CHAPTER FOUR

HYPOTHESES DEVELOPMENT AND RESEARCH METHODOLOGY

4.1. INTRODUCTION

This chapter serves two objectives. The first objective is to identify and establish links among variables, develop the theoretical framework and hypotheses of the study. The second objective is to discuss methodology issues related to sample selection, measurement of variables, model specification and econometrics tests. The remainder of the chapter is structured as follows. Section 4.2 develops research hypotheses. Section 4.3 explains the corporate transparency effects on Stock price synchronicity. Section 4.4 specifies the research paradigm. Section 4.5 documents the measurement issues and the empirical models. Section 4.6 describes sample and state data sources. Section 4.7 concludes and summarizes the chapter.

4.2. HYPOTHESES DEVELOPMENT

Based on the research questions identified in chapter one, the hypotheses of this study are developed in this section. The first group of hypotheses seeks to answer whether corporate transparency, represented by financial reporting timeliness, analyst activities and credibility of disclosures, affect stock price informativeness. That is, the first hypothesis tests whether countries that have a high frequency of interim reporting have a higher level of firm-specific information incorporated in stock prices than those who report less frequently. This hypothesis addresses the expected differences in the value relevance of accounting information that is attributed, *ceteris paribus***,** to the impact of frequent reporting. The second hypothesis tests whether countries that have more financial analysts following communicate more market and industry information. The third hypothesis tests whether higher credibility of disclosures proxied by the

percentage of total firms audited by the Big 5 audit firms results in incorporating more market and industry information into stock prices.

As mentioned earlier, accounting information timeliness plays a major role in communicating private information in an arbitrage economy. The second group of hypotheses, therefore, seeks evidence on the moderating role of financial reporting timeliness on the relationship between analysts following activities and audit credibility and stock price synchronicity. The following section discusses the development of the five hypotheses of this study.

4.3 CORPORATE TRANSPARENCY EFFECTS ON STOCK PRICE SYNCHRONICITY

In this section, I examine the effect of reporting timeliness, financial analysts following, and audit credibility of disclosures on stock price synchronicity. Section 4.3.1 develops the hypothesis regarding the effects of reporting timeliness on stock price synchronicity. Section 4.3.2 discusses the hypothesis regarding the association between financial analysts and stock price synchronicity. Section 4.3.3 discusses the hypothesis regarding the link between credibility of disclosures and stock price synchronicity. Section 4.3.4 discusses the moderating effects of financial reporting timeliness on the relationship between financial analysts and stock price synchronicity. Finally, section 4.3.5 examines the moderating effects of reporting timeliness on the relationship between audit credibility and stock price synchronicity.

4.3.1 Reporting timeliness

Prior empirical evidence relates volatility in stock prices to firm information flow. For example, the findings of Ross (1989) show that the rate of information arrival is a direct predictor of stock price volatility. This mechanism is operated due to the proper

functioning of risk arbitragers in the market (Ross 1989). The findings of Ross are supported by prior empirical findings and strategic models (e.g., Golsten and Milgrom, 1985; French and Roll, 1986), which suggest that informed trade brings on volatility due to information flow. The findings of Roll (1988) indicate that the changes in stock returns are mainly a consequence of firm private information being incorporated in stock prices. Further, Ferreira and Laux (2007) suggest that idiosyncratic volatility (reverse of stock price synchronicity) is a good summary measure for private information flow into stock prices.

Recent researches have linked greater firm-specific return variation (less stock price synchronicity) to better functioning stock markets by using stock price synchronicity as a measure of incorporation of private information into stock price at a country level (e.g., Morck et al., 2000; Wurgler, 2000). Further, other researchers have applied stock price synchronicity to measure firm level stock price informativeness (Durnev et al., 2003; Piotroski and Roulstone, 2004; Chan and Hameed 2006; Chan et al. 2006, etc. For details, see the literature review in Section 2.4.1). Stock price synchronicity, according to these studies, is likely to reflect the extent of capitalization of information about firm fundamentals into stock prices.

The lower the stock price synchronicity, the more firm-specific information is reflected in the stock price. In contrast, some recent evidence suggests a different interpretation for stock price synchronicity. The results of Rajgopal and Venkatachalam (2006), Yang and Zhang et al. (2006) and Ashbaugh-Skaife et al. (2006) suggest a contrary view that stock price synchronicity is a noise measure rather than the information interpretation (see Section 2.4.2 for details). The bulk of the literature is supporting the information interpretation. This line of research is continuing, highly cited and employs both firm

and country level sets of data. Nevertheless, the opposing evidence is more likely to only be conditional on the methodology employed. For example, Rajgopal and Venkatachalam (2006) focus on the average monthly variance of the raw or adjusted market returns rather than directly using stock price synchronicity constructed using the classic market model. Ashbaugh-Skaife et al. (2006) tested future earnings information and analysts forecast error. Although the authors did not find a significant association with stock price synchronicity, other studies (Durnev et al., 2003; Ferreira and Laux 2007) found that the extent to which prices reflect a greater level of current and future earnings information is positively related to the amount of firm-specific information impounded in the price (i.e., low synchronicity). Similarly, Ferreira and Laux (2008) report an association of stock price synchronicity and financial analysts following. If the current study shows that lower stock price synchronicity is associated with better financial reporting transparency, then synchronicity as a measure of firm specific information reflected in the stock price is reasonably supported and vice versa.

Ferreira and Laux (2007) state that firm accounting information disclosures are a major factor in the flow of firm-specific information. They also argue that the cost-benefit payoff of obtaining firm private information determines whether or not disclosures that are more transparent encourage the collection of private information. Reporting timeliness, namely, interim reporting is seen as a practice of increased disclosures by firms (Butler et al. 2007). Existing evidence supports that firm annual reports contain information disclosed in interim reports and that interim reports improve annual earnings forecasts (Brown and Niederhoffer, 1968; Brown and Rozeff, 1979; McNichols and Mangold, 1983). Increased firm disclosure has links to better capital market functioning. Prior research has established a role for increased disclosure in improving market liquidity, reducing the cost of capital and information asymmetry

(e.g., Welker, 1995; Healy et al., 1999; Leuz and Verrecchia, 2000; Botosan, 1997; Sengupta, 1998; Piotroski, 2003; Botosan and Plumlee, 2002; Welker, 1995; Healy et al., 1999; Brown et al., 2005). McNicholes and Manegold (1983) investigate the effects of interim reporting on stock price volatility. They document less stock price volatility around annual earnings announcements after a firm introduces quarterly reporting.

In order to link stock price synchronicity and reporting frequency, prior researches have put forward some guidelines. Durnev et al. (2004) argue that higher firm specific variation (lower stock price synchronicity) is driven by more informed trade induced by feasible private information collection costs. Durnev et al. (2003) report that more future earnings information is contained in stock prices that incorporate more firm-specific information.

While Morck et al. (2000) attribute higher firm-specific information to better private property protection, Jin and Myers (2006) introduced a theoretical model and argued that even with a higher level of private property protection, insiders in opaque or less transparent firms can still impede the flow of private information into stock prices and increase R^2. Their findings indicate that investors can receive more cash in more transparent firms even with poor governance. Jin and Myers (2006) argue that a lack of transparency leads outside investors to trade on market and industry information leading to the higher explanatory power of systematic risk in the total stock return. Ferreira and Laux (2008), and Hutton et al. (2009) found that transparency of financial reporting is positively correlated with idiosyncratic volatility.

According to Veldkamp (2005), if obtaining firm private information is costly, investors are likely to focus on information that is common to many stocks. He argues that when

information is costly, rational investors will not buy information about all assets; instead they will learn about a subset and, thus, a shock to one "signal" is passed on as a common shock to many asset prices, which induces stock price co-movement (Synchronicity). This argument is consistent with the view that higher stock price synchronicity is associated with less information on a firms fundamentals in stock prices.

In line with the above reasoning, Morck et al. (2000) conjecture that more firm-specific price variation (less stock price synchronicity) would occur in countries with better accounting standards. Although their results are marginally significant in supporting their conjectures, the reasoning behind this argument remains valid.[35]

Consistent with the previous information cost argument (Grossman and Stiglitz 1980; Durnev 2004; Veldkamp 2005), this study suggests that increased timeliness of reporting disclosure provided by the firm, namely, higher reporting frequency, will lead to a lower information risk and lower information cost (Francis et al., 2004). It will also induce better private information collection by arbitragers and, hence, will lead to more informative prices (proxied by low stock price synchronicity in this study). Increased timeliness of reporting, namely, higher interim reporting quality also indicates high transparency (Bushman et al., 2004). In accordance with Jin and Myers (2006) argument, high quality accounting information will also induce lower R^2 and lower stock price synchronicity.

For the above reasons, I state the first hypothesis as follows (stated in alternative form):

[35] Their findings show an association between accounting standards and stock price synchronicity significance of approximately 20% p value.

Hypothesis 1: Higher reporting-frequency is negatively associated with stock price synchronicity, *ceteris paribus.*

4.3.2 Analysts following

Financial analysts who specialize in processing and interpreting financial information reported by firms have been considered as an important component of the private information system (Bushman et al., 2004). Financial information disclosures and subsequent collection and processing of private information by investors have been crucial for a better functioning financial market (Verrecchia, 1982). The role of the financial analysts and incentives in communicating private information to the market have been discussed in many theoretical studies (Grossman and Stiglitz, 1980; Diamound and Verrechia, 1981; Admati and Pfleidere, 1986).

The extant literature suggests that analysts are prominent information intermediaries in the capital market. Their prospective analysis is aimed at forecasting a firm's future earnings and cash flow, and conducting respective analysis that interprets past events (Beaver, 1998). The rationale of the existing role of the analysts can be based on the assumption that better cost-benefit trade off on information collection leads to more informed trading and more informative prices, as suggested by Grosman and Stiglitz, (1980).

Empirical studies regarding the role of the financial analysts can be classified into two major streams: firm level and country level. For firm-level scope, empirical evidence supports that better analysts coverage improves forecasts (Hong et al., 2000), helping the price discovery process (Gleason and Lee, 2003), serving adverse selection practice (Brennan et al., 1999; Bhattacharya, 2001) and affects synchronous stock price movements (Piotroski and Roulstone 2004; Liu, 2007; Kelly and Ljungqvist, 2007;

Crawford et al., 2009). For the cross-country basis, empirical evidence supports the association of financial analysts accuracy and country and market size in addition to private protection level (Chang et al., 2000), and increases the synchronous movements of stock (Chan and Hameed, 2006; Fernandes and Ferreira, 2008)

Prior researches provide some guidelines to link stock price synchronicity, as a proxy for private information flow, and financial analysts following activity. Existing research has established an informational role for financial analysts. However, existing findings do not provide concrete evidence on the extent of the role of financial analysts in affecting the levels of systematic and unsystematic risk in stock returns (Piotroski and Roulstone, 2004). Financial analysts are outsiders who have relatively less competitive advantage in accessing firm-specific information compared to insiders and big institutional investors. Therefore, analysts' efforts are more likely to be directed towards collecting processing and communicating market and industry information (Piotroski and Roulstone, 2004; Chan and Hameed, 2006).

Such preference is suggested in prior research. As stated by Piotroski and Roulstone (2004, p.1121) "Clement, (1999), and Jacob et al. (1999) show that analysts' accuracy improves with industry specialization. Gilson et al. (2001) show that the composition of analysts' coverage changes after spin-offs and equity curve-outs. Ramnath (2002) show that analysts revise their earnings forecasts in response to the earnings announcements of other firms in the same industry. Piotroski and Roulstone (2004, p.1121) continue to argue that, "because analyst forecasts and subsequent revision induce price-relevant trade (Givoly and Lakoniskox, 1979; Lys and Sohn, 1990; Park and Stice, 2000), their forecasting activities should cause prices to reflect this additional industry and market-level information". Piotroski and Roulstone (2004,p.1121) conclude that, "these results

suggest that analyst's comparative advantage lies in interpreting specific-industry or market sector trends and improving intra-industry information transfers. Moreover, analysts can improve the efficiency of prices not just through their firm specific forecasts, but also by identifying the common industry components of each firm news events intra and disseminating that information into the price information process of all covered firms."

Chan and Hameed (2006) provide additional evidence that supports the argument that the coverage of analysts spreads more market and industry information. Their argument is that, intuitively, the lack of publicly available firm-specific information and less stringent disclosure requirement in emerging markets leads to greater investor demand for analysts who produce firm-specific information. However, because of the weak protection of property rights in these countries, risk arbitragers are not motivated to trade on firm specific information. Therefore, analysts are less motivated to collect and process firm-specific information and, subsequently, focus on communicating systematic risk.

Therefore, it can be concluded that, in emerging markets, financial analysts are less motivated to communicate market firm-specific information due to the low cost-benefit payoff (Chan and Hameed, 2006). Furthermore, in developed markets, analysts will also be less motivated to communicate firm-specific information. This is because their low competitive advantage in accessing firm-specific information compared to insiders and big institutional investors directs their efforts towards processing and communicating market and industry information (Piotroski and Roulstone, 2004). Therefore, in accordance with the above argument, analyst-forecasting activities should

cause stock prices and returns to reflect systematic risk resulting in more stock price synchronicity.

For the above reasons, I state the second hypothesis as follows (stated in alternative form):

Hypothesis 2: Analysts following is positively associated with stock price synchronicity, *ceteris paribus*.

4.3.3 Credibility of disclosures

Prior evidence provides value relevance for financial intermediaries, namely, external auditors and financial analysts in reviewing firm financial information and communicating to the market their own disclosures (Francis et al., 1999; Healy, 2001). The main role of the auditors is to ensure that insiders measure and report firm earnings in accordance with GAAP (Healy et al., 2000). Since auditing effectiveness varies with the quality of external auditors, third party users' perceptions of auditors' independent assurance are mostly affected by the level of audit quality (Gul et al., 2009). As stated in Gul et al. (2009, p.15), "audit quality is defined as the joint probability of detecting and reporting financial statement errors". High-quality audits increase as a response to increasing agency cost (e.g., Watts and Zimmerman, 1986; Francis and Wilson, 1988; DeFond, 1992). Previous accounting research has provided evidence regarding the positive role of auditing and audit quality in limiting biased financial reporting (e.g., Becker et al., 1998; Balsam et al., 2003; Kim et al., 2003).

The fact that stock prices react to earnings announcements suggests that overall investors regard accounting information as credible (Kothari, 2001). Prior evidence indicates that auditors' qualification does not signal timely information to the capital market (Healy et al., 2001). Earlier studies show that auditors' annual qualified opinions do communicate new information to investors (e.g., Dodd et al., 1984, 1986; Dopuch et

al., 1986, 1987; Manry et al., 2003; Guan et al., 2006). Heally et al. (2001) concluded that auditors' qualification communicates information already reflected in stock prices.

Healy et al. (2001) argue that several interpretations explain the scarce evidence concerning the value relevance of auditors' opinion to investors. They are either more interested in serving the interests of managers who hire them (Watts and Zimmerman (1981 a, b), or more concerned about reducing their legal liability, which is consistent with their lobbying for standards that reduce their own risk even though such standards reduce the value of financial reports to investors (Healy et al., 2000). Another explanation is that auditors issue their reports on an annual basis, which make it difficult for them to provide a timely signal to the market (Healy et al. 2001).

There is no prior research, to the best of my knowledge, which directly tests the effect of auditor's opinion on the incorporation of firm-specific information into stock price. Gul et al. (2009) found that the presence of shares issued to foreign investors and the appointment of high-quality auditors led to a decrease in stock price synchronicity in China, however, it is not clear whether this is attributed to decreasing market noise or incorporating more firm-specific information into the stock price. Choi and Jeter (1992) report that subsequent to qualifications, firms show lower stock price responses to earnings. However, according to Healy et al. (2001), Choi and Jeter's study does not control for the unusual performance of firms with qualifications. Therefore, it is difficult to attribute the decline in earnings response coefficients to the reduced credibility of disclosures.

External auditors, such as analysts, may be viewed as playing an information intermediation role between controlling majority shareholders and outside minority

shareholders (Heally et al., 2001). Their professional competence and familiarity with client business facilitates the dissemination of more reliable, firm-specific information to outside investors (Gul et al., 2009); but this does not indicate that they provide timely signals to the stock market (Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987). They just communicate information already reflected in stock prices (Healy et al., 2001).

Financial analysts collect information from public and private sources (Bushman et al., 2004). Audit credibility enhances the credibility of the firms' public information (either audited or non audited firm information) that is used by analysts to evaluate the current performance of the firms that they follow, make forecasts about their future prospects, and recommend that investors buy, hold or sell the stock (Healy et al., 2001).

Previous research supports the role of the analysts in processing and communicating market and industry risk. A study by Piotroski and Roulstone (2004) on the US market, as well as on other markets (Chan and Hameed, 2006; Ferreir and Laux, 2008; Kim and Shi, 2007; Fernandes and Ferreira, 2009) provide evidence that analysts' incentives tend to crowd out firm-specific information and incorporate more market-wide and or industry-wide information in stock prices. The above studies conclude that analysts information production activities increase stock price synchronicity.

Therefore, since auditor opinion is accompanied with audited annual firm public information that is evidenced not to provide timely signals to the capital market (Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987; Heally et al., 2001; Kothari, 2001; Manry et al., 2003; Guan et al., 2006), it is likely to enhance the credibility of firm disclosures, which motivates analysts to follow those firms and disseminate more industry and market information.

For the above argument, I test the following hypothesis (stated in the alternative form):

Hypothesis 3: Credibility of disclosures in a country is positively associated with stock price synchronicity, *ceteris paribus.*

4.3.4 Reporting timeliness, Analyst following and Stock price synchronicity

Financial analysts are outsiders who generally have less access to firm level or idiosyncratic information than insiders or main institutional investors (Piotroski and Roulstone, 2004). As such, analysts could focus their efforts on obtaining and impounding industry and market level information into prices.

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. 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; Kelly and Ljungqvist, 2007; Crawford et al., 2009). The accounting information can quickly reach a broader market. Broader market means that the number of investors using this information in their investment decisions will increase. This will have an effect on stock price synchronicity (proxy for stock price informativeness) because investors' investment decisions will be reflected in stock price.

At one extreme, if no one uses accounting information, then the timeliness of this information will not matter, and we should expect no moderating role for reporting frequency on the relationship between financial analysts following and stock price synchronicity. When the usage of the financial analysts reports increases, it can be

argued that the importance of the frequent reporting of such information will increase market wide information. Therefore, with the presence of frequent financial reporting the relationship between financial analysts following and stock price synchronicity will be stronger.

Analysts and financial information may also be substitutes as argued in Holthausen and Verrecchia's (1988) model. Their model suggests that a substitution role between analysts and financial information exists if the *ex ante* variance in the expected price for the second signal (earning announcements) is negatively associated with the quality of the first signal (analyst reports). Frankel and Li (2004), and Botosan (1997) also found evidence supporting this argument. If the substitution role or the crowding out effect is true, then it is expected that more analysts are following the firm and that more firm information other than firm financial report is available to the market.

Given the other information sources provided by analysts, the reporting frequency is not as important as when financial information is the only source of information investors can get. When the usage of accounting information decreases, the importance of the timeliness of this information also decreases and, thus, the presence of frequent interim reporting is not expected to moderate the relationship between financial analysts and stock price synchronicity. As a result, the relationships between financial analysts following and stock price synchronicity will not be affected by the number of frequent reporting. Since the direction of the effect of reporting timeliness on the relation between analysts following and stock price synchronicity is unclear, I test the following non-directional hypothesis (stated in the null form):

Hypothesis 4: Number of interim reporting is not related to the relationship between analysts following and stock price synchronicity, *ceteris paribus*.

4.3.5 Reporting timeliness, credibility of disclosures and Stock price synchronicity

Prior research has focused on the role of auditors and financial analysts as intermediaries in the financial market who review the firm financial statements and communicate their own disclosures to the market (Francis et al., 1999; Healy et al., 2001). Auditors provide investors with independent assurance that the firm's financial statements conform to GAAP (Healy et al., 2001).

A number of studies address, often indirectly, annual report informativeness by examining the price response accompanying the report's release (e.g., Wilson,1987; Lobo and Song,1989) which suggest a price response to the earlier of the annual report or the 10-K filling. However, other studies, including Foster et al. (1986), and Bernard and Stober (1989) failed to detect such a price response. Cready, (1991**)** found little evidence of a volume of shares response and no evidence of a price response at annual report dates. They stated that the informativeness of annual reports from a price-based perspective remains an open question. Such a finding is consistent with Hakansson, (1977) in that it suggests that "small" investors rely on the public information system (i.e., the annual report) while "large" investors rely more on pre disclosure information in making investment decisions.

In terms of audit credibility value added, Pittman and Fortin (2004) report evidence that is consistent with the prediction that firms intend to replace bank debt with public debt, which reduces cross monitoring among lenders and increases default risk according to extant research. Menon and Williams (1991) conducted an empirical study on auditor

credibility and initial public offerings (IPO). Their evidence, in general, supports the hypothesis that investment bankers and their clients have a preference for credible auditors for the IPO.

Prior studies show that annual audit qualification does not signal timely information to the market (e.g., Dodd et al., 1984, 1986; Dopuch et al., 1986, 1987; Heally et al., 2001; Kothari, 2001; Manry et al., 2003; Guan et al., 2006). One interpretation of this is related to auditors' incentives to serve the interest of managers who hire them (Watts and Zimmerman, 1981 a, b). Another explanation is that auditors are more concerned about reducing their legal liability (Healy et al., 2000). Prior research has shown that financers, particularly bankers, price audit credibility by requiring firms to hire an independent auditor as a condition of financing even when it is not required by regulations. Leftwich (1983) found that banks require firms to present audited financial information even for private companies.

Firm annual reports contain information disclosed in their interim reports and interim reports improve annual earnings forecasts (Brown and Niederhoffer, 1968; Brown and Rozeff, 1979; McNichols and Mangold, 1983). Increased firm disclosures are linked to better capital market functioning by improving market liquidity, reducing the cost of capital and reducing information asymmetry (e.g., Welker, 1995; Healy et al., 1999; Leuz and Verrecchia, 2000; Botosan, 1997; Sengupta, 1998; Piotroski, 2003; Botosan and Plumlee, 2002; Welker, 1995; Healy et al., 1999; Brown et al., 2005: Butler et al., 2007). McNicholes and Manegold (1983) document less stock price volatility around annual earnings announcements after the firm introduces quarterly reporting.

Auditors do not necessarily provide timely signals to the capital market (Dodd et al., 1984, 1986; Dopuch et al., 1986, 198; Kothari, 2001). At best they just confirm information already available to investors (Healy et al., 2000). Auditors only issue their reports annually and, therefore, the range of interim reporting as the moderating variable is likely to have no effect on the relationship between audit credibility and stock price synchronicity. This is simply because auditors are not using this information and, therefore, not issuing interim audit reports (Cready, 1991; Healy et al., 2001; Manry et al., 2003; Guan et al., 2006). In other words, the relationship between credibility of disclosures and stock price synchronicity is not likely to be affected by the range reporting timeliness (i.e., number of interim reporting) simply because auditor reports are issued annually and it is difficult for them to provide a timely signal to the market (Healy et al., 2001). Therefore, reporting timeliness is not likely to moderate the relationship between stock audit credibility and stock price synchronicity.

Since previous research on the moderating effects on the relationship between auditor quality and stock price synchronicity is not clear, and to provide empirical evidence on this unexplored issue in a cross-country scope, I test the following hypothesis (stated in the null form):

Hypothesis 5: Reporting timeliness does not moderate the relationship between audit credibility and stock price synchronicity, *ceteris paribus.*

4.4 MEASUREMENT ISSUES AND EMPIRICAL MODELS

This part of the chapter constructs the empirical models of the study and discusses the measurement issues of the variables involved in these models. Section 4.5.1 focuses on the measurement of the dependent variable (stock price synchronicity). Section 4.5.2

discusses the measurement issues of the independent variables (corporate transparency attributes). Section 4.5.3 constructs the empirical models for testing the study hypotheses. Section 4.5.4 presents the model specification. Finally, section 4.5.4 justifies the inclusion of the structural and institutional variables in the model.

4.4.1 Stock price synchronicity measurement

Morck et al. (2000) extend the work of Roll (1988) by introducing two measures for cross-country stock synchronous movement. One of which uses a simple and direct measure as the percentage of stocks moving together of the total stocks in the market, and the other is the classical pricing model used by French and Roll (1986), and Roll (1988).

4.4.1.1 Percentage of stock moving together

Following 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 a single week can be calculated according to equation (1), as discussed in Chapter two section 2.3 and defined below:

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

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) defined below:

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

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. Table 4.1 ranks countries by stock return synchronicity, measured by the fraction of stocks moving together in the average week of 1995.

4.4.1.2 Market Model

Following the methodology outlined in Morck et al. (2000), and the models based on French and Roll (1986), and Roll (1988), the firms' biweekly return is regressed against the country market index return and US market index as follows:[36]

$$r_{it} = \alpha_i + \beta_{1,i} r_{m,jt} + \beta_{2,i}[r_{us} + e_{jt}] + \varepsilon_{it}, \quad (11)$$

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.

[36] Please refer to chapter two, Section 2.3 equations number (7) for more details.

Table 4.1

Country Ranking by Stock Price Synchronicity Measured by the Weekly Fraction of Stocks Moving Together in 1995

Country	f_i (%)	Country	f_i (%)
United States	57.9	Spain	67.0
Canada	58.3	Indonesia	67.1
France	59.2	South Africa	67.2
Germany	61.1	Thailand	67.4
Portugal	61.2	Hong Kong	67.8
Australia	61.4	Philippines	68.8
U.K.	63.1	Finland	68.9
Denmark	63.1	Czech	69.1
New Zealand	64.6	India	69.5
Brazil	64.7	Singapore	69.7
Holland	64.7	Greece	69.7
Belgium	65	Korea	70.3
Ireland	65.7	Peru	70.5
Pakistan	66.1	Mexico	71.2
Sweden	66.1	Columbia	72.3
Austria	66.2	Turkey	74.4
Italy	66.6	Malaysia	75.4
Norway	66.6	Taiwan	76.3
Japan	66.6	China	80
Chile	66.9	Poland	82.9

Note:
Adapted from Morck et al. (2000).

The regression statistics of equation (11), $R^2_{i,j,}$ measures the percent of variation in the bi-weekly return of stock i in country j explained by the variation in country j 's market return and the US return. Therefore, given the statistics, stock price synchronicity can be defined as:

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

Where $SST_{i,j}$ is the sum of squared total variations. Table 4.2 ranks countries by stock market synchronicity, measured by the average R^2 of firm level regressions of bi-weekly stock returns on local and US market indexes in each country in 1995. It can be seen, that, in general, countries with higher developed financial systems and high income such as the United States, Canada and the UK have the least synchronous stock price movement. In contrast, countries with less developed financial systems have the highest synchronous movements (i.e., Peru, Mexico, Turkey and Poland).

4.4.2 Corporate transparency measurement

The relevance of accounting information and the choice of accounting measurement procedures or disclosure policies may be examined in terms of market reaction. Specifically, accounting output is evaluated based on security price reaction. The highest association with security prices or returns is the most consistent with information that results in efficient fund allocations (Beaver and Duke, 1972; Gonedes, 1972). Bushman et al. (2004) visualized corporate transparency represented within a country as an output from a multifaceted system whose components produce, gather, validate and disseminate accounting information. They developed a transparency framework impounding three main headings: (i) corporate reporting regime consisting

Table4.2

Country Ranking by Stock Price Synchronicity Measured by Average Weekly R^2 in 1995

Country	R^2	Country	R^2
United States	0.021	Korea	0.172
Ireland	0.058	Pakistan	0.175
Canada	0.062	Italy	0.183
U.K.	0.062	Czech	0.185
Australia	0.064	India	0.189
New Zealand	0.064	Singapore	0.191
Portugal	0.068	Greece	0.192
France	0.075	Spain	0.192
Denmark	0.075	South Africa	0.198
Austria	0.093	Columbia	0.209
Holland	0.103	Chile	0.209
Germany	0.114	Japan	0.234
Norway	0.119	Thailand	0.271
Indonesia	0.14	Peru	0.288
Sweden	0.142	Mexico	0.29
Finland	0.142	Turkey	0.393
Belgium	0.146	Taiwan	0.412
Hong Kong	0.15	Malaysia	0.429
Brazil	0.161	China	0.453
Philippines	0.164	Poland	0.569

Note:

Adapted from Morck et al. (2000). Countries are ranked by stock market synchronicity, measured as the average *R*2 of firm-level regressions of bi-weekly stock returns on local and US market indexes in each country in 1995. Returns include dividends

of disclosures intensity, accounting principles, frequent reporting and audit quality of financial disclosures; (ii) private information acquisition that covers financial analyst following, institutional investors holdings and insider trading; and, finally, (iii) the free press in a country represents the disseminating information capacity in a country.

According to Bushman et al. (2004), there are three measures of disclosure intensity: First, *CIFAR*, representing the average number of 90 accounting and non-accounting items disclosed by a sample of large companies in their annual reports. Of these three disclosure measures, *CIFAR* is based on the broadest set of disclosures, including general information; items from the income statement, balance sheet, and funds flow statement; accounting standards; stock data; governance data and special items.

Second, Disclosure (*DISCL)*, which is constructed based on the prevalence of disclosures concerning research and development (R&D) expenses, capital expenditures, product and geographic segment data, subsidiary information and accounting methods. These items were selected because they are expected to be highly proprietary in nature and highly useful to outside investors for valuing firms' securities, as well as for monitoring managerial decisions. In addition, there is considerable cross-country variation in the disclosure intensity of these items. The disclosure of accounting methods was included because the knowledge of accounting methods facilitates the interpretation of accounting disclosures.

DISCL was constructed from detailed data included in *CIFAR*. For each disclosure underlying *DISCL, CIFAR* rates each country based on a sample of financial statements from that country using a scale that varies from high or low, to finer ratings that can include up to eight gradations of comprehensiveness. For example, on the question of

product/geographic segment disclosure the scale includes four categories: (i) disclosed by most firms, (ii) disclosed by some firms, (iii) disclosed by few firms, and (iii) not disclosed by firms. Because the scale differs across individual disclosure categories, the ratings were converted on each disclosure into percentiles within the sample of countries and *DISCL* is measured as the average percentile across all disclosure categories.

The third disclosure intensity variable, *GOVERN*, measures the prevalence of specific disclosures related to the governance of the firm. The disclosures underlying this measure relate to identity of managers, identity of board members and their affiliations, remuneration of officers and directors, share ownership by directors and employees, identity of major shareholders and the range of shareholdings. Here again, *CIFAR* rates each country within the total sample of countries on the comprehensiveness of the disclosures for each category. *GOVERN* is the average percentile rank within the sample of countries across all categories.

The variable *MEASURE* is related to accounting principles used and attempts to capture cross-country differences in the accounting principles used in presenting the financial statements. Using *CIFAR* data, *MEASURE* captures the extent to which (i) financial statements reflect subsidiaries on a consolidated basis, and (ii) general reserves are used. Because consolidated financial statements are generally viewed as more informative and the use of general reserves is viewed as a way to obscure a firm's periodic performance, higher values of *MEASURE* are assigned to firms that consolidate financial statements and do not use general reserves. Hence, it is expected that higher values of *MEASURE* are associated with more informative financial statements (i.e., higher transparency).

The measure of the financial reporting timeliness, *TIME,* increases with the frequency and comprehensiveness of interim reports. Higher values of *TIME* are interpreted as higher timeliness of financial accounting information reported by firms. *TIME* is the average percentile rank within the sample of countries across the indicated categories as indicated by *CIFAR*. Reporting timeliness is measured using the average ranking of number of frequency of reports per year, number of disclosed items in each interim report and the consolidation of interim reports.

Finally, credibility of disclosures, *AUDIT,* is a measure of the credibility of financial accounting disclosures defined as the share of the total value audited in a country by the Big 5 accounting firms. Using *CIFAR*, *AUDIT* equals 1, 2, 3, or 4 if the percentage share of Big 5 auditors is between (0, 25%), (25%, 50%), (50%, 75%), and (75%, 100%), respectively. Big 5 auditors are used in prior research as an indication of relatively high audit quality. Hence, a high value of *AUDIT* is interpreted as an indication of high quality audits and enhanced credibility of financial accounting disclosures. A robustness measure is the number of professional auditors per 100,000 of the population, as used by Bhattcharaya, Daouk and Wellker (2003).

The above items (i.e., *CIFAR*, Disclosure, Govern, Measure, Reporting timeliness and Credibility of disclosures) represent the first category of corporate transparency or corporate financial reporting transparency. The second category of corporate transparency is private information acquisition and communication. Relations between public information disclosure and the private information processing and gathering activities of investors have long been recognized as important determinants of information allocations in an economy (e.g., Verrecchia, 1982). Three private information systems were considered. The first system is financial analysts who

specialize in processing and interpreting financial information reported by firms and in collecting additional information through discussion with firms' managers, suppliers, customers, and so on. To capture the amount of private information acquisition by financial analysts, the average number of analysts following large firms (*NANALYST*) is as used in Chang et al. (2000).

Private information collection, processing, and trading activities of insiders and institutional investors represent the other two systems in this category according to the framework of Bushman et al., (2004). Although the detailed information acquired and processed by institutional investors and corporate insiders is not reported publicly, they communicate firm private information to the market through their trading behaviour or what is called in the finance literature as signalling (e.g., Bushman et al., 2004; Piotroski and Roulstone, 2004).

This study measures the importance of institutional investors by (*POOL INV),* which, using data from Beck et al. (2000), is defined as the average ratio of the value of pooled investment schemes to gross domestic product (GDP) between 1993 and 1995. The extent of insider trading activities is measured by (*IT ENF),* a dummy variable equal to 1 if the country enforced insider trading laws before 1995, and 0 otherwise, as reported in Bhattacharya and Daouk (2002). Higher values of (*POOL INV*) and lower values of (*IT ENF*) are interpreted as indicative of more private information acquisition by institutional investors and corporate insiders, respectively (Bushman et al., 2004).

The third category of corporate transparency is information dissemination. The inclusion of information dissemination is motivated by the perspective that the lack of a well-developed communication infrastructure may impede the flow of information

reported by firms, thereby limiting the availability of the information to economic agents (Bushman and Smith, 2001). Firm-specific information dissemination is measured by the penetration of the media channels in the economy, as measured by (*MEDIA*), which is the average rank of countries' per capita number of newspapers and televisions from 1993 to 1995, as reported by World Development Indicators.

4.4.3 Control variables

Following prior studies, specifically Morck et al., (2000) and Jin and Myers (2006), a number of control variables are included in the empirical model to control for structural and institutional factors in the country.

4.4.3.1 Structural variables

Structural variables were included to control for the consideration that there is a negative correlation between stock price co-movement and per capita income in low economies, which have more correlated economic fundamentals. To control for such consideration a set of economic fundamentals were included in the regression. These variables include macroeconomic volatility, country size and economic and managerial diversification.

$vgdpg_j$ = Some economies have volatile market fundamentals that may overpower variations due to firm factors, so that stock prices tend to move together. If so, then we will see greater stock price synchronicity attributed to macro-economic instability. To measure market volatility, variance of per capita GDP growth for each country from 1990 to 1994 measured in nominal US dollars was utilized.

$loggs_j$ = Natural Log for country size, it can be argued that economic activity in small countries can be geographically localized, so that nearby geopolitical instability or localized environmental hazards such as tsunamis or earthquakes might have

market-wide effects that would not be as evident in a larger country. Therefore, country size is added as an innate control variable to control for any overpower effects on synchronicity. Country size is measured by logarithm of geographical size in square kilometres for each country.

$Ins\,Herf_j$ = Industry Herfindahl Index. This variable is included to control for the economic specialization. In some economies, listed firms can be concentrated in a few industries, an example of which might include emerging markets with vast petroleum economies. Therefore, this concentration of listed firms in a few industries could explain the high synchronicity in those economies. Controlling the fundamentals of those firms could help findings if undiversified economies exhibit more stock price synchronicity than diversified ones. To measure this variable an industry herfindal index is constructed following Morck et al. (2000) $H_j = \sum_k h^2_{k,j}$ where $h_{k,j}$ is the combined value of the sales of all country j in industry k as percentage of those all country j firms. This index was constructed from Datastream using 1995 data using 1-digit classification.

$fHerf_j$ = Firm Herfindah index to control for the economic and managerial specialization that is closely related to economic specialization and managerial diversification. Alternatively, some economies may be dominated by a few very large firms. If most other listed firms are suppliers or customers of these dominant firms, a high degree of stock price synchronicity might occur. Therefore, if in low income countries where only a few huge listed firms exist it could explain the synchronous movements of stock prices. To measure this variable, a firm herfindal index is constructed following Morck et al. (2000), Jin and Myers (2006) $\hat{H}_j = \sum_i \hat{h}^2_{i\varepsilon j}$ where $\hat{h}^2_{i\varepsilon j}$ is the sales value of firm i as

percentage of the total sales of all country j firms. This index was constructed using 1995 data from *DataStream.*

$SyncROA_j$ = Firm fundamentals might move together for the reasons above. Widespread interoperate ownership or having highly diversified conglomerates counting for a big part of the listed firms may cause firm fundamentals to move together as the performance of some firms may depend on the performance of other firms. To control for these cross-sectional differences, firm specific fundamental synchronicity was included in the regression. To capture this synchronicity, a measure of co-movement of firm fundamentals can be constructed to control for the above reasons. Following Morck et al., (2000) and Durnev et al., (2004), SyncROA is calculated in a manner analogous to *SYNCH.*

$$ROA_{j,\,j} = ai + \beta i ROA_{m,\,j}$$

Where

$ROA_{j,\,j}$ = Return for each firm i in each country j. Returns on assets calculated after tax plus depreciation.

$ROA_{m,\,j}$ = The value-weighted average of the return on assets for all firms in the country. Data was collected from 1993 to 1997.

4.4.3.2 Institutional variables

Institutional variables were included to control for the consideration that there is a negative correlation between stock price co-movement and per capita income in low economies that have more correlated institutional constitutions. To control for such consideration, a set of institutional fundamentals were included in the regression. These variables include private property protection and anti-director rights.

g_j = Property right protection was included as a control variable following Morck et al. (2000), Jin and Myers (2006). Morck et al. (2000) argue that weak property rights discourage informed risk arbitrage. Their results support the view that a greater respect for private property rights by governments in developed economies underlies their findings that stock prices in high-income countries are less synchronous than in poor countries. Jin and Myers (2006) conclude that high firm opacity leads to high synchronous movements in stock prices. If good private property protection renders insignificant or becomes less significant in the model, then that will support the study hypothesis of the association of transparency with stock price synchronicity. To capture this variable a good government index was constructed using three sub-indices based on La Porta et al. (1998a). These indices measure: (i) government corruption, (ii) risk of expropriation of private property by government, and (iii) government risk denying contracts. Each index has a scale from zero to ten; the higher indicating more respect for private property.

adr_j = Anti-director right index was developed first by La Porta et al. (1998a) and used by Morck et al. (2000). The index represents six rights measuring how strongly a legal system favours minority shareholders. Minority rights include (i) allowing one share one vote, (ii) allowing mail proxy for voting (iii) proportional representation among directors for minorities (iv) primitive rights to new issues, and (v) percentage of share capital to call an extraordinary shareholder meeting. This index can be a proxy for good government. If stock price synchronicity shows a significant relationship rendering GDP insignificant, then that will explain the results that synchronous stock price move more in the absence of stockholder minority. According to La Porta et

al. (1998a) many countries with strong property protection in general can be poorly protecting the property rights of public investors, which makes this variable appropriate. Figure 4.1 shows the stock price synchronicity matrix and conceptual development of the study's empirical model.

4.4.3.3 Annual reporting control variables

Annual reporting attributes were included to control for the consideration that there is a negative correlation between stock price co-movement and annual and interim reporting. Chambers, Stephen and Penman (1984) argue that the variability of stock returns at the time of the announcements of firms' annual and interim earnings differs from that in non-announcement periods, indicating that, on average, more information arrives at the market during periods when earnings reports are released than at other times. They also argue that based on prior studies (e.g., in Beaver, 1968; and May, 1971; Ball and Brown, 1968; and Brown and Kennelly, 1972), the longer the lag of reporting, such as annual reporting, allows information to be incorporated from other sources like interim reporting. Other evidence support that firms' annual reports contain information disclosed in their interim reports and that interim reports improve annual earnings forecasts (Brown and Niederhoffer, 1968; Brown and Rozeff, 1979; McNichols and Mangold, 1983). Continuing with the reciprocal roles that annual and interim reporting can play in incorporating firm information in stock prices, Defond et al. (2005) report that annual earnings' announcements are less informative in countries with more frequent interim financial reporting. Consequently, annual reporting may show a significant negative relationship with stock price synchronicity; however, once interim reporting is added to the regression, annual reporting is likely to be rendered insignificant in the model. Statistically, annual reporting variance with the dependent variable will be completely overlapped by interim reporting variance. Therefore, annual

reporting attributes, namely, Logarithm Disclosure Intensity (*CIFAR),* Logarithm Financial Disclosure (*DISCL)* Governace disclosures *(Govern)* and Logarithm of Accounting Principles (*MEASURE)* have been added to the model as controls.

4.4.4 Empirical models for testing hypotheses

The argument behind constructing the empirical model of this study is similar to that brought by Morck et al. (2000), Jin and Myers (2006). According to Morck et al. (2000, p. 228):

> *"..What explains the highly significant negative correlation between stock price synchronicity and per capita GDP? Per capita GDP is a general measure of economic development. [Therefore,] particular economy characteristics, or dimensions of economic development might plausibly be related to stock price synchronicity, and that per capita GDP might serve as a proxy for these characteristics. Our strategy is to see which development measures are most correlated with stock price synchronicity, and to ask whether they render per capita GDP insignificant in multivariate regressions. From this exercise, we hope to learn what economic linkages might underlie the correlation between stock price synchronicity and per capita income."*

Therefore, the building of the empirical model of this study will follow the same strategy outlined by Morck et al., (2000) and Jin and Myers (2006). The model will start by regressing GDP and other control variables on stock price synchronicity and then gradually add our transparency variables into the regressions. If the exercise shows significant results for our transparency variables and renders GDP and other control variables insignificant, then corporate transparency significantly explains the variation in stock price synchronicity. The following sections discuss the construction of the empirical model of this study.

4.4.4.1 Stock price synchronicity as dependent variable

The two measures developed in equations (2) and (4) in Chapter two state the value of stock price synchronicity between the interval [0.50 and 1.0] and [0, 1], respectively. It is not suitable for the values of the synchronicity measure based on equation (2) and (4)

Table 4.3a
Country Ranking by Per capita Gross Domestic Product for 1995 [37]

Country	Per Capita GDP ($)	Country	Per Capita GDP($)
Japan	33190	Taiwan	10698
Denmark	27174	Portugal	9045
Norway	25336	Korea	7555
Germany	24343	Greece	1332
United States	24343	Mexico	3944
Austria	23861	Chile	3361
Sweden	23861	Malaysia	3328
France	23156	Brazil	3134
Belgium	21590	Czech	3072
Holland	20953	South Africa	2864
Singapore	20131	Turkey	2618
Hong Kong	19930	Poland	2322
Canada	19149	Thailand	2186
Finland	18770	Peru	1920
Italy	18770	Columbia	1510
Australia	17327	Philippines	880
U.K.	17154	Indonesia	735
Ireland	14186	China	455
New Zealand	13965	Pakistan	424
Spain	13965	India	302

[37] Adapted from Morck et al. (2000). Countries are ranked by per capita GDP

to be within those intervals. Therefore, as per Morck et al. (2000), a logistic transformation is applied to this variable as formulas (13) and (14) below:

$$\Psi_j = log\left(\frac{f_j - 0.5}{1 - f_j}\right), \quad (13)$$

$$\gamma_j = log\left(\frac{R^2_J}{1 - R^2_J}\right) \quad (14)$$

4.4.4.2 GDP per capita as a control variable

In order to test the relationship between stock price synchronicity (SYNC) and the components of corporate transparency as a sign of financial development, this study follows the approach of Jin and Myers (2006) in replicating the study of Morck et al., (2000). I first control for GDP per capita as a general measure of economic development and as a plausible proxy for any development characteristics that might be related to synchronicity. Different transparency attributes that are hypothesized to be correlated to synchronicity will be tested sequentially. As discussed above, variables that show significant results with synchronicity and render GDP per capita insignificant in the Multivariate analysis will be the cause of the correlation between synchronicity and GDP per capita and will show statistical evidence of an association with synchronicity. Table 4.3a ranks countries in accordance with Gross domestic product per capita in 1995.

4.4.4.3 Stock market size and the role of large numbers

According to Morck et al. (2000), controlling for market size is based on the Law of Large Numbers. If the sign of the stock returns is random (i.e. 50% up, 50% down), then by construction that will push the value of synchronicity to decrease as in equation (15), as the number of stocks in a market become larger or get closer to normality.

$$E\left[f_{jt}\right] = E\left[\frac{\max\left[n_{jt}^{up}, n_{jt}^{down}\right]}{n_{jt}^{up} + n_{jt}^{down}}\right] \cong \frac{1}{2} \quad (15)$$

Similarly, in the market model (equation 11 above), which constructs the basis for calculating R^2 or stock price synchronicity, the expected return gets closer to zero as the market index becomes larger. The market index is basically the weighted average of all stocks in the market. Larger numbers push the sign of the return to be random (50%, 50%) as the population gets larger. However, a market with few securities may produce higher synchronicity where the weight of individual security is more important.

Therefore, to control for the above effects, a logarithm of the number of listed stocks was used in each market following Morck et al. (2000). Table 4.3b ranks countries by the number of listed stocks.

4.4.5 Model Specification

Based on the above argument, the association between corporate transparency attributes and stock price synchronicity is tested using standard multiple regression controlling for GDP, market size and other control variables. Figure 4.2 shows the theoretical presentation relationships of the study hypotheses. To test the first three hypotheses of this study, which are (i) reporting timeliness is negatively associated with stock price synchronicity, (ii) financial analyst following is positively associated with stock price synchronicity, and (iii) audit credibility is positively associated with stock price synchronicity, I closely follow Morck et al. (2000) and Jin and Myers (2006) approaches as follows:

$$\begin{aligned} SYNCH = {} & \alpha_i + \beta_1 logGDP_j + \beta_2 logn_j + \beta_3 logTIME_j + \beta_4 ANALYST_j \\ & + \beta_5 AUDIT_j + \beta_6 CIFAR_j + \beta_7 DISCL_j + \beta_8 GOVERN_j \\ & + \beta_9 MEASURE_j + \beta_{10} MEDIA_j + \beta_{11} loggs_j + \beta_{12} vgdpg_j \\ & + \beta_{13} InzHerf_j + \beta_{14} fHerf_j + \beta_{15} SyncROA_j + \beta_{16} g_j \\ & + \beta_{17} adr_j + \mu \end{aligned} \qquad (16)$$

Table 4.3b
Country Ranking by the Number of listed Stock in 1995[39]

Country	No of listed stocks	Country	No of listed stocks
Japan	2276	Taiwan	353
Denmark	264	Portugal	90
Norway	138	Korea	461
Germany	1232	Greece	248
United States	7241	Mexico	187
Austria	139	Chile	190
Sweden	264	Malaysia	362
France	982	Brazil	398
Belgium	283	Czech	87
Holland	100	South Africa	93
Singapore	381	Turkey	188
Hong Kong	502	Poland	45
Canada	815	Thailand	368
Finland	104	Peru	81
Italy	312	Columbia	48
Australia	654	Philippines	171
U.K.	1628	Indonesia	218
Ireland	70	China	323
New Zealand	137	Pakistan	120
Spain	144	India	467

[39] Adapted from Morck et al. (2000).

Where:

LogGDP: Logarithm of per capita GDP, ***Logn***: Logarithm of number listed stocks, ***LogANALYST***: Natural log financial analysts following, ***LogTime***: Natural log of reporting timeliness, ***Audit:*** Natural log of Credibility of disclosures ***CIFAR****:* Disclosure intensity, ***Discl****:* Financial disclosure, ***Govern****:* Governance disclosure, ***Measure****:* Accounting principles, ***Loggs****:* Logarithm of geographical size, ***Vgdpg*** *:* Variance in GDP growth, ***InzHerf*** : Industry Herfndahl index, ***Fherf*** : Firm Herfndahl index, ***SyncROA*** *:* Earning co-movement index,***Gov***: Good government index, ***Adr:*** Anti-director rights index.

To test the fourth and fifth hypotheses that are related to the moderating effects of timeliness of financial reporting on the relationship between share price synchronicity and (i) financial analysts following and (ii) audit credibility, I use the same model above including Timeliness analysts interaction variable (*Timanly)* and Timeliness auditor interaction *(TimAudt).*

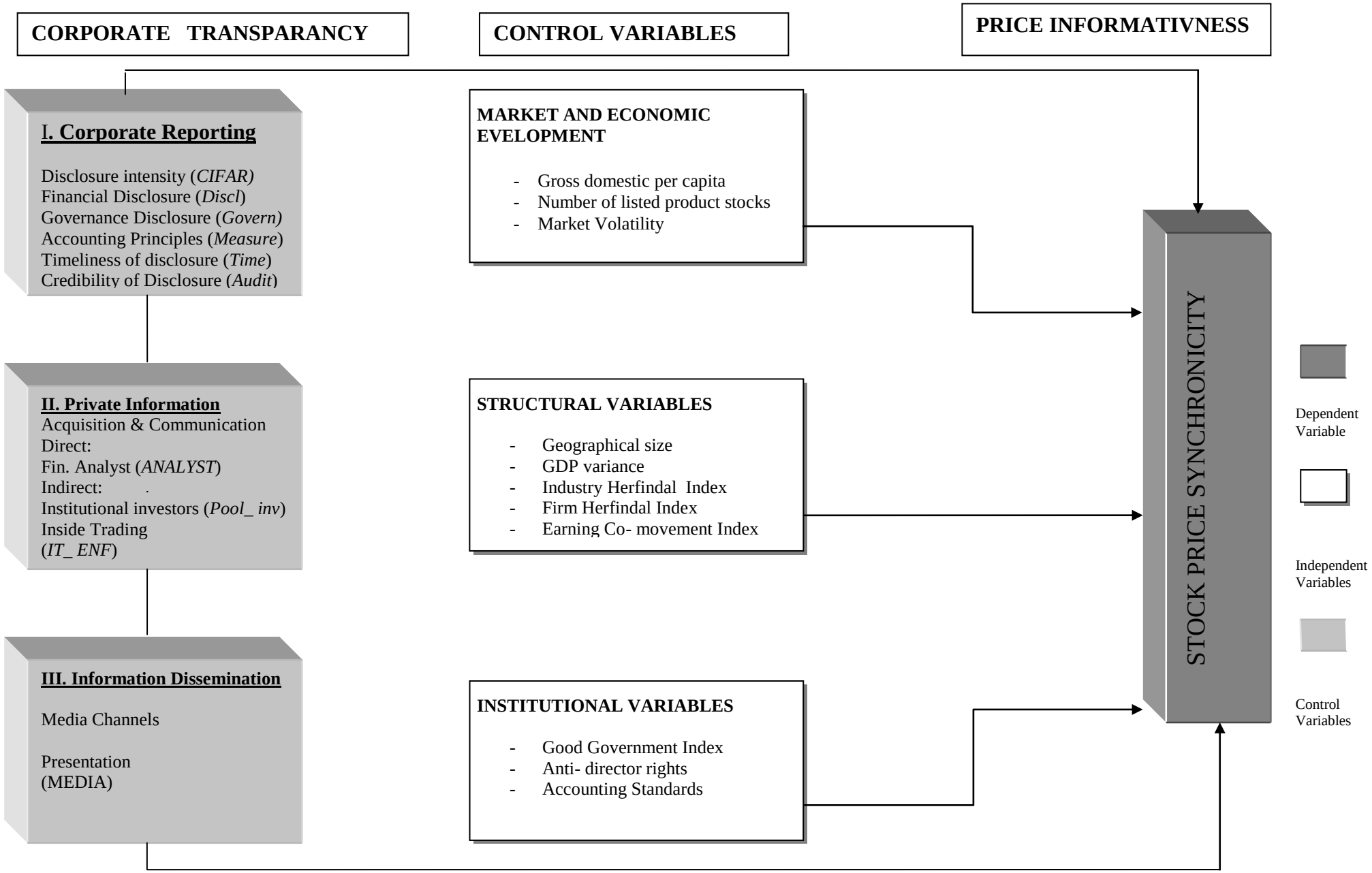
$$
\begin{aligned}
SYNCH = {} & \alpha_i + \beta_1 LogGDP_i + \beta_2 Logn_i + \beta_3 LogTime_i + \beta_4 Analyst_i + \beta_5 Audit_i \\
& + \beta_6 Timanalyst_i + \beta_7 Timaudit_i + \beta_8 CIFAR_i + \beta_9 Discl_i + \beta_{10} Govern_i \\
& + \beta_{11} Measure_i + \beta_{12} loggs_i + \beta_{13} vgdpg_i + \beta_{14} InzHerf_i + \beta_{15} fHerf_i \\
& + \beta_{16} SyncROA_i + \beta_{17} gr_i + \beta_{18} adr_i + \mu
\end{aligned}
$$

(17)

Where:

LogGDP : Logarithm of per capita GDP, ***Logn***: Logarithm of number listed stocks, ***LogANALYST***: Natural log financial analysts following, ***LogTime***: Natural log of reporting timeliness, ***Audit:*** Natural log of Credibility of disclosures ***CIFAR****:* Disclosure intensity, ***Discl****:* Financial disclosure, ***Govern****:* Governance disclosure,

Figure 4.1 Stock Price Synchronicity Empirical Model Development

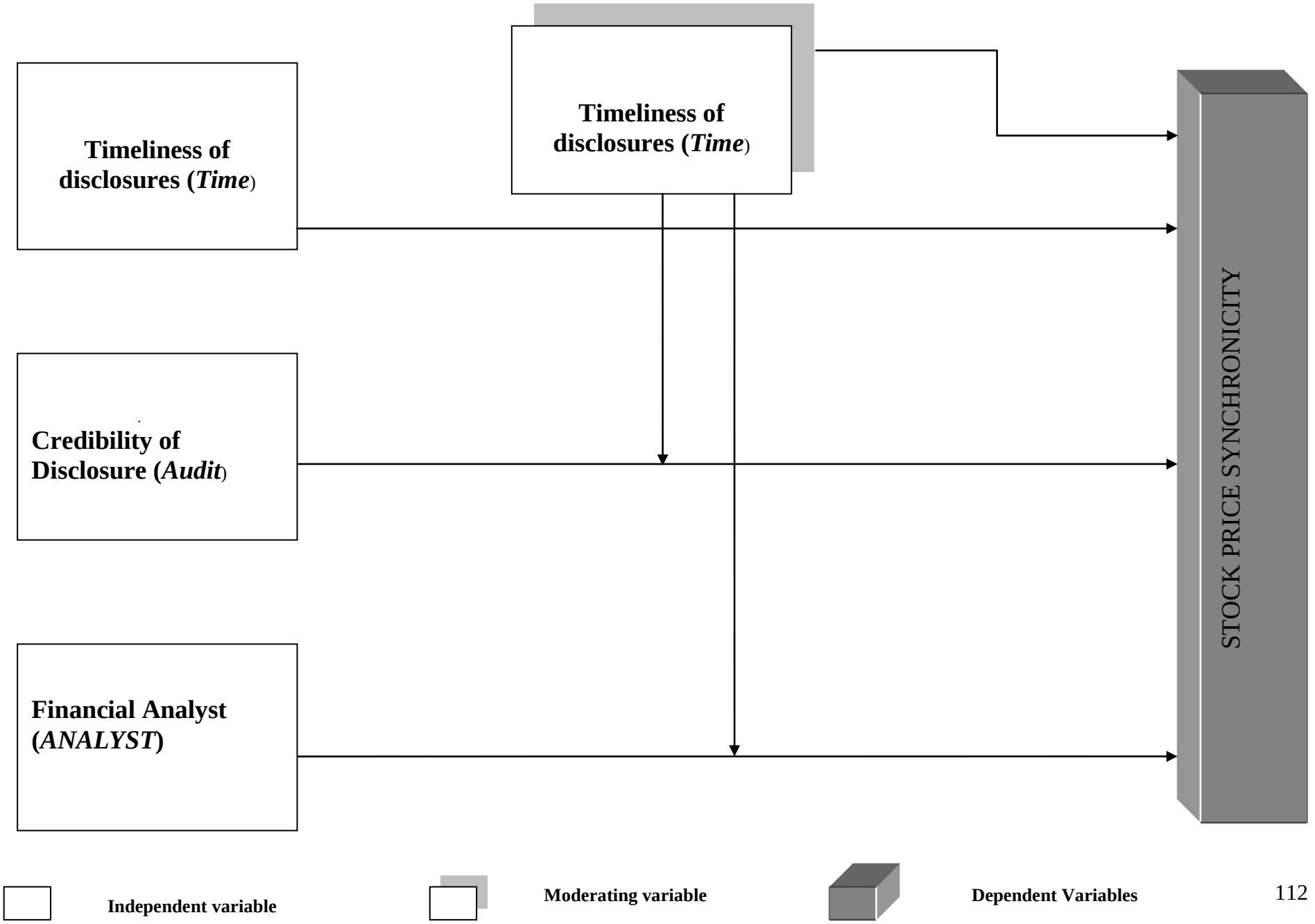


CORPORATE TRANSPERANCY
CIFAR – Center for International Financial Accounting reporting
Discl. Annual disclosure
Govern. Corporate governance
Time. Interim reporting
Audit. Big five audit firms

INNATE VARIABLES
GDP: Gross domestic per capita
Market Volatility: Variance or Sd of Mkt Return
Industry Herfindal index: Firm sales to Industry sales
Firm Herfindal Index: Firm to Market sales
Earning Co- Movement: Firm ROA to country ROA.

STOCK PRICE INFORMATIVNESS
Average explanatory variation of
Market return on stock return

Figure 4.2
Theoretical Representation of Relationships



Measure**:* Accounting principles, ***Loggs**:* Logarithm of geographical size, ***Vgdpg**:* Variance in GDP growth, ***InzHerf: Industry Herfndahl index, ***Fherf***: Firm Herfndahl index, ***SyncROA**:* Earning co-movement index, ***Gov***: Good government index, ***Adr:*** Anti-director rights index, ***Timanly***: Reporting timeliness and analyst interaction, ***Timaud***: Reporting timeliness and audit interaction.

4.5 SAMPLE AND DATA SOURCES

The data needed to construct the measure of the dependent variable of this study (Stock price synchronicity) consists of biweekly returns for all companies listed in 1995 for 40 countries. To obtain the data for 1995, *DataStream* covers all companies previously covered by the database. Therefore, the sample selection starts by dowanloading all companies covered by *DataStream* using the default data type "Price Adjusted" as December 2007 and going back to 1995[40]. Table 4.4 Panel "A" shows the initial sample of stocks downloaded from *DataStream,* as of December 2007. The system was not able to download four countries from the *DataStream* database – Germany, Norway, Canada and the United States. The number of stocks for the United States, as of December 2007, was very big. The system kept showing that the Excel worksheet did not have enough space to download all the companies as of December 2007. The maximum number of companies the system was able to download for December 2007 was 4,200 companies while the record shows that the number of stocks covered as of 1995 was 7,241 companies. Therefore, since the data needed for the construction of Stock price synchronicity of this study is the same as the study by Morck et al. (2000), this study uses the data for Stock price synchronicity of Morck et al. (2000), as it is more reliable, published, and similar to the data that would have been collected from the *DataStream* database.

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

According to the methodology of Morck et al. (2000), biweekly returns were used to overcome thin trading for some firms that trade less frequently. New listed or recently listed are included in the sample if more than 30 weeks data is available. Newly listed or recently delisted stocks are included in the sample only if more than 30 weeks of data is available for the year in question. Therefore, two screening criteria were used to exclude firms from the calculation of stock price synchronicity for a country: (i) Less than 30 weeks trading in order to get sufficient observations to assess the explanatory power of the market return (R^2) for each stock, and (ii) Excluding any biweekly stock returns exceeding 25% biweekly stock returns since that may represent coding errors. The initial number of companies downloaded in 1997 by Morck et al. (2007) was 22,741 companies. After applying the screening criteria, the number of companies remaining was 15,120 companies. Table 4.4 panel "B" shows, the initial number of companies downloaded by Morck et al. (2000). The *DataStream* database was used to collect the rest of the control variables for 1995 including the Industry Herfndahl index (*InzHerf),* Firm Herfndahl index (*Fherf),* Earning Co-Movement index *(SyncROA)* and the two noise control variables, namely, Market volatility using the variance (*Mvv*) and Market volatility using the Standard deviation (*Mvsd).*

This study initially intended to study the period 2001 to 2007 and, therefore, downloaded data from *DataStream* database for the same period. However, the purpose of this study and the research problem for the study are to test corporate transparency as a whole system, as outlined in the framework of Bushman et al. (2004). Available data for the same period focused on the quality of accounting numbers rather than corporate transparency as a system. In summary, the preference to use 1995 data was based on the following reasons:

First: The most reliable and available data is only available in the *International Accounting and Auditing Trends, Center for International Financial Analysis and Research (CIFAR).* CIFAR data was based on examining and rating companies based on their annual reports concerning the inclusion or omission of 90 items. A minimum of three companies in each country were studied. The companies represent a cross-section of various industries groups where industrial companies represent 70% while financial companies represent the remaining 30%. CIFAR has been used in highly cited studies (i.e., La Porta et al. 1998; Morck et al. 2000; Bushman et al. 2004).

Second, other sources of transparency measures test accounting numbers, such as Accrual quality (i.e., Dechow and Dichev, 2002), Discretionary accruals (Wiedman, 2002), Earning quality attributes (Francis et al., 2005) or other international measures including World competitiveness reports (Jin and Myers, 2006).

Third, although using 1995 data can be considered outdated, this study intends to add the limited research in the international research database. Due to the limited data, the choice was either to study the issue or defer studying until enough data was available. This study takes the position of Miller (2004) and Bushman et al. (2004) who argue that studying the issue with the limited data, with the acknowledgment of the limitation, is better than leaving the issue until enough data is available. The empirical regularities of this study were interpreted as suggested by Levin and Zervos (1993), as hypothesized relations. They also argued, "not finding hypothesized relations would shed meaningful doubt" on the hypothesized relations".

Table 4.4
Number of listed Stock in 1995

Panel A (2007 DataStram downloading)				Panel B (Morck et al. (2000) dowanloading)			
Country	**No of listed stocks**	**Country**	**No of listed stocks**	**Country**	**No of listed stocks**		**No of listed stocks**
Japan	3992	Taiwan	1261	Japan	2276	Taiwan	353
Denmark	205	Portugal	70	Denmark	264	Portugal	90
Norway	N/A	Korea	1931	Norway	138	Korea	461
Germany	N/A	Greece	323	Germany	1232	Greece	248
United States	N/A	Mexico	162	United States	7241	Mexico	187
Austria	130	Chile	226	Austria	139	Chile	190
Sweden	520	Malaysia	1043	Sweden	264	Malaysia	362
France	1031	Brazil	163	France	982	Brazil	398
Belgium	246	Czech	98	Belgium	283	Czech	87
Holland	159	South Africa	349	Holland	100	South Africa	93
Singapore	745	Turkey	326	Singapore	381	Turkey	188
Hong Kong	1097	Poland	344	Hong Kong	502	Poland	45
Canada	N/A	Thailand	564	Canada	815	Thailand	368
Finland	149	Peru	208	Finland	104	Peru	81
Italy	332	Columbia	77	Italy	312	Columbia	48
Australia	1977	Philippines	297	Australia	654	Philippines	171
U.K.	2130	Indonesia	364	U.K.	1628	Indonesia	218
Ireland	59	China	1773	Ireland	70	China	323
New Zealand	149	Pakistan	259	New Zealand	137	Pakistan	120
Spain	144	India	1144	Spain	144	India	467

Therefore, the results of this study will mainly serve as a guide for further extensive research. Some recent studies have adopted a similar argument and used all data due to data limitations. For example, Butler et al. (2007) studied the difference in timeliness between firms reporting quarterly and those reporting semi-annually. The findings of Butler et al. (2007) are based on a sample of 28,824 reporting-frequency observations from 1950 to 1973 before SEC regulations in the USA. The SEC took an active role in regulating reporting frequency for exchange-listed firms by mandating annual reporting in 1934, semi-annual reporting in 1955, and quarterly reporting in 1970. Therefore, although the data in this study may be considered outdated, the findings still represent an addition to the body of knowledge in this area, as the results are consistent with most recent studies in the area (e.g., Jin and Myers 2006; Ferreira and Laux 2008; Hutton et al., 2009). Table 4.5 presents a summary of variables identification, their measurements and the data sources for the dependent variable, independent variables and control variables.

4.6 SUMMARY AND CONCLUSION

This chapter discusses two main parts. The first part discusses the hypotheses development of this study. The second part discusses the research paradigm, the construction of the empirical model, the variables measurements, the study sample and the data sources. Five hypotheses are developed in this study. The first three hypotheses propose that stock price synchronicity, as an inverse measure of stock price informativeness, is negatively associated with timeliness (frequency and intensity of disclosures), and positively associated with financial analysts following and credibility of disclosures. The next two hypotheses predict the moderating effects of reporting frequency on the relationship between the number of analysts following and credibility of disclosures and Stock price synchronicity.

To address the research objectives, this study follows the mainstream paradigm in accounting research and assumes rationality of market participants and the functionalism of the capital market. The study uses cross-country data from 40 countries and employs 15,920 firm stocks to construct the dependent variable (Stock price synchronicity). Out of the ten transparency attributes presented in the framework of Bushman et al. (2004), three transparency variables, namely, timeliness of reporting, analyst following and credibility were proposed to proxy for the independent variable (corporate transparency). Based on prior studies and to control for the general development in the country, and the structural and institutional factors, three groups of control variables were included in the construction of the empirical specification.

Transparency variables were obtained from CIFAR 1995. Other structural and institutional data was collected from secondary data sources. Stock prices and returns, as well as firms accounting data were obtained from published market data sources, specifically the *DataStream* database for 1995. This study's methodology proposes the statistics of the Standard multiple regressions to test the research hypotheses. The next chapter presents the empirical results and discusses the findings of this study.

Table 4.5
Variables Identification and Measurement Issues and Data Sources

Concept	Abstract	Type	Definition	Measurement	Data source
Price informativeness	Stock price Synchronicity	DV	Reasonable benchmark for measuring the relative amount of firm – specific vs market and industry information incorporated in the price market and industry	Log of (R^2), based on CAPM or market models. Or average percentage of shares moving together in a week in a country in 1995	Morck et al. (2000).
Economic variables	GDP per capita Market size	CV[41]s	GDP per capita No of PLCs in the market	(Log) GDP per capita 995 (Log) no of listed companies	World bank/ country economic and market data
Structural variables	Geographic size GDP growth variance Industry Herfindal Index Firm Herfindal Index Earning co- movement index	CVs	Area / population Change in GDP (90-94) Industry to market sale Firm to country sales Percentage of firm return to market.	(Log) country size (log) gdp v. growth (log) ind. to mkt sales (log) firm / country sales ROA firm/country	World Bank data World Bank data Market data Market data Market data
Institutional Variables	Good government index Anti- director index	CVs	Measure of legal, judicial system Measuring stockholder rights	Score 3 indexes 5 points scale.	La Porta (1998) La Porta (1998)

Table 4.5
(Continued)

Concept	Abstract	Type	Definition	Measurement	Data source
Annual Financial Reporting	CIFAR	CV[42]	International Accounting and Auditing Trends, Center for Financial Analysis and Research (CIFAR	Index created by examining and rating companies' 1995 annual reports on the inclusion or omission of 90 items	CIFAR - 1995
Annual Financial Reporting	DISCL	CV	Average ranking of the answers to the following questions: A6g (R&D), B3f (capital expenditure), Ca (subsidiaries), Cb (segment-product), Cc (segment-geographic), and D1 (accounting policy).	Internally constructed from data contained in CIFAR	Bushman (2004)
Annual Financial Reporting	GOVERN	CV	*Average ranking of the ans*wers to the following questions: B2a (range of shareholdings), B2b (major shareholders), Ce (management information), Cf (list of board members and their affiliations), Cg (remuneration of directors and officers), and Ch (shares owned by directors and employees).	Internally constructed from data contained in CIFAR	Bushman (2004)
Annual Financial Reporting	MEASURE	CV	Average ranking of the answers to the following questions: A3 consolidation) and A6p (discretionary reserves	Internally constructed from data contained in CIFAR	Bushman (2004)

[42] IV : Independent variable

Table 4.5
(Continued)

Concept	Abstract	Type	Definition	Measurement	Data source
Timeliness of reporting	TIME	CV	Average ranking of the answers to the following interim reporting questions: Ea (frequency of reports), Ed–Ef (count of disclosed items), and Eb (consolidation of interim reports).	Internally constructed from data contained in CIFAR	Bushman [2004)
Credibility of disclosures	AUDIT	IV	Variable indicating the percentage of firms in the country audited by the Big 5 accounting firms. AUDIT equals 1, 2, 3, or 4 if the percentage ranges between (0, 25%), (25%,50%), (50%, 75%), and (75%, 100%), respectively.	International Accounting and Auditing Trends, CIFAR	International Accounting and Auditing Trends, CIFAR
Financial analyst Following	ANALYST	IV	Number of financial analyst following the largest 30 companies in 1996	Averge numbers of analyst	Chang, Khanna, and Palepu(2000)
Private Information Transparency	IT_FNF	CV	Indicator variable equal to 1 if the country enforced insider trading laws before 1995, 0 otherwise.	Bhattacharya and Daouk [2001]	Bhattacharya and Daouk [2001]
Private Information Transparency	POOL_INV	CV	Average of total assets of pooled investment schemes to GDP between 1993 and 1995	Levine [1999]	Levine [1999]
Information dissemination	MEDIA	CV	Average rank of the countries' media development (print and television) between 1993 and 1995.	World Development Indicators	World Development Indicators