CHAPTER 2

THEORETICAL FRAMEWORK AND REVIEW OF LITERATURE

This chapter reviews the selected theories and literature regarding the mandated accounting changes in the historical event studies. Its contents include the fundamental of disclosure regulation, its objectives and approaches. The pcsitive accounting theory develops the efficient market hypothesis, capital asset pricing model, market model, contracting process, to prelude to a new theory by using market based accounting reseach (MBAR) method. Furthermore, accounting change is an event that affects the economic components. It is necessary to understand the event study and the modelling of abnormal returns which is included in MBAR.

2.1 Disclosure Regulation

2.1.1 Objectives of disclosure regulation

The financial reporting environment consists of various groups who are interested in the results of the activities of a profit-oriented organization. These groups have been classified as direct users and indirect users. Direct users include the owners of a corporation and its shareholders; the creditors and

suppliers; the management of a firm; the taxing authorities; the laborers in an organization; and the customers. Indirect users include the financial analysts and advisers; the stock exchanges; the lawers; regulatory or registration authorities; the financial press and reporting agencies; trade associations; labor unions; competitors; the general public; and other governmental departments. These two types of users have different information needs because they have diverse and conflicting sets of objectives.

There are two major categories of theories of regulations: (1) public-interest theories; and (2) interest-group or capture theories (Stigler, 1971; and Posner, 1974) .

The public-interest theories of regulation maintain that regulation is supplied in response to the demand of the public for the correction of inefficient or inequitable market prices. They are instituted primarily for protection and for the benefit of the general public.

The interest-group theories of regulation maintain that regulation is supplied in response to the demands of special-interest groups, in order to maximize the income of their members. The main versions of this theory are: the political ruling-elite

theory which concerns the use of political power to gain legulatory control and the economic theory which concerns economic power (Peltzman, 1976).

Regulation is intended to increase social welfare (Posner,1974 and McCraw, 1975). The need to achieve desired social goals which include fairness of reporting, information symmetry, and the protection of investors, dictates a regulation of disclosure.

2.1.2 Disclosure regulation approaches

The important criteria in disclosure regulation focus on the usefulness of information in decision making of the users, especially the investors and the debtors. The evolution of five approaches used in regulation exist:

1. an economic truth and fair view approach;
2. a decision usefulness approach;
3. an information economic approach;
4. a political approach;
5. a social welfare approach.

The first approach favors neutral reporting and the

pursuit of faithful representations through the standard-setting process. Under such an approach, accounting is compared to financial map-making, where map has to be accurate and faithful. The second approach implies the decision theories in decision modelling and decision maker classifying. The decision model is based on the characteristics of accounting information, for example, relevance and reliability. The other accompanying criteria such as, comparability, understandability, materiality, and benefits exceeding costs are considered. The example of this approach is the issue of Statement of Financial Accounting Concept No. 2, Qualitative Characteristics of Accounting Information. This approach also focuses on the behavior of the decision makers about the effects of accounting process in investment decisions.

The third, information economic approach applies the ***Agency Theory*** that can explain the contractual concept between the agent who is assumed to be the manager and the principal who is assumed to be the owner-shareholder. To reduce the conflict of interests and the loss of owner's welfare, monitoring and bonding such as auditing and providing the sound accounting systems are necessary. The authorized regulator has to state the minimum financial disclosure to be served and to satisfy the shareholders and the investors. The fourth, political approach is

a social choice to force the regulators in finding some accommodations. The econonic theories of the political process adopt the self-interest view that assumes politicians maximize their utility. Under this assumption, the political process is a competition for wealth transfers. Participation in the competition involves nonzero information, lobbying, and coalition costs. The politicians are hypothesized to use large reported earnings as "evidence" of a monopoly. The final, social welfare approach favors the adoption of standards with good rather than bad economic consequences. Under such an approach, regulation is enacted that have a positive, or at least nonnegative, impact on social welfare. This is the new approach that has engaged recently to argue for the recognition of accounting. Cooper and Sherer (1984) stated that:

Our position, that the objectives of and for accounting are fundamentally contested, arises out of the recognition that any accounting contains a representation of a specific social and political context. Not only is accounting policy essentially political in that it derives from the political struggle in society as a whole, but also the outcomes of accounting policy are essentially political in that they operate for the benefit of some group in society and to the

detriment of others....Social welfare is likely to be improved if accounting practices are recognized as being consistently neutral; that the strategic outcomes of accounting practices consistently (if not invariably) favor specific interests in society and disadvantage others.

At recent, the accounting literature contains many studies using the finance-based theory and/or the theory of regulation to explain accounting and auditing practices. These studies apply the development and methodology of the economic-based empirical approach. Other approaches (e.g., the behavioralist approach) also exist in the accounting literature.

2.2 Positive Accounting Theory[1]

The positive accounting theory uses the economic concept in science. Positive propositions are concerned with how the world works. They take the form "if A then B", for example: "If a firm switches from FIFO to LIFO and the stock market has not anticipated the change, the stock price will rise." This statement is a prediction that can be refuted by evidence. It

---

[1] Ross L. Watts and Jerold L. Zimmerman, Positive Accounting Theory, Prentice-Hall International Edition, 1986.

presents the theory and methodology underlying the economic-based empirical literature in accounting.

The objective of theory is to explain and predict phenomena (in this case, accounting practices). Positive accounting theory is important because it can provide those who must make decisions on accounting policy (corporate managers, public accountants, loan officers, investors, financial analysts, regulators) with predictions of, and explanations for, the consequences of their decisions.

The introduction of concept of the theory came from the developments in finance, which inherited the concept from economics. The results to these early empirical studies led to the development of the ***efficient markets hypothesis*** .

2.2.1 Efficient market hypothesis

A large body of empirical evidence supports a theory called the efficient market hypothesis (EMH). It has a major impact on a great deal of economic and financial research. The basic reasoning behind the EMH is the notion that stocks already reflect all available information.

It is common to distinguish among three versions of the

EMH: the weak, semistrong, and strong forms of the hypothesis. These versions differ by their notions of what is meant by the term "all available information."

The weak-form hypothesis asserts that stock prices already reflect all information that is available to many people at very low cost. The semistrong-form hypothesis states that all published information regarding the prospects of a firm must be reflected already in the stock price. Such information includes, in addition to past prices, fundamental data on the firm's product line, quality of management, balance sheet composit on, patents held, earning forecasts, and accounting practices. These data are also readily available at low cost. Finally, the strong-form hypothesis states that stock prices reflect all information relevant to the firm , even including information available only to company insiders (e.g., the management's future investment production plans, pricing policies). Few people expect this form of the EMH to be consistent with data.

In general, the evidence is consistent with semistrong-form of hypothesis and is generally accepted by researchers as descriptive (Fama, 1976).

Jensen (1978) defines an efficient market as follows:

A market is efficient with respect to information set ⊕t, if it is impossible to make economic profits by trading on the basic of information set ⊕t.

Underlying the EMH is competition for information. Competition drives investors and financial analysts to obtain information on the firm from many sources. The implications of the efficient market clearly contradict the hypothesis that accounting reports are the sole source of information and its implications. These contradictions led researchers to address two questions:

Do changes in accounting methods and their earnings effects systematically mislead to stock prices? and

Are accounting earnings associated with stock prices or changes in stock prices?

2.2.2 Capital asset pricing model (CAPM)

The capital asset pricing model (CAPM) is a set of predictions concerning equilibrium expected returns to risky

assets. It is a centerpiece of modern financial economics. The model gives a precise prediction of the relationship that can be observed between the risk of an asset and its expected return. This relationship serves two vital functions. First, it provides a benchmark rate of return for evaluating possible investments. For example, in analyzing securities, the interesting factor is whether the forecasting expected return for a stock is more than its "fair" return given its risk. Second, the model helps to make an educated guess as to expected return on assets that have not yet been traded in the market place. For example, how do the investors price an initial public offering of stock? How will a major new investment project affect the return required by the investors on a company's stock? Although the CAPM does not fully withstand empirical tests, it is widely used because of the insight it offers and because its accuracy suffices for many important applications.[1]

CAPM is a mathematic model of the investors' expectations in portfolio investments under an accepted level of risk. The CAPM model can be illustrated as :

---

[1]Zvi Bodie, Alex Kane, and Alan J. Marcus, Investments, Second Edition, Irwin, 1993, p.242.

$$E(Rit) = Rft + [E(Rmt) - Rft]\ \beta i$$

where $E(Rit)$ = the expected return on security i at time t,

Rft = return on riskless assets at time t,

$E(Rmt)$ = the expected return on the market securities as a whole at time t,

βi = risk coefficient of security i,

$= \sigma(Rit, Rmt)/\sigma^2(Rmt)$ or

$=$ covariance between Rit and Rmt .
variance of Rmt

2.2.3 Portfolio theory and market model

In general, optimal portfolio investment is based on the investors' wealth and satisfaction on the investment decision. Porfolio theory can explain the roles of accounting information in decision making of the investors by its relevance to the needs. In a single period, the factors that an investor will invest in a security are based on two parameters, *expected return* and *variance of return* (risk) of the security in such period. Beaver (1989)[1] suggested the three aspects of portfolio theory in application of financial reporting as follows:

---

[1] William H. Beaver, Financial Reporting: An Accounting Revolution, Second Edition, Prentice-Hall, 1989, p.30.

(1) The consequenses of concern of investor are characterized as the expected return (also called reward) and the variance of return (also called risk) of the portfolio. The attributes of the returns of individual securities are relevant only in so far as they contribute to the expected return or the risk of the portfolio.

(2) The portion of the variance of individual securities' returns can be diversified away, and therefore the vaviance of the portfolio return is not merely an average of the variances of the securities, return that comprise it.

(3) The security-specific parameters of interest to the investor, and the investor's demand for security-specific information (e.g., financial reporting) will vary in a manner related to the portfolio strategy chosen.

The role of the financial information is up to the beliefs of the investor. Such beliefs are those of *expected return* and *variance of return* for each of the portfolios. Both parameters are in turn a function of the expected return on the individual securities, the variance of return on the individual securities, and the covariance or correlation among returns of individual securities. The role of information is potentially to alter these parameters of the investor's beliefs.

The market model is a statistical description of relation between the rate of return on asset *i* (R*it*) and rate of return on market portfolio of assets (R*mt*) when the joint distribution of the rate of return on asset and the market portfolio is bivariate normal. It is the market model (Sharpe,1964) that the return on security *i* is illustrated as follow:

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_{it}$$

Real return = Expected return + Abnormal return

where R*it* = real return on security *i* at time *t*,

α_i = intercept or constant of rate of return,

β_{it} = slope *i* or systematic risk on security *i*,

= covariance between R*it*, R*mt* / variance of R*mt*,

R*mt* = systematic return in portfolio market,

e_{it} = difference between real return and expected return or abnormal return.

2.2.4 Market-based accounting research (MBAR)

The market-based accounting research (MBAR) is an accounting research methodology by which the researchers

investigate the effects of accounting information on the investors' portfolio investment decisions. The main objective is to evaluate the *information content* of accounting information system by empirical studies on the security market behavior. MBAR contains the applications of portfolio theory, EMH, CAPM, and market model in order to explain and predict the relationships between stock prices and published accounting information. One of the proxies of such effect is the abnormal return (AR) on investment. MBAR is an approach to studying the accounting signal effect on the marketable security reactions surrounding the day of announcement.

Lev and Ohlson (1982) has concluded the literature of MBAR empirical in the accounting fields as follows:

(1) Information content of accounting data which are earning announcement and non-earning financial data.

(2) The effects of accounting choices and changes in order to explain and predict the behavior of managers, accounting professioners, auditors, financial analysts, investors, regulating agencies, and others who involve in the circumstances.

2.3 Event Study and Modelling Abnormal Returns[1]

An event study is an empirical investigation of the relationship between security price and economic events. Most event studies have focused on the behavior of share prices in order to test whether their stochastic behavior is affected by the disclosure of firm-specific events for examples, earnings announcements, accounting change, and other information involved. The basic structure of the standard form of event study is commonly referred to as residual or abnormal return analysis that employs the market model. Basic structure of residual analysis is required in the following steps:

Step 1. Identify event dates for a sample of firms subject to the disclosure item of interest (for example, earnings announcements), and group observations into a common *event test.*

Step 2. Within the overall *test period* (TP) of interest, calculate the estimate of the *abnormal return* for each firm and for each period around the announcement date:

$$u_{jt} = R_{jt} - E(R_{jt}) \qquad t \in TP$$

---

[1] Norman Strong, Modelling Abmormal Returns: A Review Article, Journal of Business Finance & Accounting, 19(4), June 1992.

Step 3. Compute the mean abnormal return across firms in the sample, possibly cumulated over the TP, as an estimate and test whether it = 0 using a test statistic of the form:

$$\frac{\text{mean abnormal return}}{\text{standard diviation}}$$

The next sections concern the design of event studies: alternative methods for measuring abnormal returns, evidence on the efficiency and power of methods, testing procedures and special problems concerned with estimation, and controlling for extra-market factors.

2.3.1 Alternative Methods for Measuring Abnormal Returns

There are various dimensions along which the calculation of abnormal returns can vary.

2.3.1.1 Calculation of returns

There are two choices in calculating returns, discrete returns and logarithmic returns:

Discrete: $$R_{jt} = \frac{P_{jt} + D_{jt} - P_{jt-1}}{P_{jt-1}}$$

$$\text{Logarithmetic: } R_{jt} = \log[(P_{jt} + D_{jt})/P_{jt-1}],$$

$$\text{or } R_{jt} = \ln[(P_{jt} + D_{jt})/P_{jt-1}],$$

where P_{jt} = the price of security j at the end of period t;

D_{jt} = dividends paid during period t;

P_{jt-1} = the price of security j at the end of period t-1, adjusted for any capitalizations in order to make it comparable to P_{jt}.

Theoretically, logarithmic returns are analytically more tractable when linking together sub-period returns to form returns over longer intervals (simply add up the sub-period returns). Empirically, logarithmic returns are more likely to be normally distributed and so conform to the assumptions of standard statistical techniques.

2.3.1.2 The Measurement Interval

The most popular measurement intervals are monthly, weekly, and daily intervals. Morse(1984) has examined the econometric trade-off between the choice of monthly and daily data from analytical perspective. Morse's results generally support the choice of shorter measurement interval to detect information effects. These results are further supported by

simulation studies of Brown and Warner (1980), (1985) and Dyckman et. al. (1984).

2.3.1.3 The Benchmark for Abnormal Returns

A number of alternative specifications of the benchmark expected return have been used in the literature.

Model A: Mean adjusted returns

The mean adjusted returns benchmark assumes that *ex ante* expected return for security *j* is a constant that can vary across the firms:

$$E(R_j) = k_j \quad \text{for all } t.$$

This will be the case if interest rates, risk premia, and the security's risk are constant over time. The *ex post* predicted return for security *j* in period *t*, in the absence of any news disclosure, is given by k_j and the predicted abnormal return is given by the difference between the actual return on security *j* and k_j, which is estimated from historic data:

$$u_{jt} = R_{jt} - k_j$$

Model B: Market adjusted returns

The market adjusted returns model assumes that *ex ante* expected returns are the same of all securities and therefore equal in any period to the expected market return in that period:

$$E(R_j) = E(R_m) \text{ for all } j.$$

The *ex post* abnormal return on security j in period t that controls for market effects is given by:

$$u_{jt} = R_{jt} - R_{mt},$$

where the marginal expected return on security j in period t TP is conditioned on the realization of the market return in period t.

Model C: Capital Asset Pricing Model (CAPM)

The CAPM benchmark, as it is implemented in practice, might be more appropriately termed a one-factor

Security Market Line benchmark. This model controls for security risk as well as for the market. The *ex ante* expected return for security j in period t is given as:

$$E(Rjt) = (1 - \beta j)Rft + \beta jE(Rmt),$$

where Rft is the return on risk-free security in period t (normally taken to be the return on Treasury Bills) and βj is the systematic risk of security j relative to the market index.

To implement this method, βj must first be estimated. The predicted abnormal return is then given by:

$$ujt = Rjt - (1 - \beta j)Rjt - \beta jRmt.$$

Model C collapses to Model A if a security's systematic risk is constant and if Rjt and Rmt constant over time. Model C collapses to model B if all securities have the same systematic risk as the market.

Model D: The matched/control portfolio benchmark

A variant of CAPM benchmark is the matched or control portfolio benchmark, also known as the *difference in*

returns benchmark. Most early versions of method controlled a security's return for its *systematic risk* against the market. Under this procedure, the sample securities subject to disclosure event are formed into a portfolio, p. A second portfolio, q , is drawn independently of the disclosure item of interest, or in some cases conditional on the portfolio securities not experiencing the disclosure event under study. The portfolios are weighted to have the same estimated β value, often constrained to unity. The abnormal return is the difference between the returns on portfolios p and q:

$$u_{pt} = R_{pt} - R_{qt}.$$

Beaver(1981) compares this procedure with the CAPM benchmark. Other versions of this method (for example, Vermaelen, 1981) calculate abnormal returns for individual securities as the difference between actual security returns and the return on a reference portfolio of securities in the same beta risk decile.

Model E: The Market Model (MM) benchmark

The MM has probably been the most popular benchmark employed in event studies . The MM makes no explicit assumption about how equilibrium security prices are established.

Instead, it assumes that returns are generated according to the following mechanism:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + u_{jt},$$

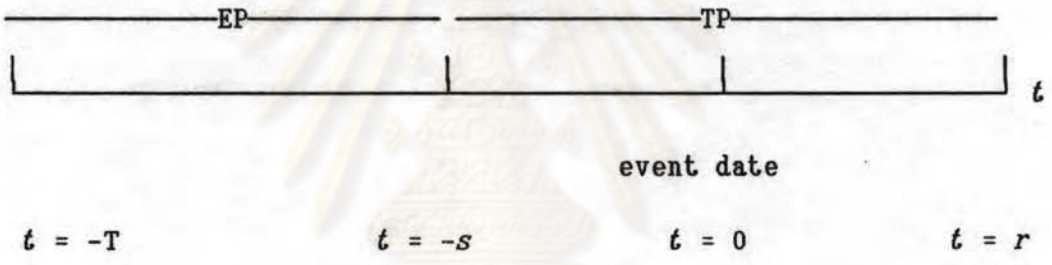
where u_{jt} is a mean zero, independent disturbance term in period t. The model partition a R_{jt} into a systematic component linearly related to R_{mt} and an unsystematic component, u_{jt}, which is uncorrelated with R_{mt}. The effect of firm-specific events is meant to be fully captured in the unsystematic component, the assumption being that the information signal and R_{mt} are independent. Both α_j and β_j must be estimated here, resulting in a predicted abnormal return of:

$$u_{jt} = R_{jt} - (\alpha_j + \beta_j R_{mt}).$$

Further motivation for employing the market model benchmark is that, in general, it results in smaller variances of abnormal returns, leading to more powerful statistical tests, and that it produces smaller correlations across security abnormal returns giving closer conformity to standard statistical tests (Beaver, 1981).

2.3.1.4 Choice of estimation period and test period

With all of benchmarks A, C, D, and E above, the returns history for each security is usually divided into an estimation period (EP) and test period (TP). The EP is used for estimating the parameters of the benchmark expected return. This allows predicted abnormal returns to be calculated within the TP. One form of this procedure is illustrated schematically below:



Here the TP spans t = -T to t = -s while the TP covers t = $-s,..,..o,..r$. Within this setting, the value of kj in model A, for example, would be estimated over the T $-s$ observations in the EP.

In some studies the EP spans either side of the TP. It is generally chosen as a period of time close to the TP but one in which the disclosure events under study are expected to have no effect on security prices. This intended to allow parameter estimation to be made during a period when there are no

persistent abnormal returns. (Thomson II et.al.,1988)

For estimation of the parameters of the market model, the number of observations used in practice has varied widely. For example, on daily data Lambert and Larcker (1985) used 60 observations, while Dodd et al. (1984) used 600 observations. On weekly data, the number of observations tends to span between two or four years, while on monthly data five years in the norm. In practice, there is a trade-off between including more observations to increase statistical accuracy and not going too far forward or back from the TP in case the parameters of the return generating mechanism have shifted. Data availability considerations often constrain the choice.

2.3.1.5 Choice of the market index

With any of the models B, C, D, or E for estimating abnormal returns, a market index must be selectd. Market indices can differ in terms of the type and number of constituent securities, the weighting attached to securities, and how security prices are averaged to form the index. In addition some stock indices are just price indices while others incorporate a dividend adjustment and so are true return indices.

For methods employing a CAPM benchmark, the theoretically correct market index is a value-weighted index of the entire universe of capital assets. As pointed out by Roll (1977), such an index is practically unmeasurable.

The standard procedure adoped in practice has been determined largely by data availability, and involves selecting either a published value-weighted or equally-weighted arithmetic average index of equity securities. For example, Dimson and March (1986) employ both the capitalisation weighted Financial Times Actuaries All share Index, adjusted for dividend yield, and an equally weighted index of returns on all UK listed shares.

2.3.1.6 Accumulative abnormal returns over time

Almost all event studies call for abnormal returns to be cumulated over a number of periods. This may be in order to fully capture the efect of an event on share prices, or to accommodate uncertainty over the exact date of event.

The two most popular methods of accumulating abnormal returns over time are Cumulative Abnormal Returns (CAR)

(Fama et al., 1969), and the Abnormal Performance Index (API) (Ball and Brown, 1968). These are calculated as follows:

$$CAR = \sum_{t \in TP} \frac{1}{N} \sum_{j} \hat{u}_{jt}$$

$$API = \frac{1}{N} \sum_{j} \prod_{t \in TP} (1 + \hat{u}_{jt}) - 1$$

The interpretation of these measures depends upon whether returns have been measured in continuous or discrete time (Ohlson, 1978; and Watts and Zimmerman, 1986). In continuous time CAR represents the abnormal return on a portfolio that is rebalanced every period to give equal weighting in each security. In discrete time the API gives the abnormal return from initially investing equally in each security and then holding these securities over the cumulation period. (Roll, 1983; Blume and Stambaugh, 1983; and Dimson and Marsh, 1986, discuss the possible biases introduced by using the CAR method.)

2.3.2 Evidence on the efficiency and power of the method

There have been a number of simulation studies of the various event study methodologies. The most influential of these

have been a pioneering study by Brown and Warner (1980) on monthly data, and articles by Brown and Warner (1985), Dyckman et al. (1984) and Jain (1986), all extending the original Brown and Warner study to daily data.

On monthly data the main conclusion of Brown and Warner (BW) was the following:

..... a simple methodology based on the market model performs well under a wide variety of conditions. In some situations, even simpler methods which do not explicitly adjust for market wide factors or for risk perform no worse than the market model.

In addition BW established the following results for their simulations:

(1) with a sample size of 50 and an abnormal return of one per cent the event's impact is unlikely to be detected using monthly data whatever the method used;

(2) if the exact month of the event cannot be identified so that some form of event window has to be used (such as with CARs) when the power of any method to detect abnormal

performance is drastically reduced;

(3) using an equally-weighted index leads to more powerful tests than using a value-weighted index;

(4) *t*-test are reasonably well-specified; but certain non-parametric tests are not.

The third result above is due to the fact that on the randomly selected sample of securities from which Brown and Warner study, returns are more highly correlated with an equally weighted index. This means that greater precision is achieved in measuring systematic risk against the market and in measuring residuals, with the result that abnormal performance is easier to detect.

On daily data BW conclude,

.....methodologies on the ordinary least square market model and using standard parametric tests are well-specified under a variety of conditions.

In addition, BW find that although daily security returns and abnormal returns typically depart from normality,

mean abnormal returns across securities converge to normality as the sample size increases.

The findings of Dykman, Philbrick and Stephen (DPS) on daily data reinforce the findings of BW. In particular, DPS find a slight preference for market model over other procedures and they find that any non-normality of daily abnormal returns has little effect on event study tests.

Both Brown and Warner (1985) and Dyckman et al. (1984) find daily data result in more powerful test statistics than are found for monthly data simulation in Brown and Warne (1980).

The findings of BW and DPD on event studies employing monthly and daily data clearly show that accurately identifying announcement dates and concentrating on abnormal returns in as small an event window as possible, results in much more powerful hypothesis tests.

2.3.3 Testing procedures and special problems concerned with estimation

With the availbility of daily stock return data, increased attention has been paid to the possible measurement

problems involved in estimating market model parameters over shorter measurement intervals.

2.3.3.1 Thin trading and biased beta estimation

Unbiased and consistent estimation of the beta risk coefficient is important for infrequent share trading. Price-adjustment delays result in an error-in-variables problem in the ordinary least square (OLS) market model regression equation resulting in biased and inconsistent beta estimates.

A number of methods for correcting for this bias have been proposed in the literature (Scholes and Williams, 1977; and Dimson, 1979). The Scholes and Williams (SW) beta estimator is derived as follows:

$$\beta_{sw} = (\beta^{-1} + \beta^{0} + \beta^{+1}) / (1 + 2\rho_m)$$

where β^{n} is an estimator of the slope coefficient in a simple regression of the return on security in period t against the return on the market in period $t + n$

ρ_m is an estimator of first order serial correlation coefficient for the market index.

Under the stated assumptions, the SW beta estimator is consistant estimator of the true beta.

The Dimson aggregate coefficients (DAC) estimator does not require that a trade takes place in every return interval. Dimson's formula is as follows:

$$\beta_D = \sum_{k=-n}^{n} \beta_K .$$

Here β_K, k = -n,....,0,.....,n are estimates of the slope coefficients in a multiple regression of return on the security in period t against the return on the market in periods $t - n$,. k = -1,...,5.

2.3.3.2 Thin trading and event studies

Both BW and DPS, in the studies previously referred to, report results for the impact on simulated event studies using daily data of correcting for thin trading. They find that using either the SW or the DAC procedures results in

reduced biases in OLS estimates of beta but results in no improvement in either the specification or power of event study tests.

DPS perform an event study simulation separately on low-, medium- and high-trading volume populations. They find that the SW and DAC methods do not increase the ability to detect abnormal performance on daily returns for thinly traded securities.

In addition, Bartholdy and Riding (1994)* compare the SW and DAC with OLS applied. They find that OLS beta estimates are less biased, more efficient, and as consistent as SW or DAC estimators. Lower beta estimates are associated with lower trading frequencies.

---

* Jan Bartholdy and Allan Riding, Thin Trading and the Estimation of Betas: the Efficacy of Alternative Techniques, The Journal of Financial Research, Vol. XVll, No. 2, Summer 1994, pp.241-254.

2.3.3.3 Testing procedures

A refined test procedure which has been used in a number of event studies is due to Patell (1976), and is often referred to as *Patell Standardised Residual* (PSR) *Test.* The PSR is based on market model and is constructed as follows. The abnormal return for security i in period $t \in TP$ is calculated according to market model. Patell notes that when the parameters of the market model are estimated from observations outside the TP, abnormal returns are prediction errors rather than true residuals and should therefore be standardised according to the following formular:

$$vit = \frac{\hat{u}it}{si\sqrt{Cit}},$$

where $si^2 = \frac{\sum_{t=1}^{T} \hat{u}it^2}{T-2}$ is an estimate of variance

of the residuals during the EP;

$$Cit = 1 + \frac{1}{T} + \frac{(Rmt - \bar{R}m)^2}{\Sigma(Rmt - \bar{R}m)^2}$$

reflects the standards econometric adjustment for increase in variance for prediction outside the EP;

T = the number of observations in the EP; and

$$Rm = \frac{1}{T} \sum_{t=1}^{T} Rmt \ .$$

Summing the standardised abnormal returns across securities, a normalised sum can be formed which is distributed unit normal for large N:

$$ZVt = \frac{\sum_{i=1}^{N} Vit}{\left[\sum_{i=1}^{N} \frac{Ti - 2}{Ti - 4}\right]^{1/2}} \sim N(0,1) \ ,$$

where Ti = the number of EP observations for security i.

A similar test can be constructed on the cumulative abnormal returns:

$$CAR_i = \frac{1}{\sqrt{L}} \sum_{t=1}^{L} \frac{u_{it}}{S_i \sqrt{c_{it}}},$$

where L = the number of observations cumulated in the TP (see Patell, 1976, pp. 256-7).

A number of studies when faced with the problem of cross-sectional correlation due to contemporaneous event dates have adopted a procedure originally employed by Jaffe (1974) and Mandelker (1974). Under this procedure, for each time period an equally weighted portfolio is formed of those securities that are subject to an event during that calendar time period. A portfolio abnormal return is calculated for each period in the TP as:

$$\hat{u}_{pt} = \frac{1}{N} \sum_{i \in p} \hat{u}_{it}$$

The TP will include all calender periods in which any sample security experienced an event. The TP portfolio abnormal returns are then standardised by dividing by their estimated standard deviation calculated over the EP as follows:

$$SE(Upt) = \sqrt{\frac{1}{T-1} \sum_{t \in TP} (\hat{u}pt - \bar{u}p)^2}$$

where $\bar{u}p = \frac{1}{T} \sum_{t} \hat{u}pt \qquad t = 1, \ldots, T \in TP$.

This estimate of the standard diviation of the portfolio residuals directly takes into account cross-sectional dependence between residuals of securities within each portfolio in a given period (for a formal development of this see Collins and Dent, 1984). If abnormal returns across different portfolios are assumed to be cross-sectionally uncorrelated, the standardised portfolio abnormal return can then be averaged across *N* portfolios to give a *t*-statistic (or *z*-statistic for large *N*).

2.3.3.4 Recent developments

Recent empirical and analytical approaches to the problem of cross-sectional dependence in abnormal returns have tended increasingly to adopt so-called *system methods* involving the pooling of time series and cross-sectional data using joint generalized least square (GLS) estimation techniques in a

multiple regression approach to event studies (see, for example, Binder, 1985; Thompson, 1985; Malatesta, 1986; McDonald, 1987; and Schipper and Thompson, 1983). Collins and Dent (1984) provide an earlier analysis while Bernard (1987) provides the most complete discussion of the problem in this complex. In applications, the choice of technique involves a trade-off between, the degree of violation of OLS assumptions, where GLS is more efficient than OLS if the residual covaiance is known, and on the other hand, the problem of having to estimate the residual covariance matrix and subsequently employing estimated GLS. Preliminary evidence from simulation studies (Malatesta, 1986; and McDonald, 1987) suggests that OLS works as well as estimated GLS.

A small number of papers have recently adopted a testing procedure based on *empirical distribution* (for example, Foster et al., 1984; Marais, 1984;and, for an example within simulation study, Kothari and Wasley, 1989). Significance tests based on the empirical distribution of abnormal returns for the sample securities do not require any distributional assumption such as normally, and they take into account cross-sectional dependencies and differences in residual variances across securities.

2.3.4 Controlling for extra factors

The empirical studies regularly have a potential impact on size effect. This refers to the finding for a number of countries that smaller captallization stocks have higher risk-adjusted returns, on average, than large capitalization stocks. Dimson and Marsh (1986 and 1988) provide a clear and comprehensive analysis of the potential impact of size effect on event study methodologies. Their approach to controlling for size effect is also used by Foster et al. (1984) and receives further support from the recent simulation study of Kothari and Wasley (1989). Dimson and Marsh (1986) point out that if the benchmark expected return fails to reflect the size effect then estimates of abnormal returns will be biased for both small and large capitalization stocks.

Both Foster et al. (1984) and Dimson and Marsh (1986) employ a size control portfolio as a benchmark for computing abnormal returns. With this approach the predicted abnormal return for security j in period t is given as:

$$u_{jt} = R_{jt} - R_{pt}$$

where R_{pt} is the equally weighted mean return on a portfolio of

stocks in the same size decile as firm *j* in period *t*. Dimson and Marsh (1986) also adjust this benchmark for difference in beta risk but this has a negligible effect on their results.

Kothari and Wasley (1989) apply the size control portfolio approach to their simulation study of event study. They conclude as follows:

.....For event studies in which control for the firm size effect is warranted... a conventional t-test based upon size control portfolio abnormal returns is valid [well-specified] and of equal or greater power than alternative testing procedures.

2.3.5 Event study conclusions

Strong (1992) provides the broad conclusions that can be drawn about the current state of the art in event-study research design as follows:

(1) If the sample securities have no unrepresentative explosure to extra-market factors and event dates are diffusely spread out in calender time for the sample securities, then calculating abnormal returns using the ordinary least squares market model and using standard parametric statistical tests

appears to be a well-specified procedure.

(2) Where event-date clustering is a problem then some correction for cross-sectional dependence should be used.

(3) Special care should be taken in checking whether the sample of event securities is unrepresentative across any extra-market dimention, in particular firm size, and, if necessary, some form of control portfolio approach should be employed.

(4) The ability to detect information content in an event study may be considerably enhanced if the precise event day for the sample securities can be established. Simultaneously, this reduces the possible effects of omitting non-market factors from the security return generating mechanism. In many event studies in practice, accuracy of event dates is likely to be more important than sophistication in modelling or statistical techniques.

2.4 Tests of the Theories

Watts and Zimmerman (1990)[1] reviewed the two types of tests of theories that have been conducted: stock price tests and accounting choice tests. Stock price tests of theories reveal some price reactions to mandatory accounting changes. Most accounting choice studies use combinations of three sets of variables which represent the manager's incentives to choose accounting methods under bonus plans[2], debt contracts, and the political process.

2.4.1 Stock price tests

Benston (1973) represents the earliest test to investigate whether securities acts met one of their stated objectives and increased the information available to investors. Benston finds no evidence of costs or benefits of the security acts. While a number of other studies suggest that accounting regulation imposes costs on firms. Chow (1983)

---

[1] Watts and Zimmerman, Positive Accounting Theory: A Ten Year Perspective, The Accounting Review, January, 1990, pp.131-156.

[2] The author have to omit the data of management compensations and bonus plans because it is confidential and unavailable.

finds that the 1933 Secutity Act reduced the wealth of shareholders of firms that were affected by the act relative to those firms not affected by the act (OTC stocks). Hence, there is evidence that regulation imposes private (e.g., ***the stock price effects)*** and social costs (e.g., the resources spent by the SEC) and little evidence of benefits. In the literature of accounting change studies, the researchers usually test the stock price effects by implying the Efficient Market Hypothesis (EMH) of naive investor theory. ***The naive-investor theory*** is the theory which would suggest a market reaction simply because the market participants were not sufficiently knowledgeable about accounting to understand the nature of the change in income that would result from the accounting change. They cannot compare the reported earnings of firms that use different accounting procedures. Ricks (1983) concluded that presumably the naive-investor hypothesis would suggest that the income effect of an accounting change would fool the market. In many cases , the income effect was not readily available, but it seems clear that the tests of naive market reaction would have been much more powerful if the income effect had been used in the analysis[1].

---

[1] William Ricks, Market Assessment of Alternative Accounting Methods: A Review of the Empirical Evidence, Journal of Accounting Literature, Vol.1, 1982, pp. 92-93.

2.4.2 Accounting choice tests

The initial empirical studies in accounting choice used positive agency costs of debt and compensation contracts and positive information costs. *The contracting cost theory* subsumes two theories: information costs and agency. Since accounting measurements are used to enforce many of the contracts, the agency theory is used to explain reactions of the contracting parties to changes in methods of accounting measurements. Efficient market research has shown that a stock market reaction to accounting standards or discretionary accounting changes results only when new information is disclosed or when there is a direct cash flow effect (e.g., from use of the new method for income tax purposes, the effect of the method on bookeeping costs, a change in management's bonus payment). Contracting and information costs are assumed to be nonzero in both the firms' contracting process and in the political process. These contracts include formal contracts, such as debt contracts, and informal contract, such as unwritten working arrangements between managers. Watts and Zimmerman (1986) summarize that accounting numbers are used in the firm's contracts that are designed to reduce agency costs (bonding and monitoring costs). Ratios such as *debt/equity* ratios are used in debt contracts to restrict managers' actions

that transfer wealth from debtholders. Finance researchers had introduced costs of debt that increase with the debt/equity ratio (Jensen and Meckling 1976) to explain (in combination with differential taxes) how optimal capital structures could vary across industry. There is a negative relation between debt/equity ratio and stock price effect. A given decrease in reported earnings or equity resulting from the mandated accounting changes increases the probability of default on debt/equity and times charges earned covenants more, the larger the debt/equity ratio ceteris paribus. In addition, the larger the debt/equity ratio, the larger costs per share of technical default. Both these factors combine to produce the prediction that wealth transfer from shareholders to bondholders, and the stock price drops. For the obverse, an accounting change that increases reported earnings (or increases equity which decreases debt/equity) increases stock price because it reduces the probability of a debt agreement technical defult.

The political process is assumed to be a competition for wealth transfers in the self-interest view that politicians maximize their utility. ***The political process theories*** hypothesize the use of accounting numbers in the political process. The set of laws and regulations are the equilibrium result of two opposing forces : those who receive the benefits and those who

provide the benefits. The influences of the political process create incentives for politically sensitive firms to choose accounting methods that defer the reporting of earnings and reduce the variance of reported earnings. Accounting researchers, relying on economists' conjectures, assume that large firms are more politically sensitive than small firms and face differential incentives in their choice of accounting procedures (Gagnon, 1967; Watts and Zimmerman, 1978). They have used firm size to proxy for a firm's political sensitivity and thus the incentive of managers to choose earnings reducing accounting procedures. This is called ***the size hypothesis***. The size hypothesis is based on the assumption that large firms are more politically sensitive and have relatively larger wealth transfers imposed on them (political costs) than smaller firms. The stock price effects of mandated accounting changes via political process depend on whether the change restricts or expands the set of available procedures (Watts and Zimmerman, 1986, pp.235-243). Information costs in the political process allow changes in accounting procedures to have stock price effects. Changes that increase earnings and variance of profits reduce stock prices and changes that decrease earnings and variance of profits increase stock prices. The stock price effects via the political process of announcement of mandated procedure changes are more likely to be observable because they vary with the changes' effects on the

firms' political costs. Table 2.1 illustrates relationships of mandated accounting change and the stock prices via political process.

Table 2.1

The Stock Price Effects of Mandated Accounting Change Via Political Process

Mandated Accounting Changes	Effect on Accounting Numbers	Stock Price Effects
1. A restriction of the accounting procedures set	-Lower reported earnings and assets	-Increased
	-Higher reported earnings and assets	-Decreased
2. An expansion of the accounting procedures set	-Reducing the variance of profits	-Increased
	-Increasing the variance of profits	-Decreased

Accounting numbers are useful in estimating the securities' ***risk*** in the situation which market prices or bond ratings cannot be observed. The estimations of ***systematic risk (betas)*** and bond rating obtain from their correlation to the accounting numbers. Zmijewski and Hagerman (1981) hypothesize that

political costs vary with the firm's risk and that high-risk firms are likely to choose an earnings decreasing portfolio of procedures. Their reasoning follows two lines. First, high-risk firms have high variances of earnings changes and hence are more likely to report "large profits." Second, because of information costs, voters, politicians, and bureaucrars may not adjust for risk when considering the level of reported earnings. (Watts and Zimmerman, 1986, p.251)

Accounting numbers are used in different ways across *industries.* Besides the obvious regulatory uses of accounting numbers in financial institutions and public utilities, differences in industries' opportunity sets are likely to affect the accepted set of accounting methods. One type of studies is likely to prove useful and increase the tests' power. The studies investigating differences of investment opportunity sets (e.g., the relative amount growth opportunities of assets in place, Myer 1977), accounting policies, organizational structures, and financial policies across industries are likely to produce information useful for the modelling suggested. ***Industry type*** is another factor that may be systematically different between the test firm and the rest of the population. It has been noted that firms in the same industry tend to make accounting changes at the same time (William Ricks, 1982, pp. 92-93).

2.4.3 Variables selected in the tests

Tests of the theories in this study are conducted to investigate whether some other theoretical factors or variables are involved in the stock price effects. Table 2.2 contains the a summary of factors or variables used in the tests.

Table 2.2

Variables Used in The Tests of Theories

Tests	Variables
a. Stock price effects test implying the EMH of naive-investors.	- Accounting numbers changed: - income effect, - cumulative effect.
b. Wealth transfers via debt contract (contract process).	- Change in tightness of debt covenants: - debt/equity ratios.
c. Wealth transfers via political process.	- Political costs: - size : total assets, - risk : betas.
d. Difference across industries.	- Industry types.

2.5 Literature of Accounting Change Studies

2.5.1 Two categories of accounting change studies

It is difficult to design a powerful test of stock price effects of voluntary change than those of mandated changes because stock price effects of voluntary changes are more observable than those of mandated changes. Voluntary changes imply that managers take voluntary actions to change accounting procedures, and there are reasons to believe that such actions are relatively easy to predict. Therefore, market can anticipate in advance voluntary changes because managers' actions are easy to predict. Market anticipation allows stock prices to have already adjusted before announcement, making it diffult to detect stock price effect at time of voluntary changes. Consequently, it is difficult to isolate the aspects of discretionary accouting changes which are most closely related to concurrent market behavior (Harrison, 1977).

With respect to nondiscretionary or mandated accounting ehanges, managers are forced to follow a set of accounting procedures adoped by authoritive bodies. However, actions of standard setting bodies are less predictable because they are composed of various parties. Market cannot easily anticipates

mandated changes beforehand, hence, it is a more powerful test associated with market expectation.

2.5.2 Empirical studies of the economic impacts of accounting regulations

The majority of past studies aimed at detecting the stock price effects of particular accounting regulations. Appendix A illustrates key features of 27 capital market studies relating to 15 Accounting Regulations. They are primarily concerned with detection of the economic effects of accounting regulations without explicitly testing theories for the existence of such effects.

Appendix B contains three studies that attempted to test theories on whether particular accounting regulations have economic consequences. Those studies have tested theories to see how accounting regulations affect investor wealth, several suggesting that the agency theory can be used to derive many hypotheses. Based on this theory, they can predict that unexpected accounting regulations can change the costs and nature of existing debt covenants and, the wealth of stockholders and bondholders.