Ordinary least squares regressions of the logarithm of systematic stock return variation, log (ψ) , on the logarithm of per capita GDP (*LogGDP),* logarithm of number of listed stocks *(Logn),* Reporting timeliness *(Time),* Credibility of disclosures *(Audit),* Financial analyst (*ANALYST),* Timeliness analyst interaction (*Timanly*), Timeliness Audit interaction (*Timaudt*) Annual reporting control variables (Logarithm Disclosure intensity *(CIFAR),* Financial Disclosure (*Discl.),* Governance Disclosure *(Govern),* Accounting Principles *(Measure)),* structural and institutional control variables (Logarithm of geographical size (*Logs*), Variance in GDP growth (*Vgdpg),* Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earning Co-Movement index (*SyncROA),* Good government index *(Gov),* Anti-director rights index (*Adr).*The sample consists of the 32 observations (countries). Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed t-tests.

If by dropping the control transparency variables, namely, the above four transparency attributes, does not change the sign or the significance of this study transparency variables, specifically, timeliness of reporting, credibility of disclosures and financial analysts following, the results of this study hold.

Table 5.10 (Models 1-8) shows the results of the repeated regressions without the above four transparency attributes. The results are not qualitatively different from our basic models (Model 9 and Model 12). Therefore, the results of this study hold.

5.5.7 Further robustness check

The following robustness check focuses on testing our results using different stock price synchronicity measures decomposed from the original synchronicity measure. Using the market model, the two measures are country average stock variation ($\sigma^2_{m,i,j}$) and firm specific variation or the residual ($\sigma^2_{\varepsilon,i,j}$). The following briefly discusses the two measures.

5.5.7.1 Market wide variation and firm specific in formation

In order to separate stock market variation into market wide variation and firm-specific variation (or the residuals), Morck et al. (2000, p.246) recalculate $R^2 j$ as follows:[112]

$$R^2 j = \frac{\sum i \varepsilon j \, R^2_{I,J} \, SST_{i,j}}{\sum i \varepsilon j \, SST_{i,j}} = \frac{\sum i \varepsilon j \dfrac{\sigma^2_{m,i,j}}{\sigma^2_{\varepsilon,i,j} + \sigma^2_{m,i,j}} \left(\sigma^2_{m,i,j} + \sigma^2_{\varepsilon,i,j}\right)}{\sum i \varepsilon j \left(\sigma^2_{m,i,j} + \sigma^2_{\varepsilon,i,j}\right)}$$

Where:

[112] $R^2 j$ is basically the stock price synchronicity from the market model. Equation 12 in chapter four Section 4.3.2.1 is stated as follows: $R^2 j = \dfrac{\sum_i R^2_{ij} \, SST_{i,j}}{\sum_i SST_{i,j}}$

.

Table 5.10
Multiple Regression Results – Without Control Transparency Variables

MODEL 1-8	$\alpha_i + \beta_1 LogGDP_{i,t} + \beta_2 Logn_{i,t} + \beta_3 LogTime_{i,t} + \beta_4 Analyst_{i,t} + \beta_5 Audit_{i,t} + \beta_6 Timanly_{i,t} + \beta_7 Timaudt_{i,t} + \beta_8 CIFAR_{i,t} + \beta_9 Debt_{i,t} + \beta_{10} Governance_{i,t} + \beta_{11} Monetary_{i,t} + \beta_{12} Legor_{i,t} + \beta_{13} Legdog_{i,t} + \beta_{14} InvRisk_{i,t} + \beta_{15} FRisk_{i,t} + \beta_{16} SyncFRM_{i,t} + \beta_{17} g_{i,t} + \beta_{18} dep + \mu$							
VARIABLES	**MODEL 1**	**MODEL 2**	**MODEL 3**	**MODEL 4**	**MODEL 5**	**MODEL 6**	**MODEL 7**	**MODEL 8**
Intercept	1.45	1.50	1.27	-14.55	2.30	-13.78	-15.00	-14.64
	(0.50)	(0.50)	(0.58)	(0.12)	(0.45)	(0.17)	(0.12)	(0.13)
Logarithm of per capita GDP (*LoGDP*)	0.11	0.11	0.10	0.45	0.06	0.42	0.48	0.45
	(0.59)	(0.59)	(0.61)	(0.10)	(0.78)	(0.17)	(0.10)	(0.11)
Logarithm of number listed stocks (*Logn)*	-0.1	-0.11	-0.11	-0.19	-0.1	-0.18	-0.2	-0.19
	(0.41)	(0.42)	(0.41)	(0.15)	(0.44)	(0.17)	(0.15)	(0.16)
Corporate Transparency								
Reporting timeliness *(Time)*	-0.84**	-0.85**	-0.81**	2.24	-0.95**	2.13	2.34	2.26
	(0.02)	(0.02)	(0.03)	(0.20)	(0.03)	(0.25)	(0.20)	(0.22)
Credibility of disclosures *(Audit)*	0.69*	0.69*	0.66	0.58	-0.18	0.03	0.59	0.59
	(0.09)	(0.10)	(0.12)	(0.12)	(0.94)	(0.99)	(0.13)	(0.14)
Fin. Analyst *(ANALYST)*	0.40**	0.40**	0.39*	7.18*	0.39*	7.08*	7.44*	7.24*
	(0.05)	(0.05)	(0.06)	(0.07)	(0.06)	(0.08)	(0.07)	(0.08)
Timeliness * Fin. analyst (*Timanly*)				-1.57*		-1.55*	-1.63*	-1.59*
				(0.08)		(0.09)	(0.08)	(0.09)
Timeliness* Audit credibility (*Timaudt*)					0.21	0.14		
					(0.69)	(0.78)		

Table 5.10
(Continued)

Control variables								
Logarithm of geographical size (*Logs*)	0.01 (0.83)	0.01 (0.84)	0.01 (0.84)	0.11 (0.15)	0.00 (0.96)	0.10 (0.25)	0.11 (0.15)	0.11 (0.16)
Variance in GDP growth (Vgdpg)	0.00 (0.90)	0.00 (0.94)	0.00 (0.79)	-0.01 (0.28)	0.00 (0.83)	-0.01 (0.28)	-0.01 (0.33)	-0.01 (0.40)
Industry Herfndahl index (InzHerf)	0.92** (0.03)	0.93** (0.04)	0.91** (0.04)	1.07** (0.01)	0.91** (0.04)	1.06** (0.02)	1.11** (0.01)	1.07** (0.02)
Firm Herfndahl index (Fherf)	-1.91 (0.29)	-1.99 (0.30)	-1.91 (0.31)	-1.09 (0.54)	-2.1 (0.27)	-1.22 (0.51)	-1.27 (0.49)	-1.08 (0.55)
Earning Co-Movement index (SyncROA)	1.11 (0.23)	1.11 (0.24)	1.17 (0.23)	1.72 (0.08)	1 (0.31)	1.64 (0.11)	1.74 (0.08)	1.71 (0.09)
Good government index (Gov)	-0.12** (0.01)	-0.12** (0.02)	-0.11** (0.02)	-0.17*** (0.00)	-0.11** (0.02)	-0.17** (0.01)	-0.18*** (0.00)	-0.18** (0.01)
Anti-director rights index (Adr)	0.02 (0.76)	0.02 (0.76)	0.03 (0.74)	0.09 (0.24)	0.01 (0.90)	0.09 (0.33)	0.10 (0.23)	0.09 (0.26)
Variance market volatility (*Mvv*)		-0.01 (0.87)					-0.02 (0.66)	
SD market volatility (Mvsd)			0.00 (0.80)					
F- Statistics	**3.81** ** **0.00**	**3.34** ** **0.01**	**3.35** ** **0.01**	**4.23*** ** **0.00**	**3.37** ** **0.01**	**3.73** ** **0.01**	**3.76** ** **0.01**	**3.71** ** **0.01**
Sample size	**31**	**31**	**31.00**	**31.00**	**31**	**31**	**31**	**31**
R^2	**0.71**	**0.71**	**0.71**	**0.75**	**0.71**	**0.75**	**0.76**	**0.75**

Note:
*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level

Ordinary least squares regressions of the logarithm of systematic stock return variation, log (ψ) , on the logarithm of per capita GDP (*LogGDP),* logarithm of number of listed stocks *(Logn),* Reporting timeliness *(Time),* Credibility of disclosures *(Audit),* Financial analyst (*ANALYST),* Timeliness analyst interaction (*Timanly*), Timeliness Audit interaction (*Timaudt*) Annual reporting control variables (Logarithm Disclosure intensity *(CIFAR),* Financial Disclosure (*Discl.),* Governance Disclosure *(Govern),* Accounting Principles *(Measure))* ,structural and institutional control variables (Logarithm of geographical size (*Logs*), Variance in GDP growth (*Vgdpg),* Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earning Co-Movement index (*SyncROA),* Good government index *(Gov),* Anti-director rights index (*Adr).*The sample consists of the 32 observations (countries). Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed t-tests.

$\sigma^2_{m,i,j}$ is the variation in return for stock i in country j explained by market factors and, $\sigma^2_{\varepsilon,i,j}$ is the residual variation in stock i 's returns.

Based on the above, the average variation in country j stock return that is explained by market factors is $\sigma^2_{mj} = \left(1/n\right)\sum i\sigma^2_{i,j,m}$, and $\sigma^2\varepsilon_j = \left(1/n\right)\sum i\sigma^2_{i,j,\varepsilon}$ is the average firm-specific variation in country j stock returns.

Table 5.11 ranks countries by stock price synchronicity that decomposed to country average market variation and firm-specific variation. Figure 5.3 plots each country average stock variation ($\sigma^2_{m,i,j}$) and firm-specific variation or the residual ($\sigma^2_{\varepsilon,i,j}$) against stock price synchronicity ($R^2 j$).

Both measures show a similar distribution, however, it can be noticed that firm-specific variation or the residuals ($\sigma^2_{\varepsilon,i,j}$) is showing some noise pattern in its relation with the original stock price synchronicity measure. This robustness check is based on testing these two additional measures of synchronicity as alternate measures for the original stock price synchronicity.

If the results are qualitatively similar to our original results obtained using the measure of stock price synchronicity, logistic transformation of R^2 for country $j(\psi)$, then this study's results are robust.

Table 5.11
Stock price synchronicity ranking by country for 1995

Country	$R^2 j$	$\sigma^2_{\varepsilon,i,j}$	$\sigma^2_{m,i,j}$	Country	$R^2 j$	$\sigma^2_{\varepsilon,i,j}$	$\sigma^2_{m,i,j}$
United States	.021	.174	.004	Spain	.192	.067	.016
Canada	.062	.190	.013	Indonesia	.140	.127	.021
France	.075	.087	.007	South Africa	.197	.074	.018
Germany	.114	.067	.009	Thailand	.271	.011	.041
Portugal	.068	.084	.006	Hong Kong	.150	.118	.021
Australia	.064	.194	.010	Philippines	.164	.145	.029
U.K.	.062	.068	.005	Finland	.142	.113	.019
Denmark	.075	.059	.005	Czech	.185	.125	.028
New Zealand	.064	.111	.008	India	.189	.132	.031
Brazil	.161	.143	.027	Singapore	.191	.102	.024
Holland	.103	.051	.006	Greece	.192	.103	.024
Belgium	.146	.047	.008	Korea	.172	.174	.036
Ireland	.058	.073	.005	Peru	.288	.128	.052
Pakistan	.175	.140	.030	Mexico	.290	.129	.052
Sweden	.142	.084	.014	Columbia	.209	.095	.025
Austria	.093	.061	.006	Turkey	.393	.218	.141
Italy	.183	.073	.016	Malaysia	.429	.079	.059
Norway	.119	.086	.012	Taiwan	.412	.084	.058
Japan	.234	.111	.034	China	.453	.079	.066
Chile	.209	.086	.023	Poland	.569	.118	.156

Adapted from Morck et al. (2000, p. 248)

Figure 5.3
Average Systematic Return and Variation

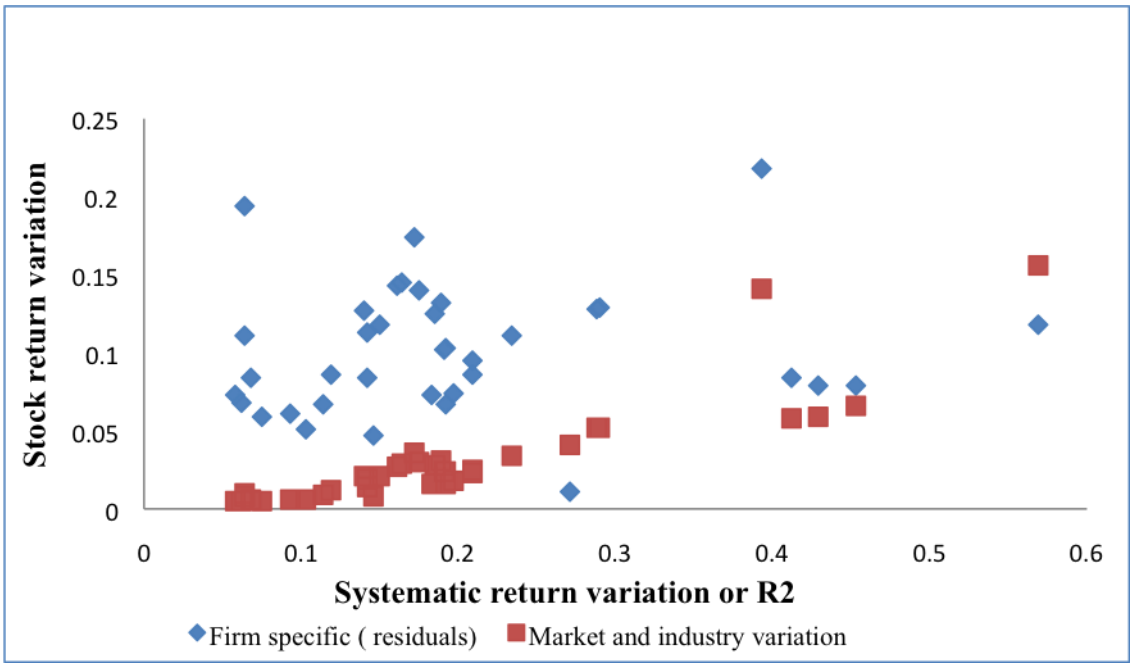


Figure 5.3 plots country average stock variation ($\sigma^2_{m,i,j}$) and firm-specific variation or the residual ($\sigma^2_{\varepsilon,i,j}$) against stock price synchronicity. Data based on bi-weekly firm- returns regressed on local and US value weighted indexes.[113]

Table 5.12 (Models 1-7) reports results of the repeated regression using the two measures. It can be noticed that our transparency variables show significant statistical results in all models using the market wide variation $\sigma^2_{m,i,j}$ measure. Specifically, timeliness of reporting and audit credibility show high significance. Financial analysts following shows marginal significance in the first model. When the "noise" proxy, introduced by Jin and Myers (2006), is controlled for in the second model, the measures of transparency remain significant in addition to the noise measure, which is also highly significant. However, private property protection shows insignificant. This result is in accordance with Jin and Myers (2006) who suggest that private property protection only affects market noise but does not encourage the flow of private information as claimed. This result suggests that the transparency variables in this study are affecting the real

[113] Adopted from Morck et al. (2000,p. 249)

flow of firm-specific information and not controlling market noise. The addition of the second measure of market noise, *SD* of market volatility (*Mvsd*) in table 5.12 (Model 3) produces similar results.

The last four models in table 5.12 (Model 4-7) use $\sigma^2_{\varepsilon,i,j}$ firm-specific variation or the residual of the market model as a measure of stock price synchronicity. The results are similar to the findings of Morck et al. (2000). Private property protection *(Gov)* and anti director index *(Adr)* show significant results. However, when the noise variables were added into the regressions, private property protection is not significant and anti director index remains significant.

Our transparency variables show insignificant results on all the above four models (Models 4-7) that use the residuals $\sigma^2_{\varepsilon,i,j}$. One possible interpretation of this is that firm-specific variation is not representing firm-specific information but mostly noise. In fact, $\sigma^2_{\varepsilon,i,j}$ is the residual that contains firm-specific return variation and the error term of the regression. The causes of the errors are the noise or the variations in the residual that are related to noise trade or because of other reasons not related to the information. The above conclusion is driven by two arguments.

First, scanning the scattering of firm-specific return variations, or the residual ($\sigma^2_{\varepsilon,i,j}$) in figure 5.3 shows a noise pattern in its relation with our original measure of synchronicity.[114] If the residual is the firm-specific return variation, then we should expect $\sigma^2_{\varepsilon,i,j}$ to be highly and significantly correlated with market wide variation $\sigma^2_{m,i,j}$ and our measure of stock price synchronicity R^2 as an arithmetical

[114] $\sigma^2_{\varepsilon,i,j}$ is showing insignificant correlations with all the five different measures of synchronicity.

Table 5.12

Multiple Regression Results – Using Market Wide Variation and Residuals Measures

$SYNCH = \alpha_j + \beta_1 \text{[illegible]} + \beta_2 \text{[illegible]} + \beta_3 \text{[illegible]} + \beta_4 \text{[illegible]} + \beta_5 \text{[illegible]} + \beta_6 \text{[illegible]} + \beta_7 \text{[illegible]} + \beta_8 CIFAR + \beta_9 \text{[illegible]} + \beta \text{[illegible]} + \beta \text{[illegible]} + \beta \text{[illegible]} + \beta \text{[illegible]} + \beta \text{[illegible]} + \beta \text{[illegible]} + \beta \text{[illegible]} + \beta \text{[illegible]} + \beta \text{[illegible]} + \mu$

MODEL 1-7

INDEPENDENT VARIABLE	$\sigma^2_{m,i,j}$	$\sigma^2_{m,i,j}$	$\sigma^2_{m,i,j}$	$\sigma^2_{\varepsilon,i,j}$	$\sigma^2_{\varepsilon,i,j}$	$\sigma^2_{\varepsilon,i,j}$	$\sigma^2_{\varepsilon,i,j}$
VARIABLES	**MODEL 1**	**MODEL 2**	**MODEL 3**	**MODEL 4**	**MODEL 5**	**MODEL 6**	**MODEL 7**
Intercept	0.13	0.14	0.22	0.37	0.38	0.33	0.36
	(0.54)	(0.42)	(0.37)	(0.24)	(0.26)	(0.36)	(0.37)
Logarithm of per capita GDP (*LogGDP*)	0.00	0.00	0.01	0.01	0.01	0.02	0.02
	(0.74)	(0.75)	(0.58)	(0.36)	(0.38)	(0.28)	(0.25)
Logarithm of number listed stocks (*Logn*)	0.00	0.00	0.00	0.01	0.01	0.01	0.00
	(0.76)	(0.95)	(0.76)	(0.26)	(0.29)	(0.58)	(0.64)
Corporate Transparency							
Reporting Timeliness *(Time)*	-0.05**	-0.03**	-0.04**	-0.02	-0.02	-0.01	-0.02
	(0.01)	(0.04)	(0.03)	(0.48)	(0.55)	(0.81)	(0.49)
Credibility of disclosures *(Audit)*	0.03*	0.02	0.02	-0.01	-0.01	-0.03	-0.02
	(0.11)	(0.21)	(0.26)	(0.68)	(0.68)	(0.39)	(0.52)
Fin. Analyst *(ANALYST)*	0.01	0.01	0.01	0.02	0.02	0.01	0.02
	(0.14)	(0.18)	(0.18)	(0.25)	(0.28)	(0.37)	(0.30)
Logarithm Discl. intensity *(CIFAR)*	0.00	-0.03	-0.07	0.00	0.00	-0.02	-0.04
	(0.92)	(0.49)	(0.23)	(0.99)	(1.00)	(0.77)	(0.68)
Financial Disclosure *(Discl.)*	-0.01	0.00	0.01	-0.01	-0.01	0.01	0.01
	(0.70)	(1.00)	(0.45)	(0.74)	(0.76)	(0.83)	(0.69)
Governance Disclosure *(Govern)*	0.04	0.03	0.03	-0.07	-0.07	-0.08	-0.08
	(0.49)	(0.49)	(0.57)	(0.35)	(0.36)	(0.37)	(0.44)
Accounting Principles *(Measure)*	-0.01	-0.01	-0.01	0.01	0.01	0.01	0.01
	(0.50)	(0.38)	(0.57)	(0.69)	(0.70)	(0.69)	(0.69)

Table 5.12 (Continued)

Control variables							
Logarithm of geographical size (*Logs*)	0.00 (0.57)	0.00 (0.49)	0.00 (0.14)	0.00 (0.51)	0.00 (0.53)	0.01 (0.27)	0.01 (0.15)
Variance in GDP growth (Vgdpg)	0.00 (0.01)	0.00 (0.45)		0.00 (0.01)	0.00 (0.06)		
Industry Herfndahl index (InzHerf)	0.00 (0.97)	0.00 (0.83)	0.01 (0.80)	0.02 (0.56)	0.02 (0.57)	0.03 (0.50)	0.03 (0.52)
Firm Herfndahl index (Fherf)	-0.06 (0.48)	-0.05 (0.51)	0.06 (0.53)	0.17 (0.21)	0.17 (0.22)	0.22 (0.14)	0.28 (0.11)
Earning Co-Movement index (SyncROA)	-0.02 (0.66)	0.02 (0.68)	0.02 (0.66)	-0.15 (0.05)	-0.14 (0.07)	-0.09 (0.25)	-0.10 (0.26)
Good government index (Gov)	0.00** (0.04)	0.00** (0.12)	0.00 (0.15)	-0.01 (0.08)	-0.01 (0.12)	0.00 (0.22)	-0.01 (0.16)
Anti-director rights index (Adr)	0.00 (0.85)	0.00 (0.63)	0.00 (0.59)	0.01 (0.05)	0.01 (0.07)	0.02 (0.04)	0.02 (0.05)
Variance mkt. volatility (*Mvv*)			0.00 (0.03)				0.00 (0.45)
SD market volatility (Mvsd)		0.00 (0.01)			0.00 (0.92)	0.00 (0.09)	
F statistics	**3.32**	**5.78**	**2.71**	**4.12**	**3.63**	**2.94**	**2.36**
	0.01	**0.00**	**0.03**	**0.00**	**0.01**	**0.02**	**0.05**
Sample size	**31.00**	**31.00**	**31.00**	**31.00**	**31**	**31.00**	**31.00**
R^2	**0.78**	**0.88**	**0.74**	**0.81**	**0.81**	**0.76**	**0.72**

Notes:

*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level

Ordinary least squares regressions of the logarithm of systematic stock return variation, log (ψ), on the logarithm of per capita GDP (*LogGDP),* logarithm of number of listed stocks *(Logn),* Reporting timeliness *(Time),* Credibility of disclosures *(Audit),* Financial analyst (*ANALYST),* Timeliness analyst interaction (*Timanly*), Timeliness Audit interaction (*Timaudt*) Annual reporting control variables (Logarithm Disclosure intensity *(CIFAR),* Financial Disclosure (*Discl.),* Governance Disclosure *(Govern),* Accounting Principles *(Measure))* ,structural and institutional control variables (Logarithm of geographical size (*Logs*), Variance in GDP growth (*Vgdpg),* Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earning Co-Movement index (*SyncROA),* Good government index *(Gov),* Anti-director rights index (*Adr)*. The sample consists of the 32 observations (countries). Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed t-tests.

complement. However, the Pearson correlation results do not show any significant correlation between the residual $\sigma^2_{\varepsilon,i,j}$ and any of the remaining five measures of synchronicity including $\sigma^2_{m,i,j}$ and R^2. In contrast, it only shows high significance with the two measures of noise introduced by Jin and Myers (2006) and used in this study. The second reason is that Morck et al. (2000) imply perfect efficiency in the market, which is definitely not the case if one takes into consideration the number of emerging markets that approximates to fifty percent of the sample. If the residual is actually the firm-specific information then other interpretation is to be sought for the insignificant result of the relationship of our transparency variables and $\sigma^2_{\varepsilon,i,j}$, as a measure of stock price synchronicity. Finally, according to the results in table 5.12 and the above argument, our results are robust and the results of the study hold.

5.5.8 Clustering analysis

Punj and Stewart (1983) defined cluster analysis as a statistical method for classification. The authors argue that unlike other statistical methods for classification, such as discriminate analysis and automatic interaction detection, it makes no prior assumptions about important differences within a population. Punj and Stewart report that according to Gerard (1957), cluster analysis is a purely empirical method of classification and, as such, is primarily an inductive technique. Malhotra (2007, p.613) states, "cluster analysis is a class of technique used to classify objects or cases into relatively homogenous groups called clusters. Objects in each cluster tend to be similar to each other and dissimilar to objects in the other clusters".

The purpose of this robustness check in this study is to check whether the effects of firm disclosures represented by reporting timeliness (interim reporting) has the same influence on stock price synchronicity through all the countries regardless of the information environment such as the number of financial analysts. The argument is that

it is unlikely in a country with poor information environment (very few analysts etc.) that an information release will have a much greater effect than in a country where the information environment is strong. When we compare the idiosyncratic volatilities of these two countries, the effect of this information release in the former country is much higher than the latter.

The approach to conduct this further test is to use two-stage cluster analysis where countries will be classified according to their scores on three variables: (i) reporting timeliness, (ii) financial analysts following, and (iii) stock price synchronicity. If the countries are grouped in clusters where higher (lower) reporting timeliness is clustered with (lower) higher stock price synchronicity and higher (lower) number of analysts following in a country, then we can conclude that the information environment represented by the number of financial analysts following is not influencing the effect of firm information on stock price synchronicity and vice versa.

Tables 5-13 to 5-15 below show the results of the two-stage cluster analysis. The sample was clustered into four groups (table 5-15). Developed countries are clustered in the first cluster where the lowest mean of SYNCH (0.091%) was clustered with the third highest mean of reporting timeliness (82.15), and the highest mean of financial analysts following (25.070). However, in cluster two, although the mean of reporting timeliness of this cluster is higher than the first cluster (85.23) it was clustered with the second higher SYNCH mean (SYNCH =13.75%) and the second lowest mean of financial analysts following. Similarly the third cluster has the second mean of reporting timeliness (82.6086) but was clustered with the highest synchronicity mean of 27.40% (lowest stock price informativeness) and second lowest financial analysts (mean = 12.014). The above clustering analysis supports the role of the financial environment in

spreading firm private information and shows that an information release may have a much greater effect in a country where the information environment is stronger than otherwise. It also supports the complementary role between firm public information and financial analysts suggested by Lang and Landholm (1996).

Table 5-13
Cluster Distribution

		Number of countries	% of Combined	% of Total
Cluster	1	8	25.0%	25.0%
	2	8	25.0%	25.0%
	3	7	21.9%	21.9%
	4	9	28.1%	28.1%
	Combined	32	100.0%	100.0%
Excluded Cases		0		0.00
Total		32		100.0%

Table 5-14
Clusters Centroids

		Stock Price synchronicity (R square)	Reporting Timeliness	Financial Analyst (Fin. environment)
		Mean	Mean	Mean
Cluster	1	.0911	82.1588	25.0700
	2	.1375	85.2350	16.2338
	3	.2740	82.6086	12.0143
	4	.1326	61.6511	9.2333
	Combined	.1544	77.2584	15.5509

Table 5-15
Frequencies of clusters

No	Cluster 1	Cluster 2	Cluster 3	Cluster 4
1	Canada	Australia	Chile	Austria
2	Finland	Brazil	Japan	Belgium
3	France	Denmark	Malaysia	Columbia
4	Germany	Italy	Mexico	India
5	Holland	Norway	Peru	Ireland
6	Hong Kong	Philippines	South Africa	New Zealand
7	U.K.	Spain	Thailand	Pakistan
8	United States	Sweden		Portugal
9				Singapore
Total	8	8	7	9

5.5.9 Endogeneity

This study has discussed the determinants of stock price synchronicity based on prior theoretical and empirical research (referenced in Chapter 4). The study has approached stock price synchronicity or the flow of firm private information as an attribute that is influenced by frequent reporting, financial analysts activities, and credibility of disclosures, as well as institutional factors such as government protection of private property rights and protection of minority interests. Of these, it is believed that financial analysts determinant is endogenous, whereas the remaining variables are econometrically modelled as exogenous. This study's treatment of certain variables as exogenous reflects the belief (as discussed in hypotheses development in chapter 4 of this study) that the simultaneity between those variables and the dependent variable, *SYNCH*, is, at best, weak and, therefore, can be ignored in the econometric analysis.

The study hypothesizes a one-way effect of transparency or analysts following on stock price informativeness. It is also possible that analysts follow (or shun) firms whose stock prices are already informative. In other words, there is a possibility of reverse causality here. If there is such an issue, stock price synchronicity and financial analysts can affect each other, thus, leading to endogeneity. In this setting, ordinary least squares estimation of the determinants of stock price synchronicity likely yields biased and inconsistent coefficient estimates. Therefore, the model of the determinants of stock price synchronicity is estimated using a simultaneous equations framework, i.e., two-stage least squares, 2SLS, (e.g., O'Brien and Bhushan, 1990, and Alford and Berger, 1999). 2SLS performs two-stage least-squares regression to produce consistent estimates of parameters when one or more predictor variables might be correlated with the disturbance. This situation typically occurs when the model consists of a system of simultaneous equations wherein endogenous variables are specified as predictors in one or more of the equations. The two-stage least-squares technique uses instrumental

variables to produce regressors that are not contemporaneously correlated with the disturbance. Parameters of a single equation or a set of simultaneous equations can be estimated (Frankel et al., 2006).

This study uses two instrument variables based on prior literature. First, prior studies in the US show that larger companies tend to attract greater analysts following because there are significant fixed costs in following a company and the payoff from following a company is related to its size (Bhushan, 1989a). Analysts have an incentive to follow firms with high trading volume, which is correlated with firm size (Frankel et al. 2006; Alford and Berger, 1999). Similar to Frankel et al., this study uses the same logic to test whether the same logic applies at the country level. The study includes a firm size variable measured by the average market capitalization of a firm in fiscal year-end 1996 as the instrumental variable. If size influences analysts following, we will be suspecting endogeneity between firm characteristics represented by firm size and financial analysts meaning that financial analysts and stock price informativeness influence the other as leading to endogeneity in the model.

Second, this study hypothesizes that analysts activity is influenced by the quality of public financial information available in an economy. According to Chang et al. (2000), prior research in the US shows that analysts following tends to be positively related to the degree of information disclosure by a company. This is, presumably, because better disclosure decreases the cost of doing research on a company (Lang and Lundholm, 1996; Healy and Palepu, 1999). Extending this logic to the country level and similar to Frankel et al. (2006), this study hypothesizes that those countries with high-quality standards for required financial reporting increase analysts following. Therefore, it is suspected that endogeneity exists between financial analysts and stock price

informativeness in a country due to firm characteristics being represented by better accounting disclosures. This study uses the quality of accounting standards in a country as the instrumental variable. The accounting standards were measured based on the rating index created by the Center for International Financial Analysis & Research Inc. This rating measures the extent to which 90 standard accounting items are reported in the annual reports of firms in any given country. If analysts disclosures show a significant relationship with the instrumental variable, we can conclude endogeneity between stock price informativeness and financial analysts.

Table 5-16 shows the regression results of the two models. The model shows that significance for the instrument variables, which suggests endogeneity of firm characteristics, is represented by quality of accounting information and financial analysts. The results suggest that financial analysts may follow firms that have informative accounting information, which may cause analysts to follow firms that have better accounting information. This result is consistent with earlier evidence reported by Bhushan (Bhushan (1989a, b) and Lang and Landholm (1996). Second the Two-Stage-Least-Squares regression in model 2 shows no significant results for firm size as an instrumental variable. This is likely to be because of the nature of firm size being an exogenous variable rather than endogenous variable, as suggested by Frankel et al. (2006).

Table5-16
Two-Stage-Least-Squares Estimation

Equation 1

$$SYNCH = \alpha_i + \beta_1 logGDP_j + \beta_2 logn_j + \beta_3 logTime_j + \beta_4 Audit_j + \beta_5 logAnalyst_j + \beta_6 loggs_j + \beta_7 vgdpg_j + \beta_8 InzHerf_j + \beta_9 fHerf_j + \beta_{10} SyncROA_j + \beta_{11} g_j + \beta_{12} adr_j + \mu$$

Equation 2

$$Actgindex = \alpha_i + \beta_1 logGDP_j + \beta_2 logn_j + \beta_3 logTime_j + \beta_4 Audit_j + \beta_5 loggs_j + \beta_6 vgdpg_j + \beta_7 InzHerf_j + \beta_8 fHerf_j + \beta_9 SyncROA_j + \beta_{10} g_j + \beta_{11} adr_j + \mu$$

Equation 3

$$Firmsize = \alpha_i + \beta_1 logGDP_j + \beta_2 logn_j + \beta_3 logTime_j + \beta_4 Audit_j + \beta_5 loggs_j + \beta_6 vgdpg_j + \beta_7 InzHerf_j + \beta_8 fHerf_j + \beta_9 SyncROA_j + \beta_{10} g_j + \beta_{11} adr_j + \mu$$

	Model 1		**Model 2**	
VARIABLES	Coefficient	t- value	Coefficient	t- value
Intercept	2.99	1.22	3.06	0.70
Logarithm of per capita GDP (*Logy*)	0.07	0.33	0.10	0.40
Logarithm of number listed stocks (*Logn*)	-0.19	-1.07	-0.32	-0.67
Reporting Timeliness *(Time)*	-1.18**	-2.74	-1.42	-1.12
Credibility of disclosures *(Audit)*	0.96**	2.16	1.02	1.18
Fin. Analyst *(ANALYST)*	0.70*	1.73*	1.09	0.75
Logarithm of geographical size (*Logs*)	0.03	0.46	0.06	0.49
Variance in GDP growth (Vgdpg)	-0.01	-0.42	-0.01	-0.42
Industry Herfndahl index (InzHerf)	0.77*	1.70*	0.66	0.87
Firm Herfndahl index (Fherf)	-1.48	-0.72	-1.51	-0.62
Earning Co-Movement index (SyncROA)	0.79	0.72	1.26	1.03
Good government index (Gov)	-0.14***	-2.84	-0.15	-1.74*
Anti-director rights index (Adr)	0.06	0.65	0.10	0.53
F statistics	3.02**		2.04*	
Sig.	0.02		0.08	
Sample size	29		31	
R^2	0.68		0.56	

Note
:*** Significance at 0.01 level;** Significance at 0.05 level; *Significance at 0.1 level

Ordinary least squares regressions of the logarithm of systematic stock return variation, log (ψ), on the logarithm of per capita GDP (*LogGDP),* logarithm of number of listed stocks *(Logn),* Reporting timeliness *(Time),* Credibility of disclosures *(Audit),* Financial analyst (*ANALYST),* Timeliness analyst interaction (*Timanly*), Timeliness Audit interaction (*Timaudt*) Annual reporting control variables(Logarithm Disclosure intensity *(CIFAR),* Financial Disclosure (*Discl.),* Governance Disclosure *(Govern),* Accounting Principles *(Measure))* ,structural and institutional control variables (Logarithm of geographical size (*Logs*), Variance in GDP growth (*Vgdpg),* Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earning Co-Movement index (*SyncROA),* Good government index *(Gov),* Anti-director rights index (*Adr).* The sample consists of the 32 observations (countries). Numbers in parenthesis are probability levels at which the null hypothesis of zero correlation can be rejected in two-tailed t-tests.

5.5.10 Statistical model fit tests

The purpose of the statistical model fit tests is to ensure that the results of this study are not driven by outliers and that normality, linearity and homoscedasticity assumptions of the error term are maintained. Model fit tests include statistical tests for outliers, multicollinearity, heteroscedasticity and autocorrelation.

5.5.10.1 Outliers

Outliers do not drive the regression results of this study. The multivariate outliers test on the residuals was carried out to check for outliers using Cook's distance. *Cook's D* assesses for change in regression coefficients when a case is deleted (Tabachnick, 2007, p. 75). The benchmark for Cook's D *is* "1", any case in the sample exceeds this value is recommended for reconsideration.[115] None of the 40 cases reports a value over "1" for Cook's D.

5.5.10.2 Normality, Linearity *and Homoscedasticity of residuals*

Multiple regression analysis assumes that the model residuals (difference between obtained and predicted scores of (DV) or stock price synchronicity in our case) are: (i) normally distributed about the predicted (DV), (ii) have a straight line relationship with the predicted (DV), and (iii) the variance of the residuals about predicted (DV) scores are the same for all predicted scores. The above three assumptions are respectively referred to as normality, linearity and homoscedasticity of residuals (Tabachnick, 2007, p. 125).

To test the three above assumptions, residual scatter plots are examined. If residuals show normality, linearity and homoscedasticity, then our robustness check for results

[115] Morck et al. (2000) use Cook's distance to check for outlier as robustness for results.

are valid and the assumption of analysis is deemed met. Figure 5.4 shows a histogram of the normal distribution of the error about the dependent variable. Figure 5.5 depicts the linearity of the residual of the stock price synchronicity scores for our final model (Model 9). In addition, this study confirms the graphical presentations screening by statistical tests for normality using Jarque-Bera and heteroscedasticity using Breusch-Pagan-Godfrey test (BPG).[116] Figure 5.6 shows the descriptive statistics of the error term, its normal distribution and the Jarque-Bera test of normality. Table 5.13 shows the statistical test of heteroscedasticity. The results of testing normality, linearity and homoscedasticity of the residuals for Model 12 show similar results to that of model 9.[117] The Durbin-Watson value is 1.053, 1.648 for the two basic models in tables 5.3 and 5.4 (Model 9 and Model 12), respectively, which is less than the benchmark value of 2. The results also show that the Durbin-Watson values for all other models meet the benchmark of 2.

5.5.10.3. Multicollinearity

To identify these problems, screening runs will be carried out for perfect or highly squared multiple correlations (SMC) or VIF among independent variables where each independent variable, in turn, serves as the dependent variable and the others serve as independent variables. The very low tolerance (1-SMC) is a good tool for multicollinearity diagnosis. Berry (1993) reports that when r is 0.9, the standard errors of the regression coefficient is doubled. When multicollinearity is present, none of the regression coefficients may be significant because of the large error of standard errors

[116] BPG regresses the squared residual on the original regressor by default. Nonindependance of errors or autocorrelation assumes the correlation of errors and this causes one more problem that violates the assumption of the multiple regressions.

[117] Model 12 tests the moderating effects of timeliness of reporting on the relationship of the analyst following and credibility of disclosures s with stock price synchronicity.

(Tabachnick, 2007, p.90). Our resulting models (Model 9 and Model 12) are free of multicollinearity problems.

Figure 5.4
Histogram of the Normal Distribution of the Error Term[118]

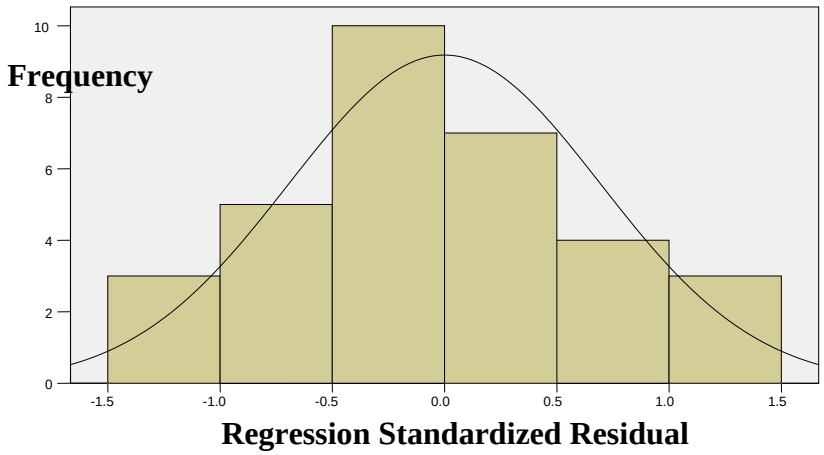
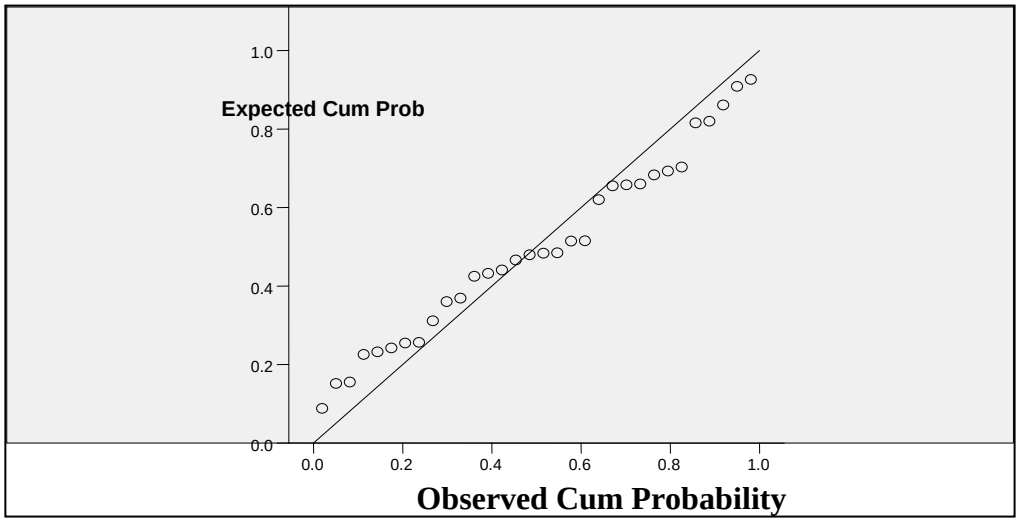


Figure 5.5
Linearity of the Residual of about the Stock Price Synchronicity Scores for Final Model[119]

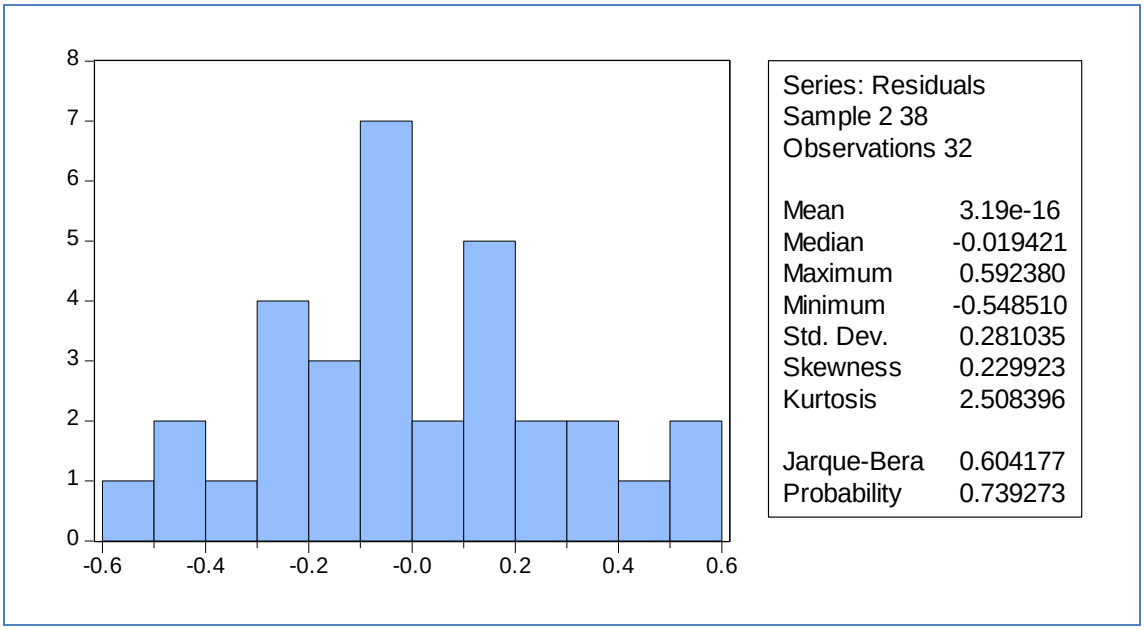


Note:
Figure 5.5 is a Normal P-P Plot of Regression Standardized Residual. Dependent Variable: Logistic transformation of R2 for country **j.**

[118] Descriptive statistics of the error term and its normal distribution is from E- Views 6 system generated figure.

[119] Linearity of the residual is a SPSS 15 system generated figure.

Figure 5.6
Descriptive Statistics of the Error Term and Test of Normality



Note:
Figure 5.6 Descriptive statistics of the error term and its normal distribution is E- Views 6 system generated figure. Jarque-Bera test use asymptotic tests and assume normality when accepting the null hypothesis and otherwise when rejecting the null. The test above accepts the null normality assumption of the residual (p value =0.73).

Table 5.17[120]
Heteroscedasticity Test for Residuals
Breusch-Pagan-Godfrey

F-statistic	0.947708	Prob. F(16,15)	0.5436[121]
Obs*R-squared	16.08663	Prob. Chi- Square (16)	0.4469
Scaled explained SS	2.665835	Prob. Chi- Square (16)	0.9999

Based on the above statistical test, the final models (Model 9 and Model 12) are consistent with the assumption of the multiple regression analysis and the results are robust.

[120] Heteroskedasticity test is E- views 6 system generated figure

[121] BPG assumes homoscedasticity when accepting the null hypothesis and otherwise when rejecting the null. The test above accepts the null hypothesis.

5.6 DISCUSSION

The following presents the final discussions of the overall results of the five hypotheses tested in this study.

5.6.1 Reporting timeliness

Notably, the regressions show a consistent negative significant relationship between timeliness of reporting and stock price synchronicity. The results support the role of timeliness of reporting in the informativeness of stock prices. The finding is consistent with recent evidence by Hutton et al. (2009), Jin and Myers (2006) and Ferreira and Laux (2007). This result is inconsistent with the study's argument that suggests timely reporting by the firm facilitates the flow of firm private information into stock prices. The original results in table 5.3 (Models 7, 8 and 9) report a significant relationship between timeliness of reporting and stock price synchronicity.

This result is remarkably robust and consistent through all the further checks. Timeliness of reporting shows a consistent significant relationship with Stock price synchronicity when using alternative measures of synchronicity, controlling for market risk noise, controlling for market size and controlling for transitory time effects. The result is also consistent with different data sets obtained by separating the sample into subsamples for developed and emerging markets. The result is also consistent in a number of additional step regressions, which include dropping control variables and other transparency attributes.

Using two new measures, introduced by Morck et al. (2000), namely, stock wide market variation and specific firm stock return variation as alternative synchronicity measures, timeliness of reporting shows consistent results. When inserting the noise measure

introduced by Jin and Myers (2000), the result is consistent and the private property protection variable tested by Morck et al. (2000) is rendered insignificant.

One interpretation of this result is that private property protection is a proxy of the enforcement quality of the law (La Porta, 1998) but does not proxy for the quality of the law and does not facilitate the flow of private information. However, timeliness of reporting contains some firm private information that can be incorporated in stock prices. This interpretation is inconsistent with Jin and Myers (2006) who argue that firm transparency is associated with lower R^2 even in the absence of private property protection.

This result is generally consistent with the efficient market hypotheses.[122] It is also consistent with earlier studies in terms of the role of interim reporting in providing firm-specific information.[123] The results show contrary results to Morck et al. (2000), which is likely to be related to the measures used by the authors.[124] Butler et al. (2007) document mixed results, which show insignificant effects of compulsory interim reporting but significant effects when interim reporting is voluntarily. There are some differences between this study and Butler et al. (2007) in terms of data set and

[122] As argued before, the results are generally consistent with the efficient market hypotheses**.** That is, fully informed market will bring stock prices to equilibrium. If interim reporting affects stock prices, then the results suggest that firm with more disclosures (i.e., interim reporting) is more likely to have more private information disseminated and less stock price synchronicity and consequently more informed trade. 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"

[123] McNichols and Mangold (1983) show that interim financial report has some information in annual reports, Brown and Niederhoffer(1968) and Brown and Rozeff, (1979) provide evidence on the role of interim reporting in improving forecasts of annual earning. Other researcher have documented the role of increased disclosures in improving liquidity (e.g. Welker, 1995; Healy et al., 1999; Leuz and Verrecchia, 2000), reduce the cost of capital (e.g. Botosan, 1997; Sengupta, 1998; Piotroski, 2003; Botosan and Plumlee, 2002), and reduce information asymmetry (Welker, 1995; Healy et al., 1999; Brown et al., 2005).

[124] Morck et al. (2000) measure is unsound as stated by Miller (2004).

methodology.[125] The results of this study support the first hypothesis of this study and that the findings are inconsistent with the theory and prior evidence.

5.6.2 Analyst following

The results are in line with extant literature, which establishes an intermediary and informational role for analysts (e.g. Lang and Lundholm, 1996; Beaver, 1998; Clement, 1999; Jacob, 2001; Gilson et al., 2001; Ramnath, 2002). Specifically, the results support the analysts' role in communicating market and industry information. Both Piotroski and Roulstone (2004), and Chan and Hameed (2006) argue that analysts have a less competitive advantage in collecting and communicating firm specific information and, therefore, are less motivated to communicate firm-specific information, and their efforts are primarily devoted to gather and interpret industry and market information.

Other studies show similar significant relationship but in the opposite direction (Liu, 2007; Kelly and Ljungqvist, 2007; Crawford et al., 2009). The results of this study suggest that financial analysts following is likely to incorporate more market and industry information in stock prices. The results are consistent with agency theory. According to Healy (2001, p.408), "one of the mechanisms for reducing agency cost is information intermediaries, such as financial analysts and rating agencies who engage in private information production to uncover any manager misuse of firm resources".

Table 5.3 (Models 7-9) shows a consistent significant positive relationship between financial analysts and stock price synchronicity. Additional sensitivity analysis (Tables 5.5 to 5.12) shows qualitatively consistent results. However, it can be seen that whenever the market noise variables are added to the regressions (Table 6-11), the significance of this variable becomes either weaker or insignificant. This is consistent

[125] Butler et al. (2007) a cross firm study in US for data 1950 – 1973. This study is cross- country study conducted based on *CIFAR* data 1995.

with the nature of market and industry information analysts are communicating, which is likely to decrease the wide market noise. Analysts shows only marginal significance (p =14%) when using the alternative measure of synchronicity in table 5.4. One of the interpretations of this result is that it is probably because this measure is less accurate than R^2. When the other transparency variables are dropped in Table 5.10, Analysts following is less significant (p =10%). One of the interpretations could be because dropping this attribute means less disclosures by the firm and, consequently, less information to analysts, especially with regard to the attribute "*Measure*", which proxies for firm annual reporting. Further regressions show that analysts following has only significant results when timeliness of reporting is present in the model. This is consistent with the "complementary" role suggested by (Lang and Landholm, 1996).

The original results and the subsequent robustness checks show some differences with some recent studies and working papers (e.g., Liu, 2007; Kelly and Ljungqvist, 2007). One of the interpretations could be that this is recent evidence and not established enough in the literature. Another reason could be the methodology of using market beta instead of stock price synchronicity. For example, Liu (2007) used short window methodology and firm level data. This study is cross-country data and used a long window (one year).

In general the basic conception of the analysts role is that they collect and distribute firm-specific information (e.g., Beaver 1998; Bushman et al. 2004). However, the interpretation brought by well cited studies (e.g., Piotroski and Roulstone, 2004; and Chan and Hameed, 2006) is that due to the competitive advantages insiders and institutional investors have to obtain firm private information, financial analysts are more motivated to communicate industry and market information. This study adopts

this theoretical stand in interpreting these results. If analysts are able to capture these competitive advantages and obtain firm private information in any different transparency settings, they would be more motivated to communicate firm-specific information (Chan and Hameed, 2006). Further explanation can be sought if a different argument is more valid.

According to the above discussion, it can be concluded that the results are robust and consistent with the theory and prior studies, and, accordingly, the second hypothesis of this study is supported.

5.6.3 Credibility of disclosures

The auditor's role is to ensure that firm annual financial reporting is in compliance with GAAP (Healy 2001) or otherwise reports a contract breach by qualifying his/her annual audit reports (Watts and Zimmerman, 1982). The results in table 5.3 panel "A" (Models 7-9) show that credibility of disclosures is positively associated with stock price synchronicity. This relationship is, in general, consistent through further robustness tests (Table 5.4 to 5.11). When the market noise variables are controlled for in the regressions (Table 5-6), the credibility of disclosures shows either less significant or insignificant results. One of the interpretations of this result is that auditing is one of the monitoring and enforcing tools in the corporate reporting process (Watts and Zimmerman, 1986, p.312). Therefore, in our case, the Big 5 represent quality of enforcing the law or compliance to GAAP (La Porta, 1998) but does not provide new information (Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987). They just, at best, confirm information already available to investors (Healy et al., 2000).

Interestingly, the result is consistent with the agency theory. According to Jensen and Meckling (1976) accounting is demanded because of its use to decrease the firm's

agency cost but the contract terms are of less use if they are not monitored and enforced. Auditing is one of the monitoring and enforcing tools and the demand for the auditing services depends on "the assessment of nonzero probabilities of reporting a breach; the higher the probability, the more effective the contract, the lower the agency cost, the higher the issue price" (Watts and Zimmerman, 1982, 1986 p.312). Therefore, in our case, we would expect a high demand for interim reporting and, consequently, high effects of interim reporting on stock price synchronicity when firms hiring "Big 5" or high audit credibility firms. Table 5.3 (model 5) shows the significance of timeliness ($_p$ = 10%, t =1.67). When audit credibility is added into the regression in (Table 5.3 Model 6), an increase in the significance was shown ($_p$ = 0.021, t =2.473).

The relationship between audit credibility and stock price synchronicity is consistent with the argument brought by earlier studies that document that auditors' report does not signal any information to the market (Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987; Healy et al., 2000; Kothari, 2001). It is also consistent with the definition of Stock price synchronicity being the reverse measure of private information flow (Ferreira and Laux 2007). However, the positive relationship comes from the association between high quality auditing (e.g., Big 5 in our case) and the higher probability of more credible reporting (Watts and Zimmerman, 1982), which gives analysts more incentive to follow more firms with credible reporting (Lang and Lundholm, 1996) and, consequently, leads to communicate more market and industry information (Piotroski and Roulstone, 2004; and Chan and Hameed, 2006).[126] Further regression of the original shows that audit credibility is insignificant if we drop financial analysts from the regression. However, by removing audit credibility from the regression, we will have a slight effect on the

[126] Lang and Lundholm (1996) find that more informative financial statements are associated with an increase in the net benefits available to information intermediaries and increased resources devoted to information discovery. Specifically, they find that more analysts follow firms and greater consensus among analysts are associated with more informative disclosure practices.

significance of financial analysts.[127] Further robustness checks show relatively less strict consistency of the results for audit credibility. Although there are some differences between the results of this study and Gul et al. (2009), a further investigation of the effects of audit credibility on stock price synchronicity is recommended.[128]

5.6.4 Reporting timeliness, Analyst following and Stock price synchronicity

The original results in Table 5.4 (models 10 and 12) show a negative relationship between the interaction variable (*TimLyst*) and stock price synchronicity. An interpretation of this is that the number of interim reporting firm issues annually affects the relationship between financial analysts and stock price synchronicity (Tabachnick 2007, p.157).

The result is consistent with the agency theory. The agency problem, in its simplest form, arises because of the separation between ownership and the management who tend to expropriate business resources. In order to align the interests of managers (entrepreneur) and those of stock and debt holders, contracting theory suggests an optimal contract between mangers and investors such as compensation agreements and debt contracts.[129] One of the mechanisms for reducing agency problems is "information intermediaries, such as financial analysts and rating agencies who engage in private information production to uncover any manager misuse of firm resources" (Healy 2001, p.408).

[127] An additional two runs was carried out on model 9 in table 5.3 panel "A". First when we drop financial analyst from the model audit credibility obviously becomes insignificant (t value dropped from 1.88 to 1.06 and p value dropped from 8% to 30%). Second when we drop audit credibility from the regression, financial analyst significance was slightly affected but still significant in the 10% area (t value dropped from 2.292 to 1.714 and p value dropped from 3.7% to 10.5%)

[128] Gul et al. (2009) investigated the effects of auditors and foreign ownership in China. Their data is on firm level and the study methodology was based on panel data (1996 – 2003).

[129] Refer to Jensen and Meckling (1976).

The result is in accordance with the efficient market hypotheses; interim reporting by firms will allow analysts to communicate more firm-specific information and lead to more stock price approaching equilibrium. Stock price synchronicity is the adverse measure of private information flow (Morck et. al, 2000; Ferreira and Laux, 2007). Therefore, the interpretation of the negative relationship between the interaction variable and stock price synchronicity indicates that more frequent interim reporting will increase firm private information process and communication by analysts. Such an information process and communication will lead to markets that are more efficient.

The results are consistent with the following: First, the role of increased disclosure and interim reporting in providing firm information (e.g., McNichols and Mangold 1983; Welker, 1995; Botosan, 1997; Sengupta, 1998; Healy et al., 1999; Healy et al., 2000; Leuz and Verrecchia, 2000; Botosan and Plumlee, 2002; Piotroski, 2003;Guan et al., 2006; Butler et al., 2007; Jo and Kim, 2007). Second, the role of financial analysts in processing private information (Beaver, 1998; Clement, 1999; Jacob, 2001; Gilson et al., 2001; Ramnath, 2002; Piotroski and Roulstone, 2004; Chan and Hameed, 2006; Liu (2007) and Kelly and Ljungqvist (2007), Crawford et al. (2009) and, finally, the complementary role of financial analysts in spreading firm information out to the mass market (Lang and Lundholm 1996).

In terms of the direction of the relationship of the interaction variable (*TimLyst*) and stock price synchronicity, prior research provides mixed results for financial analysts' relationship with stock price synchronicity. For example, Piotroski and Roulstone (2004), and Chan and Hameed (2006) found that analysts' coverage is positively correlated with synchronicity. Crawford et al. (2009) found that analysts can serve to communicate both market and firm-specific information.

In contrast, Liu (2007), and Kelly and Ljungqvist (2007) predict that analysts are most likely to produce firm-specific information given their incentive to create information with investment value. This study documents a negative relationship between timeliness, analysts' interaction and Stock price synchronicity. One of the interpretations of this negative relationship is that if analysts can achieve better competitive advantage relative to insiders and institutional investors by obtaining firm information through more frequent financial reporting, they are likely to have more incentive to communicate firm private information instead (Chan and Hameed, 2006). The negative result is consistent with Liu (2007), and Kelly and Ljungqvist (2007). Overall, the result is consistent with theory and prior studies, therefore, the fourth hypothesis of this study is supported.

5.6.5 Reporting timeliness, Disclosure credibility and Stock price synchronicity

Regression results show an insignificant relationship between reporting timeliness and audit credibility interaction variable and stock price synchronicity. The interpretation of this result is that regardless of how many interim reports a firm issues, the relationship between audit credibility and stock price synchronicity will not be affected (Tabachnick 2007, p.157). In other words, timeliness of reporting does not moderate the relationship between credibility of disclosures and stock price synchronicity. This result is reported in table 5.4 (Models 11 and 12) and, interestingly, is consistent through the further robustness checks (tables 5.5 to 5.12).

The result is consistent with Healy et al. (2000) who argue that audit qualifications, at best, confirm information already available to investors, and with Kothari (2001) who interprets the market reaction to earning announcements as the investors' perception of all accounting information to be credible. The result is also consistent with prior empirical evidence (e.g., Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987) that

suggests that auditors are intermediaries who do not provide timely signals to the capital market because they can be anticipated.

Prior studies establish some evidence in discussing the insignificant results of interim reporting moderating effects on the relationship between credibility of disclosures and stock price synchronicity. In brief, related evidence can be classified into: (i) the effect of interim reporting on private information flow, (ii) the informativeness of auditors or credibility disclosures, and (iii) the effects of interim reporting on the credibility of disclosure informativeness.

In terms of interim reporting effects on private information flow, previous research has shown that interim financial reports have some information (McNichols and Mangold, 1983; Botosan, 1997; Sengupta, 1998; Piotroski, 2003; Botosan and Plumlee, 2002). Studies that are more recent have also provided more evidence on the reporting frequency effects on stock prices and earning management (e.g., Guan et al., 2006; Butler et al., 2007; Jo and Kim, 2007).

The second issue is to discuss some of the literature on the informativeness of the credibility or the Big 5 firms (now Big4). Generally, the literature suggests that auditors are intermediaries who do not provide timely signals to the capital market (e.g., Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987, Healy et al., 2000; Kothari, 2001). Prior findings also support that "Big" auditors improve earnings management (e.g., Jones 1991; Becker et al., 1998; Francis et al., 1999; Gul et al., 1999) and they can be informative concerning going-concern reports (Francis, 2004; Taffler et al., 2004).[130]

[130] Big auditors is referred to the Big 4 in (Jones 1991; Becker et al., 1998; Francis et al., 1999) studies and Big 6 in (Gul et al. 1999) study.

The third issue discusses the effect of interim reporting on the informativeness of auditors' reports. Prior studies investigate the effects of interim reporting on the informativeness of the audit reports. For example, based on a review of 1,025 companies listed in the *Directory of Corporate Affiliations in the* United States over the period 1991-1995, Manry et al. (2003,p. 251) report the following:

> "*We find that when the auditor reviews interim earnings on a timely basis, the association between quarterly returns and earnings (and between quarterly returns and unexpected earnings) is predominantly contemporaneous. When the auditor reviews interim earnings retrospectively, however, the association between quarterly returns and earnings is not entirely contemporaneous; with retrospective reviews, returns lead interim earnings".*

Using Benford's Law for 182,278 positive quarterly earnings and 103,470 negative quarterly earnings observations for all publicly listed US companies from 1993 to 2003, Guan et al. (2006, p. 569) investigate the effect of interim reporting on the role of auditor effectiveness and report the following:

> "*The empirical results show that firms tended to engage in cosmetic earnings management in each of the four fiscal quarters. More importantly, it was found that the degree of cosmetic earnings management is significantly less severe in the fourth fiscal quarter, which is the only quarter audited, than any of the previous quarters. This result suggests that the auditor plays an important role in reducing the cosmetic earnings manipulative behaviour".*

The above two studies (Manry et al., 2003; Guan et al., 2006) suggest that interim reporting affects the informativeness of audit reports. My interpretation is that this relationship could only exist if interim reports are audited once issued. However, in a general sense, in our sample, firms are not auditing their interim reports because it is not required and auditing any interim reports is optional. For example, only in 2003, did the Securities and Exchange Commission (SEC) in the United States require firms to audit (Form 10-Q) before filing with the SEC (Manry et al., 2003).[131] The current study data is based on *CIFAR* 1995, and consists of 40 countries, nearly 50 percent of which are emerging markets. Therefore, it is difficult to assume that firms in our country sample

[131] Form 10-Q is the audit report.

are obligated to audit their interim reports. Even if they are obligated or they choose to do an interim audit, the question remaining is whether audits are conducted on a timely basis or retrospectively.[132] For example, the sample of Manry et al. (2003) is 1,525 firms; only 384 firms indicated that they chose to audit their interim reports on a timely basis.

In general, prior evidence supports this study's argument. If auditors only audit annual reports, or if they audit annual and interim reports on a retrospective basis, then these study results are consistent with prior evidence. However, if we assume that firms in our country sample audit their interim reports on a timely basis, then our results are contrary to the above two studies and other interpretations should be sought.

With regard to the effects of Big auditors in improving earnings management (e.g., Jones 1991; Becker et al., 1998; Francis et al., 1999; Gul et al., 1999), this study is concerned whether interim reporting has a moderating effect on the relationship between credibility of disclosures and Stock price synchronicity. This is just the opposite of proposing that credibility of disclosures moderates the relationship between timeliness of reporting and stock price synchronicity. The results support this proposition. In other words, when we insert audit credibility in the regression, the significance of the timeliness of reporting with synchronicity is stronger (Table 5.3 Models 7 and 8). Therefore, the results are inconsistent with the above studies.

It can be argued that credibility of disclosures informativeness, that is, evidenced by the audit-going concern reports (Francis, 2004; Taffler et al., 2004), is in contrast with this study's results and prior studies (e.g., Dodd et al., 1984, 1986; Dopuch et al., 1986,

[132] this information is not published and can be observed only through survey as per (Manry et al., 2003)

1987, Healy et al., 2000; Kothari, 2001). My interpretation for the contradiction (Francis, 2004; Taffler et al., 2004) is that this study's results are basically related to the informativeness of annual audit reports qualifications and not discussing in particular the informativeness of audit-going concern reports.

Finally, the extant literature on this issue does not provide enough evidence as to whether interim reports informativeness audited by "Big" audit firms is different from those audited by "small" audit firms (Francis, 2004). Finally, extant literature supports this study's results and further investigations may examine this issue in more depth.

5.7 SUMMARY AND CONCLUSION

This chapter presents the findings of this study using various analysis that is consistent with the multiple regression assumptions and controlling for country fundamentals and institutions. The study's results survived a number of robustness checks including using alternative measures for the dependent variable. The methodology of conducting the statistical analysis and the further checks is restricted by the limited degree of freedom and closely follows prior studies, specifically, Morck et al. (2000) and Jin and Myers (2006). The robustness checks include introducing new variables to control for market risk noise, using alternative measures for stock price synchronicity, controlling for market size and the time period effect. Additional further checks employed different data sets and tested two new synchronicity regimes. Finally, the statistical model fit tests were performed to ensure that the results are not driven by outliers and the standard error characteristics of the final regression is consistent with the multivariate analysis assumptions.

The regressions notably show a consistent negative significant relationship between timeliness of reporting and stock price synchronicity. The results support the role of timeliness of reporting in the informativeness of stock prices. The finding is consistent with recent evidence by Hutton et al. (2009), Jin and Myers (2006) and Ferreira and Laux (2007). This result is inconsistent with the study predictions that timely firm reporting facilitates the flow of firm private information into stock prices.

Financial analysts following is positively associated with stock price synchronicity. The results are in line with the extant literature that establish intermediary and informational role for analysts (e.g. Beaver, 1998; Clement, 1999; Jacob, 2001; Gilson et al., 2001; Ramnath, 2002; Lang and Lundholm, 1996). Specifically, the results support the analysts' role in communicating market and industry information. Both Piotroski and Roulstone (2004), and Chan and Hameed (2006) argue that analysts are primarily competitively motivated to gather and interpret industry and market information. Other studies show a similar significant relationship but either in the opposite or mixed directions (Liu, 2007; Kelly and Ljungqvist, 2007; Crawford et al., 2009). The results of this study suggest that financial analysts following is likely to incorporate more market and industry information in stock prices.

The OLS results show that audit credibility is positively related to stock price synchronicity. This positive relationship is generally consistent with prior evidence on the role of auditors' reports in communicating timely firm information. Prior evidence suggests that auditor qualifications do not provide timely signals to the capital market because they can be anticipated (Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987) and that, at best, audit qualifications confirm information already available to investors (Healy et al., 2000). However, the positive relationship comes from the association between high quality auditing (e.g., Big 5 in our case) and the higher probability of

more credible reporting (Watts and Zimmerman, 1982). This association leads to more incentives for financial analysts to follow more firms hiring "Big 5" auditors (Lang and Lundholm, 1996) and, consequently, communicate more market and industry information (Piotroski and Roulstone, 2004; and Chan and Hameed, 2006).[133] Further robustness checks show generally consistent results of credibility of disclosures and stock price synchronicity.

Concerning the moderating effects of reporting timeliness on the relationship between analysts following and Stock price synchronicity, the study reports a significant negative relationship between the interaction variable (*TimLyst)* and stock price synchronicity. This result is consistent with prior studies from three perspectives. First, the result supports prior evidence on the role of financial analysts in spreading firm information (e.g., Hong et al., 2000; Brennan et al., 1999; Walther, 1997; Bhattacharya 2001). Second, the result is consistent with the intermediary role of financial analysts that assumes a "complementary" relationship between firm financial disclosures and financial analyst activities (Lang and Lundholm 1996). Third, the analysts' role in communicating firm information (Liu, 2007; Kelly and Ljungqvist, 2007; Crawford et al., 2009). One of the interpretations of the negative result is that if analysts can achieve a better competitive stance relative to insiders and institutional investors by obtaining firm information through more frequent financial reporting, they will have more incentive to communicate firm-specific information (Chan and Hameed 2006).

The study results consistently report insignificant statistical results for the moderating effects of reporting timeliness on the relationship between audit credibility and stock price synchronicity. The result is consistent with the role of auditors as law enforcing agents that report breaches of contracting (GAAP compliance) by executives (Watts and

[133] Lang and Lundholm (1996) find that more informative financial statements are associated with an increase in the net benefits available to information intermediaries and increased resources devoted to information discovery. Specifically, they find that more analysts follow firms and greater consensus among analysts are associated with more informative disclosure practices.

Zimmerman, 1982, 1986). The results are consistent with prior evidence that suggests that auditors are intermediaries that do not provide timely signals to the capital market because they can be anticipated (Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987) and that, at best, audit qualifications confirm information already available to investors (Healy et al., 2000). The results are consistent with the nature of audit reports that are issued annually and regardless of how many interim reports the firm issues, auditors annual reports informativeness are not affected.

Finally, the overall results of this study are inconsistent with prior evidence concerning the effects of corporate transparency on stock price synchronicity. The robustness checks represent further supporting analysis for the original results (models 9, 12). The next chapter summarizes this study, recaptures the study research questions, discusses implications, limitations and suggests future research orientation in this area.