Seasonality and Small-firm Effect on Dealer Spreads in Stock Exchange of Thailand from 1996-2000

By

VILASINEE PUTHAI

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of

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Graduate School of Business
Assumption University
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ABSTRACT

In recent years, the tests of various asset-pricing models have disclosed a variety of anomalies or regularities in data. The fact that small companies have higher average stock returns than large companies has been long established. This fact is referred to as "small firm effect". Many financial researchers try to find out the explanation of this small firm effect during January month. The dealer spread has brought into financial research as a possible explanation of this small firm effect. So, several recent empirical studies in bid/ask spreads focus on the role that spreads play in asset pricing and also propose that these bid/ask spreads, as a part of transaction costs, may have a seasonal component.

This study examines the seasonal behavior of proportional dealer spreads for SET (Stock Exchange of Thailand) common stocks during the period 1996-2000. This research also focuses on the behavior of dealer spreads during tun-of-the-year period and the relationship between dealer spreads and firm size in these 5-year periods (1996-2000). The study uses statistical tests based on the sample data collected from 5-year SET database and two versions I-SIMS CDs.

The results of analysis indicate that there is no seasonal pattern in SET bid/ask spreads during the period of 1996 to 2000. Also, the turn-of-the-year period has no significant effect on SET bid/ask spreads during these five-year periods. However, the firm size factor has a significant effect on SET dealer spreads during this period.

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Any error in this paper is my sole responsibility.

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CHAPTER I

GENERALITIES OF THE STUDY

1.1 Background of the study

The dealer spread or **bid/ask spread** is the difference between the bid price and ask price. In equity market, dealer is the one who stands ready to trade for his own account and thus, he provides the convenience of being to trade immediately to the public. However, by giving the convenience to the public in security trading, dealer also incurs costs of holding an inventory of securities, fixed costs of handling each order, and costs due to adverse information owned by those that trade with him. To compensate for these costs, a dealer usually sells securities at the ask or offer price that is above the "true price" and buys the securities at the bid price, which is below the "true price". The "true price" is the price that would exist, in dealer opinion, in the absence of transaction costs.

Seasonality is defined as the patterns repeated from year to year. The studies of seasonality in stock markets have started since a number of stock market anomalies were found by many of the financial researchers in several share markets. The first empirical anomalies found in the modern capital markets presented in the work of Officer (1975) on seasonal for Australian share market. Later, these anomalies were also found in US equity market and London share market. Then, Amihud and Mendelson (1986), who proposed that average portfolio risk-adjusted returns are positively associated with bid-ask spreads, suggested in their study that liquidity

(transaction costs) may have a seasonal component. Since, bid-ask spread is a part of the transaction costs, so it is also expected to have such seasonality.

Small-firm effect represents the fact that small firms have higher average stock returns than large firms do. Banz (1981), who proposed an anomaly in the performance of equity returns when classified by firm size, brought "firm size" into the studies of stock market anomalies. More and more empirical researches have been conducted under this "anomalies" topic until finally, Keim (1983) found that this "small-firm effect" was largest pronounced in early January. According to the work of Stoll and Whaley (1983) that transaction costs partially explain the small-firm effect, bid/ask spread, which is a part of transaction costs, was also believed to have a relation with the "firm size". The recent work of Fortin, Grube, and Joy in 1989 showed that the spreads for the smallest firm quintile are extremely large compare with the spreads of the largest firm quintile.

1.1.1 In the literature

The recent work of Eleswarapu and Reinganum in 1993 proposed the paper of investigating the seasonal behavior of the liquidity premium in asset pricing. Bid/ask spreads were used as a representative of liquidity premium and thus, the purpose of this paper was to test the relation between average returns and bid-ask spreads in January and in Non-January months by using the data collected from NYSE firms. The result of the study was shown that as one moves from low-spread to high-spread securities, the average returns increase, which is consistent with a positive liquidity premium. However, for non-January months, the relation between average returns and spread

seems to be virtually flat. Eleswarapu and Reinganum also suggested that the size effect was significant, even after controlling for spreads. Also, in 1989, Fortin, Grube, and Joy examined the seasonal behavior of proportional dealer spreads for OTC NASDAQ common stocks and the results indicated that there was seasonality in dealer spreads. The evidence showed that the spreads tend to be larger in the second half of the calendar year and peaking in December. During the turn-of-the-year period, spreads tend to peak in mid-to-late December and then decline during January. Since, there were the empirical studies conducted in US equity market like NYSE and NASDAQ, which shown the evidence of "seasonality" in bid/ask spreads. Therefore, it is very interesting and important to find out whether or not this "seasonal behavior" in dealer spread exist in Thai stock market or the Stock Exchange of Thailand (SET). I believe that this research will be useful for the future study as an important evidence of stock market anomalies in Thai capital market. Moreover, the pattern of bid/ask spread in Thai stock market can be an important guideline or source for the investors in making appropriate investment decisions.

1.1.2 Background of the Stock Exchange of Thailand (SET)

Due to a rapid growth in a number of industrial enterprises in the late of 1960's, the market for industrial and commercial capital was not adequately served. To promote such needs, the government started to realize the importance of an organized capital market. So, the Second National Economic and Social Development Plan or NESDP (1967-1971) proposed, for the first time, a plan for the establishment of such a market, with appropriate facilities and procedure for security trading. In 1969, the government obtained the service of Sidney M. Robbins of Columbia University, a

former Chief Economist of Securities and Exchange Commission (SEC) in United States, to study the development channels of the Thai capital market. The report produced by Professor Robbins, "A capital market in Thailand', finally became the master plan for development of The Thai capital market. After that, in May 1974, the long-await legislation establishing "Securities Exchange of Thailand" was enacted, which was followed by revisions to the Revenue Code at the end of the year, allowing the investment of savings in the capital market. Then, on April 30, 1975, "The Securities Exchange of Thailand" officially started trading and its name was formally changed to "The Stock Exchange of Thailand" (SET) finally on January 1,1991.

For trading system and dealer spread system, SET replaced its traditional open auction floor trading, with a fully-computerized trading system known as the "Automated System for stock exchange of Thailand" or ASSET system. The ASSET system has had the capacity to handle up to 6,000,000 orders per day and has offered two trading alternatives: Automated Order Matching (AOM) and Screen-based trading or Put Through (PT) transactions. Under AOM system, the ASSET system will implement an order queuing process and arrange the orders according to price-and-time priority, when brokerage houses electronically send buy or sell orders from their offices to the SET's trading computer. Through PT transactions, the ASSET system will provide a facility for brokers to advertise their buy or sell interests by announcing bid or offer prices but these must be quoted through a computer screen and in line with the price spread rules of the SET. The spreads will be various from 0.1 Baht to 6 Baht according to the "market price level" (see table 3.3). Nevertheless, the interested members can also deal directly with each other and the prices may be adjusted during

the negotiation. So, the effective executed price may not follow price-spread rules and may not be the same as that advertised.

1.2 Statement of the problem

Making an effective decision is one of the important functions in management. As a financial manager, an effective and efficient investment decision is required, and therefore both costs and returns of investment must be carefully calculated and considered. As well as in buying and selling stocks, the returns from stocks and the transaction costs are the important elements in making decision of which stocks to buy or sell and how much to be invested in. Bid/ask spreads or dealer spreads, as a part of the transaction costs, thus play a significant role in the investment decision of managers. So, this study is broadly focused on finding out what is the yearly pattern of bid/ask spread in Thai stock market and the movements of dealer spreads during a year. Since, the stocks in the equity market can be classified based on the values of stocks as small-firm stocks or large-firm stocks, so this research will also put an interest in finding out how bid/ask spread relate to the firm size.

1.3 Research Objectives

The purpose of this study is to examine the seasonal behavior of proportional dealer spreads for SET common stock and also to look specifically in the change of spread during the turn-of-the-year period. This study also gives the interest to the relationship between dealer spread behavior and firm size.

To be more specific, the objectives are as follows:

1. To identify whether or not the proportional dealer spreads for SET common stock **exhibit** calendar year seasonality.
2. To determine whether or not the proportional dealer spreads for SET common stock **change significantly** during the turn-of-the-year.
3. To determine whether there is the relationship between SET dealer spread and **firm size**.

1.4 Scope of the study

This study mainly focus on the behavior of stock spreads in Thai stock market. The study will be based on the time series data of bid/ask spreads provided by the Stock Exchange of Thailand (SET), which is the main dependent variable in this study. The main independent variables will consist of the seasonal model and firm size. The firm size will be classified based on the values of each stock. Daily bid price and offer price, prepared by SET from January 1st, 1996 to December 31st, 2000, will be used as the main data to compute for proportional bid/ask spread.

1.5 Limitations of the study

Since this study is base on bid/ask spread data collected from the Stock Exchange of Thailand (SET) during the specific time span (January 1st, 1996 to December 31st, 2000), so the conclusion of this study will be implied on this time span only. The conclusion of this research is focused on the Thai stock market, so it does not imply for any stock market in other countries as well as any other Thai financial market like bond market and other money market. Also, this study is conducted under the assumption

that the seasonal factor and the firm-size factor are major influences of SET bid/ask spreads, while other variables that may have an effect on or related to bid/ask spreads are assuming to be constant.

1.6 Significance of the study

The results of this study, seasonal behavior in SET stock spread, will be useful to both investors and researchers. Bid/ask spreads, as a part of transaction cost, can be considered as a cost of buying stock of the investor. So, by knowing and seeing the clearer pattern of bid/ask spreads during the calendar year, can help the investors in making more accurate decisions of when to buy and sell stock during the year. Therefore, the seasonal or the yearly pattern of bid/ask spread will be useful for the investors and managers as the investors to make a more effective investment decision. The clearer understanding of the relationship between bid/ask spread and firm-size will help investors and managers in solving the problem of selecting or setting the appropriated investment strategies by knowing how and which stocks to buy, which is very important in their investment decision. Also, the study of broadly seasonal behavior of dealer spreads across the full calendar year, help the investors seeing the movement of dealer spread pattern, which may relate to many factors in stock market such as stock price and stock return. Moreover, the results of the study, whether the seasonal pattern will exist in Thai stock market or not, can be presented as another evidence as the case study of Thailand, which will be useful for the further studies related to the anomalies of stock. Also, the result will be the indicator that whether or not the explanation in the past is consistent with the Thai stock market behavior.

1.7 Definition of Terms

Sesonality is changes that occur within a year in a regular annual pattern. (Pringle and Harris, 1984)

Spread is difference between the proceeds an issuer of a new security receives and the price paid by the public for the issue. (Rao, 1989)

Small firm effect refers to the fact that small companies have higher average stock returns than large companies. (Dimson, 1988)

Turn-of-the-year effect refers to the fact that much of the excess performance (of small firm) or the small-firm effect can be attributed to the initial trading day of January. (Dimson 1988)

CHAPTER II

LITERATURE REVIEW

This chapter would be mainly discussed about the previous studies of the empirical researches and papers. The empirical works discussed in this chapter will be related to the thesis topic, **Seasonality and Small-firm effect in SET Dealer Spreads**, and therefore can provide a strong background and explanation of the study. These researched papers are also supported by the strong statistical evidences. The first section of this chapter would be contained the review of literature about the spread in stock exchange. The second section would be focused on the discussion of many theories and studies related to the "seasonal behavior of dealer spreads", and also consisted of the discussions about "turn-of-the-year period", which is the subpart of the seasonality question. Therefore, it is very interesting to look closely at spreads during late December and early January. For the third part, the previous empirical researches that present as the evidence of seasonality of dealer spreads in other countries are discussed clearly. The empirical studies in small-firm effect will be presented in the forth part of this chapter and the chapter summary will be provided in the last part.

2.1 Spread in stock exchange

2.1.1 Theory on bid/ask spreads

Morse and Ushman (1983) review about the theoretical research on bid/ask spreads that the theories, which explain bid/ask spread, are based on partial equilibrium studies. Starting with the work of **Garman (1976)**, which explain in his work that if the

dealer does not change the bid/ask spread to compensate for the changes in inventory levels, the dealer's inventory will eventually be driven either to zero or to a very large amount.

Bradfield (1979) also shows that the dealers will tend to adjust the bid/ask prices at the end of the day to reach a preferred inventory position and avoid the risk of holding a nondiversified portfolio overnight. In the model of **Amihud and Mendelson (1980)**, bid/ask prices are monotone decreasing functions of the dealer's inventory levels and bid/ask spreads increase as the dealer moves from preferred inventory level.

Stoll (1976) finds that dealers incur information costs through the examining changes in their inventories before price declines and increases. Therefore, dealers' inventories increased before price declines and decreased before price increases, indicates a loss due to a delay in adjusting bid/ask prices to accommodate the change in equilibrium prices.

Stoll (1978) states in his study that dealers incur three types of costs, which are holding costs, order costs, and information cost. Holding cost is the compensatory costs for trading according to the requests by the publics that may not be optimal in term of the dealers' preferences and the proper diversification. Order costs are a fixed amount per transaction, which reflects the communication and handling costs. Information costs is the costs charged by the dealers because there is the possibility that some investors may have the information, which is not available for the dealers and thus, the dealers must charge an amount on each transaction that reflects the expected value of the adverse information having by those who trade with them. The dealers are compensated for these costs by selling at ask price(above the true price)and buying at

the bid price (below the true price). Stoll (1978) explains that the "true price" is the price that would, in dealer opinion, exist in the absence of transaction costs.

Ho and Stoll (1980) documents the importance of competition in a model allowing for more than one dealer in the way that more dealers lead to narrower bid/ask spreads. They also demonstrate the positive relationship between the optimal size of the dealer's bid/ask spread and the variance of the stock price, the dealer's risk aversion, and the size of transaction.

2.1.2 Empirical findings on bid/ask spread

As summarized by **Morse and Ushman (1983)**, the previous empirical studies during the end of 1960's to the end of 1970's, as summarized in Table 1 (See appendix I), show the fairly consistent results that price is positively related with the size of the bid/ask spread but negatively related with the proportional bid/ask spread, where the proportional spread represents the bid/ask spread divided by price. **Stoll and Whaley (1983)** states that the proportional spread represents compensation to the dealer on a turn-around transaction (purchase and sale) and can be calculated by:

Ask price- Bid price/(Ask price + Bid price)/2. Also, the securities that trade frequently with a large number of shareholders tend to have smaller bid/ask spreads. The competition variables seem to be negatively associated with the bid/ask spreads. Lastly, the bid/ask spreads tend to be positively related with the risk variables such as the price variance. These previous summarized empirical studies are all applied the cross-sectional multiple regression tests with the bid/ask spread as the dependent variable and four major groups of explanatory variable; price, trading characteristics, competition, and risk.

Stoll (1978) documents the positive relation between bid-ask spreads and the riskiness of the stock, the reluctance of the dealer to bear risk, the amount of informational trading, the level of order costs and lack of competition among dealers in a stock. His study is dealing with the pricing of security dealer services and it is an empirical study of NASDAQ stocks. Stoll states that his paper is different from the earlier studies in that it is based on an explicit theory of dealer costs and it is also conducted on a larger body of data, which includes more of the relevant variables. Moreover, his work develops and tests a model of the determinants of the number of dealers in a stock and includes a number of variables not considered by **Tinic and West (1972)**.

The results show that trading volume is negatively related to the spread. Since, the trading volume is also inversely related to the amount of information trading in the way that trading is large relative to the shares outstanding if certain investors believe they have information that other investors and the dealers in the stock do not have. Therefore, Stoll (1978) concludes that the amount of information trading has a large and significant positive effect on spread. The results also show the negative relationship between stock price and proportional spread, which Stoll thinks that it is consistent with a positive coefficient less than one found in the other studies using dollar spread (actual spread) as the dependent variable. In the last part of the study, Stoll also concludes about the inverse relationship between spread and stock price that since, the fixed order costs (part of the dealer cost) per trade would be spread across more dollars in high priced stocks, so the greater the price, the percentage spread would be lower.

In 1983, **Morse and Ushman (1983)** study the relationship between information announcements and bid ask spread. The purpose of their study is to use the changes in bid/ask spread to examine the relationship between information and the market microstructure. The meaning of "temporal microstructure" given by **Garman (1976)** that it is the moment-to-moment trading activities in asset markets or the transaction-to-transaction behavior of price, volume, dealer inventories, and the market states. In the dealer market, the transaction prices tend to be influenced by the bid/ask, which declared by the dealer in stead of the direct result of supply and demand pressures like in the auction market. The size of bid/ask spread may be influenced by many factors including insider trading, total trading volume, and price variance, which are associated with information announcement. So, Morse and Ushman is expected to find the changes in bid/ask spread during the period of information announcement in their study also. Their study is focused on the bid/ask spread changes surrounding quarterly announcement and large price changes, in which the large price change are used to represent for the release of information. Since the variance of stock price and the possibility of private information existing tend to be increased by the effect of public information announcement and these two factors are positively related with bid/ask spread, so the bid/ask spread should also increase on the day surrounding public information announcements.

This result can lead to the conclusion that there is an association between information and changes in bid/ask spreads since, there is a significant increases in size of bid/ask spread on the day of the large price changes, which represent for the release of information. The possible explanation for this result are first, the dealers may try to compensate for their riskier position of the increasing in price variance due to the

information signal release by increasing bid/ask spreads. The second possible explanation is that the dealers may increase bid/ask spread in order to compensate for trading with privately informed investors. This study of Morse and Ushman is also consistent with the information-release/insider- trading hypothesis, which is one of the frameworks used to explain the "turn-of-the-year effect" or " January effect" and this will be discussed in detail in the second part of this chapter.

In 1986, **Amihud and Mendelson (1986)** study the effect of the bid-ask spread on asset pricing. They use bid-ask spreads to represent the illliquidity. They state in their study that illiquidity can be measured by the cost of immediate execution in which, the investors can choose to wait to transact at a favorable price or, they can either insist on immediate execution at the current bid or ask price. So the spread between the bid and ask prices is considered as a natural measure of illiquidity.

Amihud and Mendelson (1986) test the relationship between stock returns, relative risk(β), and spread. Amihud and Mendelson state that although, the transacting also includes brokerage commissions, but since Stoll and Whaley (1983) show that the correlation between portfolio spreads and brokerage fees is 0.996, so they omit the latter.

The result of correlation coefficient between portfolio excess return, portfolio beta, and the spread show that both beta and spread are positively correlated with excess return and also signify the high positive correlation between Beta and the spread. In the later part, Amihud and Mendelson also bring "firm size" as another one variable to test whether the "size effect" can explain or relate to their finding or not. The result shows that their results on the return-spread relation cannot be explained by

a 'size effect' even if the latter exists. Thus, they conclude that any 'size effect' may be a consequence of a spread effect in which, the firm size may serve as the proxy of liquidity, and their return-spread relation represents a rational response by an efficient market to the existence of the spread.

In the conclusion part, Amihud and Mendelson conclude their study in four main points, the first one is that market-observed average returns are an increasing function of the spread, the second point is that asset returns to their holder, net of trading cost, increase with the spread. Thirdly, there is a clientele effect, whereby stocks with higher spreads are held by investors with longer holding periods. For the last point, due to the clientele effect, returns on higher-spread stocks are less spread-sensitive, giving rise to a concave return-spread relation.

2.2 Theory in seasonality and turn-of-the-year effect

2.2.1 Seasonality in spread

The book "Stock Market Anomalies" edited by **Elroy Dimson (1988)** has collected and summarized many empirical evidences of stock market anomalies, including the intra-month seasonality in stock returns, the small-firm effect, and turn-of-the-year effect. The book states that the first empirical anomalies for modern capital markets shown in the work of **Officer (1975)** on reported stock return sesonality in Australian capital market. Then, stock anomalies are also later found by **Rozeff and Kinney (1976)** in the case of the US market and **Richards (1978)** in UK and other European markets. The monthly seasonal in stock returns is shown in the way that the mean return for stocks is positive only for days immediately before and during the first half of calendar months, and it does not distinguish from zero for the days during the

last half of the month. During that time, this anomalies attract only a little attention from the financial researchers until the " firm size anomaly" is first reported by **Banz (1981)**. Then, **Kiem (1983)** reports that nearly 50 percent of size effect is due to January abnormal returns and that more than 50 percent of this January premium attributes to the first week of January. From that time on, the January effect and the relation between the January effect and the small firm effect have become the interesting topics to be explored.

Then, in 1986, the studies of the seasonality in spread begin with the empirical work of **Amihud and Mendelson (1986)** who document that market-observed expected return is an increase and concave function of the spread and also suggest that the bid/ask spreads may have a seasonal component. So, they propose the hypothesis in their study that relative spreads (liquidity) have seasonal, but they do not test it at that time because the data (monthly bid-ask spreads) are not available. However, the hypothesis proposed by **Amihud and Mendelson (1986)** that relative spreads have seasonal is later be tested by **Fortin, Grube, and Joy (1989)** and **Eleswarapu and Reinganum (1993)**, in which the results of both studies show the strong seasonal component of dealer spreads and the details will be discussed in the third part of this chapter.

2.2.2 Turn-of-the year effect

Bergh, Wessels and Wijmenga state in the book named "stock market anomalies"(1988) that the turn-of-the-year effect, or also known as January effect is extensively studied in the literature. Several empirical evidences show the negative relation between stock's turn-of-the-year-effect and stock's previous return. This is

generally interpreted as providing support for the hypothesis that January effect is caused by tax-loss selling that temporarily depresses stock prices at the end of the fiscal year. Then, when the stock prices start to return to the regular level, the rebound of the stock prices to their normal level is recorded as the turn-of-the-year effect.

Ritter (1988) presents the evidence that the ratio of stock purchases to sales by individual investors displays a seasonal pattern, with individual having a below-normal buy/sell ratio in late December and an above-normal ratio in early January. And forty-six percent of the year-to-year variation in the turn-of-the-year effect during 1971-1985 is explained by this the year-to-year variation in the early January buy/sell ratio. Ritter (1988) studies the buying and selling behavior of individual investors at the turn of the year. He presents the great and excellent review of literature in his study, which is very useful to this thesis study and will be discussed in detail in the latter part.

Ritter (1988) explains turn-of-the-year effect as follow:

> The turn-of-the-year effect refer to the phenomenon that small stocks have unusually high returns during the period beginning on the last trading day of December and continuing to January, with the effect becoming progressively less pronounced as the month wears on. (pp. 701)

Ritter (1988) refers back to the empirical study of **Rozeff and Kinney (1976)** that their study is first documented the "January effect", that the average stock returns are higher in January than in other months. Rozeff and Kinney find that the average stock return for January is 3.48 percent, but for other eleven months, the stock return is only 0.42 percent per month. Ritter states that there are a number of frameworks, which

are proposed to explain the turn-of-the-year effect, including; (1) the omitted-risk-factor hypothesis, (2) the tax-loss-selling hypothesis, (3) the information-release/insider-trading hypothesis, and (4) the seasonality-of-the-risk-return hypothesis.

For the first one, the omitted-risk-factor hypothesis, **Banz (1981)** first present the evidence that small stocks have usually high returns. Banz focuses the explanation of the "small-firm effect" on the possibility of an omitted price risk factor. **Ross (1976)** explains that a priced risk factor is a source of risk that the market rewards people for bearing via higher equilibrium expected return. Banz also finds that the differences in CAPM betas between large and small firms cannot explain the high realized returns on small firms. This leads to the statements about "misspecification of the CAPM" in many of academic researches relate to the small-firm effect.

> Ritter (1988) explains about this argument as follow:
>
> The logic of this argument is that the Sharpe-Lintner CAPM is not an accurate description of the factors generating equilibrium asset returns, that the market compensates investors for bearing other risks that are not captured by the market return, and that small firms are more sensitive to these other risks.(pp. 703)

The tax-loss-selling hypothesis, the second framework used to explain turn-of-the-year effect, is proposed by **Roll (1983)** to identify the phenomenon of high returns on small firms in term of " turn-of-the-year effect" and he focuses his research attention immediately on the "tax-loss-selling hypothesis". Roll (1983) uses the tax-loss-selling hypothesis to explain turn-of-the-year effect in the way that, since the investors sell

their stocks at year ended to realize capital losses that may be for tax purpose, so there is a downward price pressure on stocks that have already declined during the year. Then after the year ended, this price pressure is relieved and the returns during next few days are large due to those same stocks jump back up to their equilibrium values. However, the tax-loss-selling hypothesis fails to explain the high January returns for small stocks that have not been subject to tax-loss-selling pressure.

For insider/trading /information-release hypothesis, Ritter states that the reason behind this hypothesis is that because most of the firms have December 31 as their fiscal year, management becomes aware of non-public information in early January. According to this, some managers try to take advantage of this situation by using this information to involve in trading in which the investors on the other side of the transaction lose. Therefore, investors demand a higher required rate of return to protect themselves from losses and this can lead to January effect. However, this hypothesis seems to be unable to explain the observe pattern that small firms that had previously experienced price declines have much higher January returns, on average, than other firms.

For the last one, the seasonal-of-the-risk-return hypothesis explains turn-of-the-year effect in the way that there is a January seasonal in the risk-return relation. This hypothesis is pointed out by Rozeff and Kinney (1976), which apply a traditional CAPM framework in which risk is measured by beta, the slope of coefficients in the **Fama and MacBeth (1973)** study display a January seasonal. Also, **Tinic and West (1984)** report by applying the Fama and MacBeth methodology for the period of 1935-1982, the slope of coefficient for the market risk premium is .0471 in January, but only .0038 for the rest of the year.

Ritter (1988) then explain the concept of "parking-the-proceeds hypothesis", which can be viewed as a generalization of the tax-loss-selling hypothesis. The study of Ritter (1988) is grounded on the basic of this "parking-the-proceeds hypothesis"

Ritter (1988) explains Parking-the-proceeds hypothesis as follow:

> Parking-the-proceeds hypothesis is that the turn-of-the-year effect is caused by the buying and selling behavior of individual investors. As the end of the year approaches, individuals sell securities in order to realize the losses for tax purposes. Some of the proceeds from the sales are not immediately invested, but instead "parked" until January. When these funds are reinvested, the buying pressure pushes up the price of the small firms in which individual investors typically invest.(pp.705)

Ritter also proposes that there are three requirements for parking-the-proceeds hypothesis to result in turn-of-the-year effect. The firstly, when individuals buy stocks, they buy a disproportionate number of small stocks, secondly, the price of these small stocks is affected by buying pressure, and thirdly, individuals are net buyers of small stocks in early January, because they can use the proceeds remaining from December's tax motivated sales.

The data used to investigate the buying and selling behavior of individuals at the turn-of-the-year are the daily buy/sell ratios of the cash- account customers of nation's largest retail brokerage firm, Merrill Lynch, Pierce, Fenner and Smith. The sample periods are fifteen turn-of-the-year periods from December 17, 1970 through December 16, 1985.

The difference-mean test is used to run the test. The t-statistic means show that the buy/sell ratios of are, on average, low in late December and high in early January. Also, OLS regression is used to run to test the relationship between the average excess return on small stocks during the nine-day period beginning on the first trading day of January, as dependent variable, and the average daily buy/sell ratio during the first nine trading day of January, as explanatory variable. The result shows that the year-to-year behavior of this buy/sell ratio is strongly related to the magnitude of the turn-of-the-year effect.

In the last part, Ritter (1988) concludes that in order to realize losses for tax purposes, individuals sell stocks that have dropped in price during December. However, they do not immediately invest their proceeds from December's sale. Instead, they wait until January when they can combine the proceeds from December's sale with year-end bonuses and the proceeds from sales of the larger firm on which long-term capital gains are being realized. Therefore, this huge amount of money will finally enlarge the January buying of these individual investors.

2.3 Empirical findings on the seasonality of bid/ask spread

In 1989, the hypotheses suggested by Amihud and Mendelson that relative spreads (liquidity) have seasonal is tested by **Fortin, Grube, and Joy (1989)**. The paper of Fortin, Grube, and Joy (1989) is considered as the main guiding paper to this thesis work in term of data collected, methodology used, and the previous useful referred empirical studies.

The main purpose of the study of Fortin, Grube, and Joy (1989) is to examine the seasonal behavior of proportional dealer spreads for OTC NASDAQ common

stocks. However, their analysis is design to highlight spread behavior that is relate to firm size, which is considered as an on going finance research topic. Their study also gives the special attention to the behavior of dealer spreads during the December/January turn-of-the-year period, so the results of this study will deal partly with the anomaly question.

The data are taken from the NASDAQ Historical Data File prepared by the Center for Research in Security Prices (CRSP). The sample period used is the period January1, 1973, to December 31, 1985. However, the spreads collected during the sample period are changed by definition. That is in the first part of the sample period, the spread is 'median spread', but for the second part of sample period, the spread is 'inside spread' that is the difference between the best possible daily closing bid and ask prices available. Since the sample spreads are different by definition, Fortin, Grube, and Joy then perform separate, but identical statistical test on the two data subsets. Also, because the study is concern with the firm size, they thus, group firms into five different quintiles base on equity market value. After the grouping, the result shows in both two data subsets that the spreads for the smallest firms in the sample in the first quintile are extremely large compare with other quintiles.

In the statistical analysis part, Fortin, Grube, and Joy divide into two parts, the first part is to examine spread seasonality in a broad context across the full calendar year. The statistical methodology applied for examination of the first part is a commonly used "monthly dummy regression" approach that is design to highlight seasonality in spread. For the second part of the study, which they narrowly focus on spread behavior at the turn-of-the-year, therefore, they employ "simple differences means tests".

Although, the result of two different subset of sample is not identical but there are important commonalties. The results show the 'strong' evidence of seasonality that is significant at the 0.05 level in both two subsets of the sample. So, in the last part of the study, Fortin, Grube, and Joy (1989) conclude that there is seasonality in spread. Spreads tend to increase persistently during the calendar year for all except for the smallest firms that show several negative coefficients in statistical results, which imply seasonally low spreads from February through the summer months. They also state that there is a turn-of-the-year effect in dealer spreads for all size classes of firms and that spreads tend to peak in mid-to late December and then decline during the remainder of that month and January.

Another more recent work that concerns with the seasonal behavior of spreads is the empirical study of **Eleswarapu and Reinganum (1993)**. Their paper is designed to investigate the seasonal behavior of the liquidity premium in asset pricing. Two objectives are proposed in their study, the first objective is to examine the relation between average returns and bid ask spreads in January and in non-January months. The second objective is to determine whether the restrictive portfolio selection technique of Amuhud and Mendelson (1986) can lead to spurious empirical conclusions.

The data are the monthly returns, betas, and the relative bid-ask spread collected from the types provided by the Center for Research in Security Price. The sample period is 1961-1990 using NYSE firms. The relative spread used in the paper is the dollar bid-ask spread divided by the average of the bid and ask prices. The stocks are also ranked and divided into equal seven groups based on the average spread. Then,

each of these seven groups is divided further into seven equal subgroups based on the estimated beta coefficient, which finally produce 49 test portfolios with approximately equal number of stocks. This portfolio formation technique is applied the same criteria of Amihud and Mendelson. The number of firms included in each test period ranges from 645 to 929. The monthly cross-sectional regressions are applied to test the relation between stock returns, beta, and relative spread.

The results showed by descriptive statistics present that spreads, betas, and market value of equity are dependent. (Note that in the analysis part, the descriptive statistics also present the average value of market equity in each portfolio). Low-spread stocks tend to be low beta stocks. Also, spreads tend to be negatively related with the market value of equity that is the smaller the spread, the larger the firm value. The empirical results show that in January, as one moves from low-spread to high-spread securities, the average returns increase, which is consistent with a positive liquidity premium. In contrast, for the non-January months, the relation between average returns and spread appears virtually flat.

For the size-effect test, Eleswarapu and Reinganum modify the portfolio by allow firms to be delisted in middle of a test year to avoid a potential survivorship bias, which is different from Amihud and Mendelson (1986) test. In general, this new formed portfolios have the same characteristics with those that formed by Amihud and Mendelson portfolio formation technique. However, these portfolios now have smaller-size firms with larger average bid-ask spreads. After running the new modified portfolios through cross-sectional regression, the result is different from the findings of Amihud and Mendelson. With the enlarged sample, the results show that in non-

January month, the liquidity premium is negative, though, in January month the liquidity premium is still reliably positive.

Eleswarapu and Reinganum (1993) conclude in the last part that the evidence of their study suggests a strong seasonal component on the investigation of seasonal behavior of the liquidity premium in asset pricing. That is when only the January months are considered, the liquidity premium and beta-risk premium are estimated to be positive and reliably different from zero, but for non-January months, the point estimates of the liquidity premium are negative. Also, different from the findings of Amihud and Mendelson (1986), their study suggest that the size effect is significant, even after controlling for spreads.

2.4 Small firm effect

More recently, several studies and researches related to dealer spread literature focused mainly on the role that spread play in asset pricing. Starting with the recent empirical study by **Banz (1981) and Reinganum (1981)** that signifies the abnormally large risk-adjusted returns for small firms listed on New York Stock Exchange (NYSE) and the American Stock Exchange (AMEX). **Stoll and Whaley (1983)** states that these abnormal returns can imply either the market is inefficient, or the single-period, two parameter capital asset pricing model (CAPM) of Sharpe (1964), Lintner (1965) and Black (1972) on which their empirical tests are based is misspecified, or even both. They believe that the market is inefficient only if it is possible for the investors to earn abnormal risk-adjusted returns net of all transaction costs with the currently available information. So, Stoll and Whaley considers "transaction costs" as a factor that can be used to explain these abnormal returns. They simply explain that the studies of Banz

and Reinganum are based on gross return, which includes the transaction costs in their computation. The investor, who invests in a small firm portfolio, has to face the higher transaction cost than the one who chooses to invest in similar large firm position. This happens due to the generally higher proportional spread of small firms because of their infrequent trading activity and risk, and also the broker's commission rate is an inverse function of price per share. So, transaction costs, which consists of both the dealer's bid-ask spread and the broker's commission, will be probably higher for the stock of small firm cause by the higher dealer spread and the broker's commission.

To perform the test, bid and ask prices are collected for each NYSE stock for the last trading day of each year and calculate for proportional spread. In the study, Stoll and Whaley use the sample of NYSE common stocks trade during the period of January 1955 through December 1979. First, They assess the market value effect by forming 10 portfolios of NYSE stocks. After estimating the market model regression, the result shows that both before and after the adjusting of the risk, the smallest firms outperform the largest firms by about 13 percent and 12 percent respectively. That is the mean monthly portfolio return tends to be increase as the mean total market value decrease. Without any consideration of the transaction cost, it is likely to be that an investor can earn abnormal return from the investment in low market value or low price per share stock. Nevertheless, an investor still has to face a huge amount of out-of-pocket transaction costs, which include both dealer's bid-ask spread and the broker's commission. Therefore, Stoll and Whaley perform the study to test whether the differences of firm size can explain the small firm effect or not.

Comission rate on a transaction is calculated from the minimum commission rate schedule available in the NYSE fact book. Then, they test for the relationship

between market value and transaction cost during the sample period, and find that both the relative spread and the commission rate decrease as the market value of stock in each portfolio increase, which implies that the larger firm portfolio position, the lower the transaction cost.

For the next part, Stoll and Whaley evaluate the effect of transaction costs on the market value anomaly. The monthly stock returns are adjusted for the transaction costs and formed into 10 portfolios as before-transaction-cost analysis and adjusted for the risk. The result shows that the market value effect is reversed when the transaction costs are considered and the largest firms outperform the smallest firms by about seventeen percent throughout the period of 1960 to 1979.

However, when the investment horizon is brought into the analysis, it appears that a longer holding period will tend to reduce the negative returns of small firms. So, in the last part of the study, Stoll and Whaley perform the test to check the effect of changing in holding period by using 2-month, 4month, 6-month and 12-month holding period returns. The result is as they expected, as the investment horizon increases, the after-transaction-cost abnormal return for the small firm portfolio does become positive.

The conclusion of **Stoll and Whaley (1983)** relies on the investment horizon that for the investment of one month, which the mean abnormal return for the small firm portfolio is significantly negative, the transaction cost seems to be a good explanation for the abnormal return of small firm. However, for the investment horizon between three months and one year, which the abnormal return are not significantly different from zero, the transaction cost may not be the appropriated factor to explain the abnormal return. So, Stoll and Whaley finally conclude that transaction cost, at

least, can partially explain for the abnormal return of small firm portfolio or the small firm effect.

In the same year, 1983, **Keim(1983)** provides the evidence in his empirical study that the relation between abnormal returns and size is always be negative and more pronounce in January than in any other month. Since the small firm effect or the abnormal return is more pronounced in January than in other month, so the dealer spreads are also expected to act differently during this period of time.

In the study, Keim(1983) examines the month-to-month stability of the size anomaly over seventeen-year period from 1963-1979. The data of his study are collected from the CRSP daily stock files and the sample consists of firms, which were listed on the NYSE or AMEX and had returns on the CRSP files during the entire calendar year. Then, the sample firms are ranked bases on the market value of their common equity. The market values are computed by multiplying the number of shares of common stock outstanding at year-end by the price of firm's common shares at year-end also. And finally, these yearly market values are equally divided into ten portfolios according to the size, that is portfolio one containing with the smallest firms and portfolio ten containing with the largest firms.

Keim(1983), then, test again the relation between abnormal returns and size by using security abnormal returns obtained from the CRSP daily excess return file. He computes the average daily excess returns for the size portfolios by weighting the CRSP excess returns for the security in each portfolio equally. The result shows that the average return of the portfolio of smallest forms is about 20.7 percent per year, which is greater than the return implies by its beta risk. In contrast, the portfolio of largest firms

earns a return only 9.6 percent per year, which is less than the return implies by its beta risk.

In the third part of his study, Keim(1983) investigates the month-to month stability of the size anomaly. The evidence shows in his study that the magnitude of the anomaly depends on the month of the year and that nearly fifty percent of the anomaly is concentrated in the month of January. Next, he examines whether the magnitude of the January return seasonal is related to the firm size or not by plotting graph of the negative relation between abnormal return and firm size separately for each month of the year during the period 1963-1979. The graph shows clearly that the size effect is more pronounced in January than in the other months and also that the anomaly has similar characteristics from February through December. The result is confirmed by the test of average differences (t-statistics) between daily (CRSP) excess returns (in percent) of portfolio, which are constructed from firms in the top and bottom portfolio of size (measured by market value of equity). The result of average differences (t-statistics) test shows that a monthly size effect of 15.0 percent is implied in January, which is in contrast to the implied monthly excess of return of 2.5 percent average over all months and all years. Therefore, Keim finally concludes that the size effect over the period of 1963-1979 is due to January abnormal returns, which means that this size effect is pronounced largest in January.

Since **Stoll and Whaley (1983)** conclude in their study that the transaction cost, which includes both dealer spread and brokerage commission, can partially explain the small firm effect, and this small firm effect is largest pronounced in January. So, spreads for small firm are expected to behave differently during this period also.

2.5 Summary

Dealer incurs three types of costs; holding costs, order costs, and information costs; which have to be compensated by selling at ask price (above the true price) and buying at bid price (below the true price). The difference between bid and ask price is bid/ask spread. Stock price is positively related with the size of the bid/ask spread but is negatively related with the proportional bid/ask spread, which come from bid/ask spread divided by price. Also, bid/ask spread tend to be positively associated with price variance, systematic risk, and unsystematic risk, but negatively associated with trading volume. Transaction cost can partially explain the small firm effect, so bid/ask spread as a part of the transaction cost, it is expected to be an explanation of the small firm effect phenomenon. The evidence that small firm effect is largest in early January leads to the possibility that bid/ask spreads would act something different during this period also.

Turn-of-the-year effect is the phenomenon that small stocks have unusually high returns during the period beginning on the last trading day of December and continue to January, while this effect is less pronounced for the rest period. Under the tax-loss-selling hypothesis, the turn-of-the-year effect can be explained by the behavior in buying and selling stocks of individuals. Individuals sell stocks that have dropped in price during December to realize loss for tax purpose and keep these proceeds until January to combine them with year-end bonus and then buy new stocks in a large amount.

The study of seasonality in bid/ask spread showed that, in the second half of the year, the spreads tend to be larger and peak in December. Then the spreads decline during January. The largest daily decline in spreads is on the last trading day in

December. The results show that in January, as ones move from low-spread to high-spread securities, the average returns tend to increase, which is consistent with a positive liquidity premium, while the average non-January returns do not show any such relation. That is, the relation between average returns and spread seems to be flat in the non-January months. This suggests the strong seasonal component in liquidity premium.

Table 2.1 Findings of seasonality and small-firm effect in dealer spread

AUTHOR	DEPENDENT VARIABLE	INDEPENDENT VARIABLE	FINDING
Stoll and Whaley (1983)	Mean percentage spread and Mean percentage commission rate	Market value of stocks	Both relative spread and commission rate decrease as market value of stock increase.
Fortin, Grube, and Joy (1989)	Average spreads	Average equity market value	Average spreads for a group of firms that has low average equity market value are large, while the average spreads for a group of firms that has high average equity market value are relatively small.
	Average proportional monthly spreads	Seasonal model	The results indicate there is seasonality in dealer spreads.
Eleswarapu and Reinganum (1993)	Average relative spreads	Average market value of equity	The smaller the spreads, the lager the firm value.
		Seasonal model	The evidence suggests a strong seasonal component.

CHAPTER III

THE STOCK EXCHANGE OF THAILAND

This chapter will mainly focus on the details related to the Stock Exchange of Thailand (SET). The first part of this chapter will discuss about the history of SET, how the SET has been established in the past and how SET have been developed through out the time will be clearly shown. In the second part, the organization structure and the functions of SET including the trading system will be presented. In this part, the SET"s dealer spread system and the price spread rules will also be described. The last section describes the past performance of SET, which is also related to Thai economy.

3.1 Establishment of the Stock Exchange of Thailand and its development

3.1.1 Establishment of Securities Exchange of Thailand

After the failure of BSE (Bangkok Stock Exchange) due to lack of official support and the limited understanding in equity market of investors, Thai government then had decided to take a serious action on establishing a market with appropriate facilities and procedures for securities trading. Therefore, in 1969, as recommended by the World Bank, Thai government obtained the services of Professor Sidney M. Robbins, who had previously served as Chief Economist at the United States Securities and Exchange Commission, to study the development channels of the Thai capital market. In the same year, Bank of Thailand also formed a Working Group on Capital Market Development, which was assigned the task of putting the market into action. Later, in 1970, the report namely " A capital Market in Thailand" produced by

Professor Robbins was completed and became a master plan for the development of the Thai capital market.

In 1972, the " Act for the Control of Commercial Undertakings Affecting Public Safety and Welfare" was amended to extend government control and regulation over the operations of finance and securities companies that until then had operated freely. After the amendments, in May 1974, the long-awaited legislation, which established the new Securities Exchange of Thailand (SET) was enacted. Then, at the end of the year, Revenue Code was amended to stimulate the investment of savings in the capital markets. On April 30,1975, " The Securities Exchange of Thailand" officially started trading. Finally on January 1,1991, its name was formally changed to " The Stock Exchange of Thailand" or SET.

3.1.2 Development of the Thai Stock Market

As in most developing countries, the capital market in Thailand has a relatively short history. The market has developed as an economic institution in Thailand in response to the requirements of the beginning modern economy's efforts towards industrialization. The industrialization process has substantially diversified the Kingdom's production base. In the late 1950s, the industrialization process started and was intensified by a series of National Economic and Social development Plans. The First National Economic Development Plan was launched in 1961 and then successfully followed by subsequent 5-year economic and social development plans. Consequently, the manufacturing and service sectors have expanded at impressive rates and contributed mainly to the growth of the Thai economy.

The growth in Thai economy brought the need for a new kind of institution to finance investment. Since the government maintains a policy of reliance on private initiative for industrial development, it is necessary to have an organized capital market in order to help finance long-term investment projects and this became evident during the 1960s. Therefore, the securities market was started in Thailand and then was finally developed to be the Stock Exchange of Thailand (SET).

Table 3.1 SET Development highlights

1974	20 May	The Securities Exchange of Thailand Act B.E. 2517 (1974) is promulgated, establishing the Stock Exchange of Thailand (SET)
1975	30 April	The SET begins its first trading day at offices in Bangkok's Siam Center
1983	3 May	The SET moves to new offices in Sindhorn Building on Wireless Road to allow for expansion in trading activities.
1984	26 September	The SET Act is amended. Amendments allow share certificates to be fungible items, listed companies to offer newly issued shares for sale to the public and introduce penalties for market manipulation and insider trading, among others.
1987	9 September	The foreign Broad is set up to facilitate trading by foreign investors.
1991	31 May	The Automated Trading System for the SET (ASSET) is introduced to replace traditional floor trading arrangement.
	2 August	The Price Reporting System (PRS) is introduced to report real-time trading information.
		The Stock Exchange of Thailand Information Management System (SIMS) is introduced as the SET's main computerized information management system, including securities trading and listed company information.
1992	16 March	The Securities & Exchange Act B.E. 2535 (1992) is enacted, establishing the Securities and Exchange Commission (SEC) to play a supervisory and policy formulation role in the Thai capital market.
	15 June	Scripless system is adopted by SET's Share Depository Center (SDC) to enhance efficiency in clearing and settlememt, securities depository services and share registration.
	2 July	Trading hours are extended to work sessions, morning and afternoon.
1995	1 January	Operations handling back-office and share registrar work are officially carried out by the Thailand Securities Depository Company Limited, a SET subsidiary.

	20 Febuary	The Electronic Listed Companies Information Disclosure (ELCID) System is introduced as an on-line disclosure channel for the SET's listed companies, ensuring greater efficiency in information disclosure.
1996	5 March	Information dissemination through the Internet network, http://www.set.or.th/, is introduced.
	17 June	The SET 50 index is launched.
1997	17 March	Negotiable, brokerage commission rates for sub-brokers, foreign brokers and foreign investors are introduced.
	1 December	Floor and ceiling limits for daily share price movements are extended from ±10% to ±30% of the previous day's close and a circuit breaker system is implemented for irregular price fluctuations in the market. The circuit breaker provides investors with time to consider related news and information before making investment decisions.
1998	2 March	A credit balance system is introduced to replace margin loan procedures. This will increase the financial liquidity of securities firms, in line with the separation of their finance and securities businesses, and facilitate short-selling.
	7 April	The SET moves to its new headquarters, the SET building, on Bangkok's Ratchadapisek Road.
1999	14 May	The derivatives product, the covered warrant, is introduced.

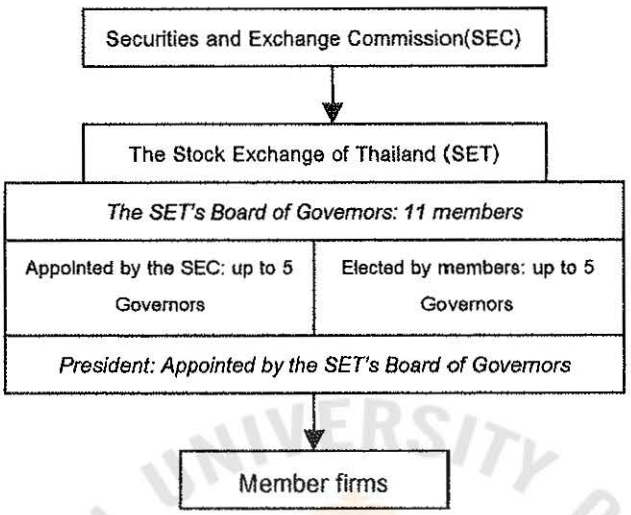
Source : The stock Market in Thailand 1999

3.2 The organization structure and function of the Stock Exchange of Thailand

3.2.1 Organization and Administration

The Stock Exchange of Thailand (SET)is a non-profit juristic entity establish with the objectives to promote the mobilization of long-term fund. SET acts as a center for the purchase and sale of securities as well as provide services related to such activities. The Stock Exchange of Thailand operates under the Securities and Exchange Act, B.E. 2534(1992) and is managed by the SET's Board of Governors that consisted of 11 members. Five Governors are appointed by the Securities and Exchange Commission (SEC), and another five Governors are elected by the SET member companies. These ten Governors, then, select the President of the SET, who is also an ex-officio member of the Board.

Figure 3.1 Regulatory Framework of the Thai Stock Market



Source: the Stock Market in Thailand 1999

The Stock Exchange of Thailand consists of 6 core operations:

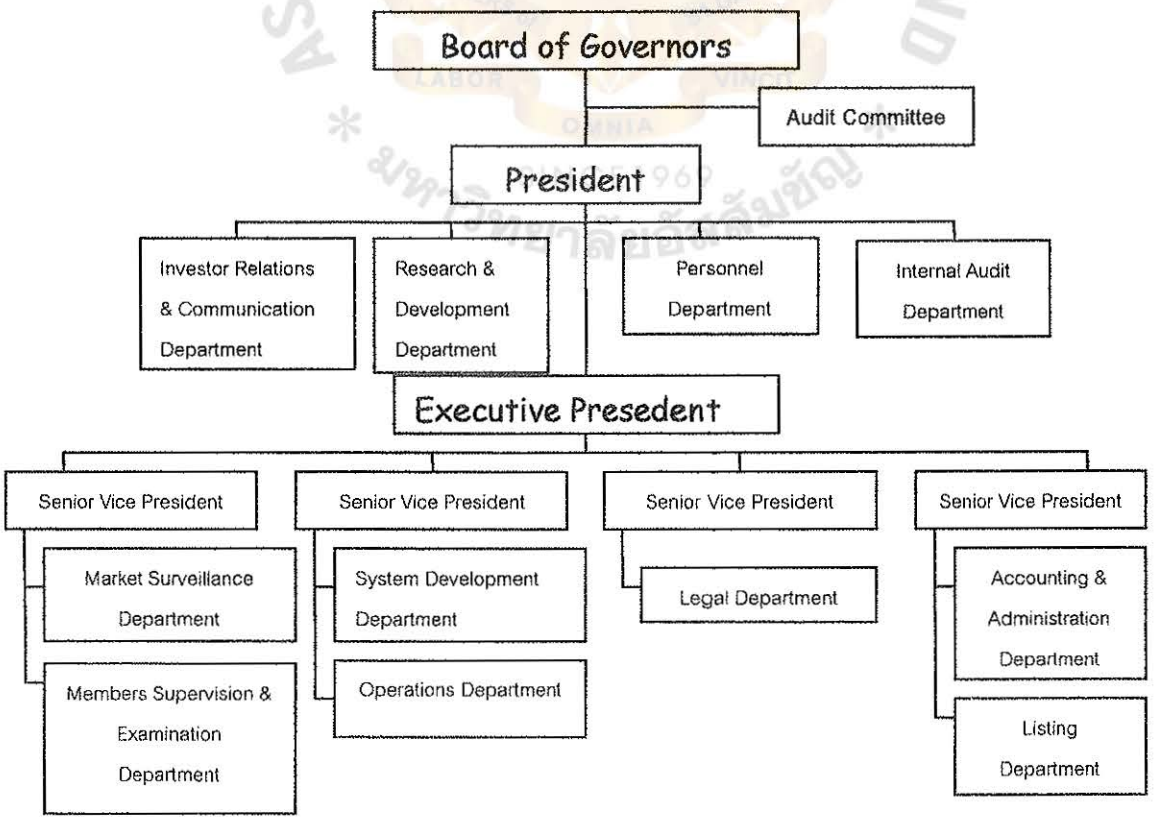
1) Securities listing
2) Supervision of listed companies and information disclosure
3) Securities trading
4) Market surveillance
5) Member supervision
6) Information dissemination and investor education

SET operates under 4 main missions:

1) To promote the mobilization of long-term funds for the benefit of national economic development.
2) To provide efficient, transparent and fair operations for a security market.
3) To provide effective protection system of investors.
4) To promote the development of the Thai capital market.

Securities traded on the SET include common stocks, preferred stocks, debentures, warrants, and unit trusts and these securities must specify holders' names and have no transfer restrictions. The issuers of listed securities must be public limited companies, which have been approved by the Securities and Exchange Commission (SEC) to offer securities for sale to the public. Also, the issuers of listed securities must be approved by the SET's Board of Governors to be listed companies. Only member companies of the SET are authorized to buy or sell securities on the Exchange. Firms may apply for membership at the SET after obtaining a securities' license from the Ministry of Finance (following recommendation from the SEC) to engage in the securities business as stockbrokers. Membership status is obtained once approval is granted by SET's Board of Governors.

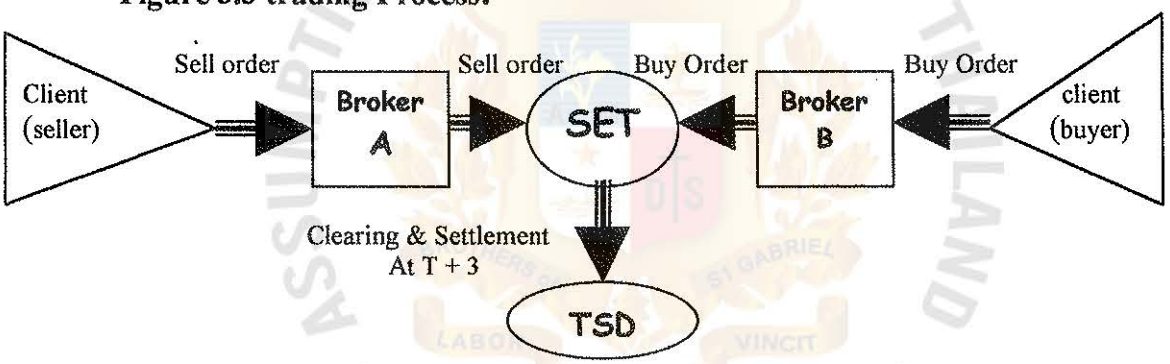
Figure 3.2 Organizational Chart Source: The Stock Market in Thailand 1999



3.2.2 Securities Trading

In 1991, the SET replaced its traditional open auction floor trading with a fully-computerized trading system known as the "Automated System for the Stock Exchange of Thailand", or the ASSET system. This ASSET system processes order queuing, arranges offer and bid orders transmitted from the member companies according to the price-and-time priority, and automatically matches them. Then, following the order matching, the system confirms each executed transaction back to the member companies.

Figure 3.3 trading Process:



SET = The Stock Exchange of Thailand
TSD = Thailand Securities Depository Company Limited
T = Trading Day

Source: Fact book 2000

The computerized ASSET system offers two trading alternatives; **Automated Order matching (AOM)** and **Screen-based trading or Put Through (PT) transaction**.

1) Automated Order Matching (AOM):

The AOM system is the primary trading alternative. Through AOM system, the member companies can send buy and sell orders to the system,

which then automatically implements an order queuing process and matches them according to price-and-time priority.

2) Screen-based trading or Put Through (PT) transaction:

A secondary trading alternative is the PT system, which provides a facility for brokers to negotiate directly with each other. The transaction will be recorded by one member company (seller) and confirmed by another member company (buyer) through the ASSET system.

Trading Days and time: The SET's trading days are Monday to Friday with two trading sessions. The morning session begins from 10:00 a.m. to 12:30 a.m. and the afternoon trading session starts from 2.30 p.m. to 4:30 p.m. The holidays include Saturday, Sunday, and all bank holidays.

Securities Clearing and Settlement: The clearing and settlement process is managed by the Thailand Securities Depository Company Limited (TSD), which is the only central securities depository in Thailand and a wholly-owned subsidiary of the exchange. All trading transactions are cleared and settled within the third consecutive business day following the trading day.

Table 3.2 Clearing and Settlement Schedules

Buy - Customer makes payment for the purchase - Member delivers the securities to customer	**Within T + 3** **Within T + 4**
Sell - Member makes payment for the sale - Customer delivers the securities to member	**On T + 3** **Before 12.00 Noon of T+1**

T = Trading day

Source: Fact Book 2000

At approximately 6:30 PM of each trading day, the TSD sends a report on the day's net trading and net cash balance to its member through computer network.

However, if the clearing house's computer system fails, a written report on trades and net cash balances will be sent to the members on the following day.

3.2.3 Dealer spread system in SET

Through Put Through (PT) transaction, a fully-computerized trading system, known as the ASSET system, will provide a facility for brokers to advertise their buy or sell interests by announcing bid or offer price. However, these must be quoted through a computer screen and in line with the price spread rules of the SET as shown in table 3.3. The PT system allows the interested members to deal directly with each other, either on their own behalf or on behalf of their clients. Nevertheless, the prices may be adjusted during negotiation, thus, the effective executed price may not be the same as that advertised and may not follow price-spread rules. After the conclusions of negotiations, dealers are required to send details of the negotiation results to the ASSET system for the SET's formal approval.

Price movements, as prescribed by the SET for securities trading, vary according to the market price level.

Table 3.3 Price Spreads: Source: The Stock Market in Thailand 1999

Market Price level	Spread
Less than 10	0.10
From 10 to < 50	0.25
From 50 to < 100	0.50
From 100 to < 200	1.00
From 200 to < 600	2.00
From 600 to < 1,000	4.00
From 1,000 upwards	6.00

During pre-opening period, the half-hour before each trading session, the SET's computerized trading system still receives buy or sell orders but does not match them, even though they may be matchable. However, the orders are placed in the system's bid/offer queue according to price and time priority. At the end of the pre-opening, the ASSET system then begins the matching process. During this time, the opening price for each stock is calculated from the price that generates the largest volume. After opening transactions start, the exchange is then open for regular trading.

3.2.4 Size of listed companies in SET

The size of the listed companies can be classified by the Market Capitalization. In 1996, there were totally 459 listed companies that traded in SET. The largest listed company that had the highest Market Capitalization in 1996 was BBL or Bangkok Bank Public Company Limited with the market capitalization valued approximately about 191,243.69 million baht or 14.78% of the total. The size of listed companies that ranked by the market capitalization had changed a lot during a five-year period of 1996 to June 2000, especially in 1998 and 1999. In 1998, the largest company classified by market capitalization belonged to PTTEP (PTT Exploration and Production Public Company) with market capitalization valued only 83,456.00 million baht. But in 1999, KTB or Krung Thai Bank Public Company Limited was ranked as the largest company with highest market capitalization of 220,795.13 million baht. As of June 2000, KTB was still be the one with the highest market capitalization valued about 148,128.38 million baht. The number of listed companies had also changed during the period of 1996 to June 2000. The number of listed companies had reduced from 459 in 1996 to 383 in June 2000.

Table 3.4 Rank of the listed company by the value of Market Capitalization

YEAR	NUMBER OF LISTED COMPANIES	HIGHEST MARKET CAPITALIZATION		LOWEST MARKET CAPITALIZATION	
		FIRM	Mkt. Cap. (Mil. Baht)	FIRM	Mkt. Cap. (Mil. Baht)
1996	459	BBL	191,243.69	AFL	< 1 Million
1997	431	PTTEP	115,940	TICO	6.96
1998	418	PTTEP	83,456.00	BMB	< 1 Million
1999	392	KTB	220,795.13	IFCTF	0.04
As of June 2000	383	KTB	148,128.38	BIJOUK	1.5

Source: I-SIMS CD and Listed Company Info 2000 (Q1-Q2)(CD)

3.3 Thai economy and performance of the Stock Exchange of Thailand (SET)

3.3.1 The Thai economies in 2000

From the broad prospective, the year 2000 will mark the absolute end of the financial crisis that began three years earlier with the help of floating baht. The financial sector had largely secured due to the reduction in non-performing loans more than half. Inflation remained quite stable through out the year, except the rising of oil prices and a weakening of the baht. The export performance was really high, with the average of 6 billion for most of the second half of the year. However, economic uncertainties and no wage increases helped holding consumer spending as people raised their saving without concerning about the lower returns gained from deposits. Therefore, with a drop in consumer spending and investment, consumer and business moods turned downwards through out the second half of the year. The core inflation (excludes energy and food prices) maintained at just 0.7-0.8% in the fourth quarter.

3.3.2 Stock market performance and conditions

Many analysts forecasted that year 2000 would be the great year for Stock Exchange of Thailand with the composite index predict as high as 65 points. However, the fact was shown that Thailand's stock market was one of the worst performers in the world, which lost over 43% for the year to date as of mid-December. The SET index reached its peak for the year at 498.46 points in April, and reached its low at 250.6 in November. At the end of the third quarter, market capitalization was 1.34 trillion baht. Activity at the Market for Alternative Investment was also quiet through out the year 2000. Although several firms were expected to enter the MAI in January, no company had yet listed as of December.

In October, the brokers' commissions were allowed to float freely after years of having been fixed at a float 0.5% of each transaction. Consequently, most brokers immediately cut their fees to around 0.25%, while some launched promotions of offering free trading in a move to build their customer base. Nevertheless, the cheaper trading costs did only little to stimulate overall market turnover, which ranged mostly from 1-3 billion baht per day over the second half. Due to the tight margins caused by the increased competition in the market and lower commission rates, the share prices for many securities firms decreased sharply. For the year 2001, the analysts believe that the SET index could range from 370 to 450 points, based on the projections of slightly slower economic growth and uncertainties in global oil prices and interest rate trends for both local and abroad.

Table 3.5 Stock Market Performance

Trading Statistics	1999	1998	1997
SET Index	481.92	355.81	372.69
Total market capitalization (billion baht)	2,193.07	1,268.20	1,133.34
Total trading value (billion baht)	1,609.79	855.17	929.60
Daily average trading value (million baht)	6.570.56	3,504.79	3,763.50
No. of brokers' customers (person)	191,580	166,347	181,058
No. of listed companies' shareholders (million baht)	1.83	1.71	1.95
No. of listed companies	392	418	431
Net Buy Categorized By Customer Type			
Foreign investors (million baht)	-3,134	30,227	55,437
Local institutions (million baht)	-2,872	-3,239	-22,453
Local investors (million baht)	6,006	-26,987	-32,984

Source: The Stock Exchange of Thailand 2000

Table 3.6 SET highlights

	1998	1999	Jan-Oct 2000
Dividend yield (%)	1.34	0.61	1.68
Market P/E ratio	10.04	14.70	6.13
Market Price/Book value	1.05	1.72	1.06
Daily avg. turnover (bt bn)	3.50	6.57	3.84
Delisted firms	14.00	26.00	13.00
Listed companies	418.00	392.00	380.00
Listed securities	494.00	450.00	440.00
Total capitalization			
* par value (bt bn)	594.33	774.26	831.21
* market value (bt bn)	1,268.20	2,193.07	1,275.71

Source: Bangkok Post: Economic Review: 2000 year-end edition

CHAPTER IV

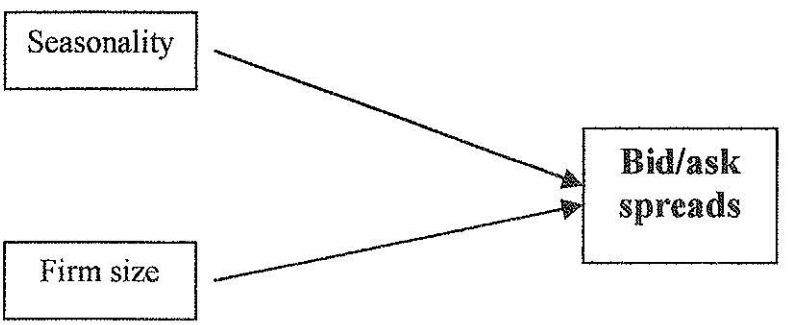
RESEARCH FRAMEWORK

This chapter presents the conceptual framework that gives the map of ideas of this study. Here, the research framework and related variables are explained clearly. In the first part the conceptual framework of the study is presented. The definitions of variables are given in the second part. The third part indicates the research hypothesis that used to analyze the study. For the last part, the expected outcome of the study is to be discussed.

4.1 Conceptual framework

This conceptual framework is based on both the empirical evidence of study conducted by Richard D. Fortin, R. Corwin Grube, and O. Maurice Joy in the study of Seasonality in NASDAQ Dealer Spreads (1989) and also on other related concepts and theories.

Figure 4.1 Conceptual Framework



Although, seasonal effects may vary somewhat in their average time of occurrence during the year but they have a degree of regularity that other elements of time series usually do not have. There are several different reasons why to examine the seasonal effects and one of them is to compare a variable at different points of the year as a purely intra-year phenomenon, for example, to find what points to allow stocks to run down. In this study, the bid/ask spreads data to be tested for seasonality are monthly data, so the monthly dummy regression approach (multiple regression) must be employed.

The empirical research of seasonality in NASDAQ dealer spreads conducted by Richard D. Fortin, R. Corwin Grube, and O. Maurice Joy in 1989 presents the evidence of strong seasonal behavior in proportional dealer spreads. The empirical results indicate that the spreads tend to be higher in the second half of the calendar year, peak in December and then decline during January. The results of study also show that the spreads for the smaller firm quintiles, classified by equity market value, are large and the spreads for the smallest firms are extremely large.

4.2 Definition of variables

Ask prices are what the dealer will sell the security for or the price they are asking. (Hickman, Hunter, and Byrd, 1996)

Bid prices are what the dealer will pay for the security. (Hickman, Hunter, and Byrd, 1996)

Bid-ask spread is difference between the bid price and the asking price (Hickman, Hunter, and Byrd, 1996)

Small firm effect refers to the fact that small companies have higher average stock returns than large companies. (Dimson, 1988)

Turn-of-the-year effect refers to the fact that much of the excess performance (of small firm) or the small-firm effect can be attributed to the initial trading day of January. (Dimson 1988)

4.3 Research hypothesis

The research hypotheses related to the study of seasonality in stock spreads are as presented below:

H1: SET proportional spreads exhibit calendar year seasonality.

H2: SET proportional spreads change significantly during the turn-of-the-year.

H3: Firm size has a significant effect on SET proportional spreads.

4.4 Expected outcome

For the first hypothesis, in which the seasonality in SET proportional spread through out the calendar year will be tested, the repeated pattern of SET bid/ask spreads is expected to find. The empirical research of Fortin, Grube , and Joy (1989), in which this study is based, has found the seasonal behavior in proportional bid/ask spread on NASDAQ Stock Exchange. In this research, the same methodology as previous research of Fortin, Grube, and Joy (1989) is perform on SET bid/ask spreads, therefore the same outcome of an existing of seasonality in bid/ask spreads is expected. According to the previous researches, the liquidity-motivated volume is found to be negatively related with proportional dealer spreads. At the same time, this liquidity-motivated trading volume is found to be actively increase at the end of December, so

the proportional dealer spreads are expected to be decreased at the end of December also.

According to the Ritter's parking-the-proceed theory, SET proportional spreads are also expected to change significantly during turn-of-the-year period. The tax loss selling and Ritter's (1988) "parking the proceeds" theories state that the individuals will tend to sell their stocks, especially the small stocks, at year end to realize the loss for tax purpose and then will later buy back the stocks at the beginning of the year. This buy-and-sell-stock behavior of individual investors at year ended brings a particular pattern to the trading volume of stock, which also has an impact on the proportional spreads. The high demand in selling stocks at year-end can increase trading volume of stocks so significantly that finally lead to a large noticeable decline in dealer spreads at the end of December, especially, on the last trading day of December. The same buying-and-selling stock behavior of individual investor is also expected to be happened in Thai Stock Market, therefore the SET proportional spreads are proposed for the same pattern.

The previous researches of Stoll and Whaley (1983), Fortin, Grube, and Joy (1989), and Eleswarapu and Reinganum (1993) have all found the inverse relationship between the firm size and proportional spreads. The larger the firm size, which is classified by the equity market value, the smaller the dealer spreads. The relationship between size of the firm and the proportional dealer spreads of SET is expected to be the same as previous researches. The logic behind this relationship was explained by Stoll and Whaley (1983) in their empirical study that the proportional dealer spread is generally higher for small firms due to their infrequent trading activity and risk. Moreover, the small firms may have other less explicit costs such as the cost of

investigating and monitoring that are higher than the large firms. For this reason, the SET proportional spreads are predicted to be higher as the size of firm gets smaller.

CHAPTER V

RESEARCH METHODOLOGY

In this chapter, in the first part, the description about data collected will be generalized. Also, in the second section, the operationalization table of the study will be presented here. For the third part, the methodologies, which will be applied to test the spread behavior across the full calendar year, spread behavior during the turn-of-the-year period, and the effect of firm-size on bid/ask spreads, are to be discussed.

There will be three statistical methods used in the two different parts of the study. The first method, monthly dummy regression approach, will be employed to examine the spread seasonality in a broad context across the full calendar year. In the second part of the study, the more narrowly focused on spread behavior at the turn-of-the-year will be tested through the simple differences of means tests. For the third part, to test the relationship between SET dealer spreads and firm size, ANOVA statistic will be applied.

5.1 Data Source and Data Collection

The bid price and offer price data will be obtained from SET through Marketing and Sale Department. The trading data that do not include in the I-SIMS CD and Listed Company CD of SET, will be available upon request including bid and offer price year by year. Therefore, five-year data of bid and offer price were requested from SET to be used in this research. These bid and offer (ask) price of stock will then be used to calculate for the proportional bid/ask spreads.

The proportional bid/ask spreads can be computed by:

$$\frac{\text{Ask price} - \text{Bid price}}{(\text{Ask price} + \text{Bid price})/2}$$

Bid and offer(ask) price obtained from the requested CD of SET for the sample will include all the firms that have traded in the Stock Exchange of Thailand (SET) except for the firms listed into the SET during the year, which will not be included in the analysis until the following calendar year. Also, the analysis will exclude firms that did not trade during the full year from the year's analysis.

The market capitalization of the listed companies that will be used to rank the size of listed companies, will be taken form CD-ROM (I-SIMS CD) provided by the Stock Exchange of Thailand. There are three versions of CD-ROM that must be used in this study. The first CD-ROM (Raw Data) provides with all of the trading information including daily bid and offer prices of stock form January 1st, 1996 to December 31st, 2000.The second CD-ROM (I-SIMS CD) will provide the market capitalization value of each stock from January 1st, 1993 to November 30th, 1997.The third CD-ROM (Listed Company Info 2000) will contain the market capitalization value of each stock during the period of November 30th, 1997 and June 30th, 2000.

Table 5.1 Data Source and Data Collection

DATA	SOURCE
Bid price and offer price	Five-year (raw data) CD requested from Stock Exchange of Thailand
Market Capitalization	I-SIMS CD and Listed Company CD provided by Stock Exchange of Thailand

Table 5.2 Operationalization of the Independent and Dependent variables

Variables	Operationalized by	Scale
Seasonality	Month	Nominal
Turn-of-the-year effect	Month, Day	Nominal
Firm size	Market Capitalization	Ratio
Bid/ask spreads	Ask price - Bid price	Ratio

5.3 Data Analysis

5.3.1 Monthly Dummy Regression Approach

In the broad seasonality investigation, the dummy-variable regression model is applied to estimate regression coefficients as indicated by the following equation:

$$(1) \qquad S(it) = b(0) + b(1)X(1it) + b(2)X(2it) + \ldots + b(11)X(11it) + e(it)$$

Where S(it) = mean proportional bid-ask spread for firm i in month t,

X(1it) = dummy variable that equals 1 for firm i for February and 0 otherwise,

X(2it) = dummy variable that equals to 1 for firm i for March and 0 otherwise,

...

...

X(11it) = dummy variable that equals to 1 for firm i for December and 0 otherwise.

The null and alternative hypotheses to be tested in equation (1) are:

$\mathbf{H_0}$: b(1) = b(2) =... = b(11) = 0

$\mathbf{H_1}$: any b(i) not = 0 i = 1,...,11.

For the above hypothesis, if H0 is accepted, it implies that there are no statistically important seasonal influences in dealer spreads. But if H0 is rejected, it implies that there are statistically important seasonal influenced in spreads.

Using dummy variables for the season is one way to include seasonal effects in a regression model without seasonally adjusting of the data. In this method, the 12th month has to be reserved as a baseline for comparison because if all 12 months were used, the 12th month would add no information that you could not figure out from the first 11. Therefore, only 11 dummy variables for 11 of the 12 months are used.

Given the particular interest in January, thus January will be chosen as the intercept month, which is arbitrary but appropriate following the empirical study of **Fortin, Grube and Joy (1989)**. Therefore, the value of the intercept in equation **(1)** will be used to represent the January average and the eleven monthly dummy variables are deviations from the January average; positive (negative) deviations will reflect average monthly spreads greater than (less) than January's. The result can be found by applying Statistical Package for Social Sciences (SPSS) program.

Since this research also put an interest on the relationship between dealer spread behavior and firm size, the chosen firms will be grouped into 5 quintiles based on their

market capitalization values (the grouping process will be presented in detail in the Analysis of Variance (ANOVA) part). Then, equation **(1)** will be applied to each quintile separately to examine the seasonality in dealer spreads in the presence of size influences. By applying equation **(1)** separately to each quintile will also allow direct comparison of spread results with the size/ seasonality rate-of-return anomalies results and reduce the within-quintile variability of proportional bid/ask spreads.

5.3.2 Simple differences of means tests

In order to find out whether or not that SET proportional spreads change significantly during the turn-of-the-year period, **t-statistic** must be employed in the study. **T-statistic** is one of the statistical method to test the hypothesis of the difference between the two population means (μ_1 **and** μ_2) is equal to **zero** where the alternative hypothesis is $\mu_1 \neq \mu_2$ or $\mu_1 - \mu_2 \neq 0$. To test the difference between two independent means, the **t-test** becomes:

$$t = \frac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{S_{(\bar{X}1 - \bar{X}2)}} \quad \text{or} \quad t = \frac{\bar{X}_1 - \bar{X}_2}{S_{(\bar{X}1 - \bar{X}2)}}$$

Therefore, the null and alternative hypotheses to be tested are as follow:

$\mathbf{H_0}$: $\mu_1 - \mu_2 = 0$

$\mathbf{H_1}$: $\mu_1 - \mu_2 \neq 0$

The first part of looking for the spread behavior at turn-of-the-year period is to compare spreads of the same firms over contiguous December/January year-end, which is a more precise test of the turn-of-the-year effect. The subsample of firms with quoted spreads available during the December/January year-end period will be collected and

examined spread behavior during various subperiods of that time frame. Then the average monthly spreads for December and January for each market equity value quintile will be computed. Then, the average monthly spreads of December and January will be compared by applying **t-statistic** at 0.05 level of statistical significance to test whether there is any significant difference between the means of these two monthly spreads.

Given a particular interest on the spread behavior at year-end-turn period, in the second part, with the same sample of firms, the spread behavior for the eleven trading day period at year-end turn will be examined. Day 0 will be used to represent the first January trading day and days +1 through +5 will be the next five January trading days. Days –5 through –1 will be the last five trading days in December. The average spreads of the last trading day of the first January trading days (day +5) will be compared with the first trading day of the last December trading days (day – 5) by using 0.05 level of significance **(t- statistic)** to see if there is any difference between these two subperiods.

5.3.3 The Analysis of Variance or ANOVA approach

The last objective on this research is given an interest on the relationship between dealer spread behavior and firm size. So, as mentioned in the previous section, the sample firms will be rank-ordered based on market capitalization values and then will be grouped into five ranked quintiles.

To divide the listed firms into 5 portfolios, firstly all of the listed companies, which had already been ranked according to their market capitalization values at the beginning of each year by SET, will be taken from I-SIMS CD and Listed Company CD. Then, secondly all these ranked listed companies will be divided into 5 portfolios

and all the odds and ends will be added to the fifth (last) portfolio, which is the smallest firm-size portfolio. For example, in the year 1996, all **459** numbers of listed companies that had been ranked according to their market capitalization values will be divided by **5** (numbers of portfolios). So, there will be **91** numbers of listed companies contained in the first four portfolios and the fifth (last) portfolio will be contained the rest of **95** numbers of listed companies. Regrouping will be done every year and the firms listed into the Stock Exchange of Thailand (SET) during the year will not be included in the analysis until the following calendar year. Also, firms that did not trade during the full year will be excluded from the year's analysis.

Next, ANOVA approach will be applied to test the relationship between the dealer spreads and the firm size. The mean or average monthly spreads for each quintile will be computed. Then, the mean spreads for five quintiles will be compared to determine whether firm- size factor has a significant effect on the dealer spreads. If, for example, the firm-size factor is significant, the mean monthly dealer spreads for the five different market capitalization quintiles will not be equal. Under ANOVA approach, rather than taking the five-step procedure using F-statistic, the easier method is to use an ANOVA table.

The format of this table is as shown below:

Source	**df**	**SS**	**MS**	**F**
Factor	1	SS(factor)	MS(factor)	$\frac{\text{MS(factor)}}{\text{MS(error)}}$
Error	n – 2	SS(error)	MS(error)	
Total	n – 1	SS(total)		

Where: SS is **sums of square**

SS(factor) measures between-sample variation.

SS(error) measure within-sample variation.

SS(total) = SS(factor) + SS(error)

MS is **mean square**

$$MS(factor) = \frac{SS(factor)}{\text{df for factor}} = \frac{SS(factor)}{1}; \text{(df = degree of freedom)}$$

$$MS(error) = \frac{SS(error)}{\text{df for error}} = \frac{SS(error)}{1}; \text{(df = degree of freedom)}$$

$$F = \left\langle \begin{array}{c} \text{estimated population variance based on} \\ \text{the variation among the sample means} \\ \hline \text{estimated population variance based on} \\ \text{the variation within each of the sample} \end{array} \right\rangle = \frac{MS(factor)}{MS(error)}$$

The hypotheses in testing a relationship between firm size and dealer spreads under ANOVA approach are as follow:

$\mathbf{H_o}$: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$

$\mathbf{H_a}$: not all μ's are equal

To conclude, by applying ANOVA approach for five market capitalization value quintiles, a difference between the five means will exist because the variation between the five samples (measured by MS(factor)) will be much greater than the variation within the samples (measured by MS(error)). Therefore, the ratio of these values is very large and F fall in the rejection area, which leads to rejection of $\mathbf{H_o}$: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$. This rejection will finally bring the conclusion of which there is a

significant effect on dealer spreads due to the firm size factor. This ANOVA test will be processed through the applying of SPSS program.

Table 5.3 Summarization of the hypotheses and statistical applied

HYPOTHESES	STATISTICAL USED
H1:SET proportional spreads exhibit calendar year seasonality.	Monthly dummy regression
H2:SET proportional spreads change significantly during the turn-of-the-year	t- statistic
H3: Firm size has a significant effect on SET proportional spreads.	ANOVA

The above research methodologies that will be applied in this study, including monthly dummy regression (Multiple regression), t-statistic, and ANOVA, are all have the assumptions under each methodology.

Table 5.4 Assumptions under Multiple Regression, t-statistic, and ANOVA

Multiple Regression	t-statistic	ANOVA
There are four important assumptions under the multiple regression approach: (1) The mean of each error component is zero or in other word, the error is zero, on average. (2) Each error component (random variable) follows an approximately normal distribution. (3) The variance of error component, σ_e^2, is the same for each value of X. the assumption here is that σ_e^2 does not change as the value of X changes (homoscedasticity). (4) The errors are	Under **t-statistic**, there are three assumptions: (1) The X_i's within each of the two populations are normally distributed. (2) The two population variances, σ_1^2 and σ_2^2, are equal. (3) The individual observations, X_i's, are independent.	In applying the **ANOVA** procedure, there are three key assumptions that must be satisfied: (1) The observations are obtained independently and randomly from each of the populations. The value of one observation has no effect on any other observations within the same sample or within the other samples. (2) The observations from each population follow (approximately) a normal distribution. (3) The normal populations all have a common variance,σ^2. The values in each sample is expected tovary about the same amount. The ANOVA procedure will

independent of each other. This implies that the error encountered for one value of Y is unaffected by the error for any other value of Y.		be much less sensitive to violations of this requirement when the samples of equal size from each population are obtained.

Table 5.5 Assumption of Ordinary Least Squares (OLS)

What can go wrong?	What are the consequences?	How can it be detected?	How can it be corrected
Multiconllinearity: Some of the independent variables are (imperfectly) correlated.	No bias βs, but estimates of the separate effects of the Xs are not reliable.	No universally accepted rule or test is available. Use the t-test on r_{12} or the VIF test.	Drop redundant variables, but to drop others might introduce bias. A combinaiton variable may be useful, but often doing nothing is best.
Aytocorrelation: The error terms for different observations are correlated.	No biased βs, but the variances of the βs increase (and t-scores fall) in a way not captured by OSL.	Use Durbin-Watson d test; if significantly less than 2, positive autocorrelation exists.	If impure, add the omitted variable or change the functional form. Otherwise, consider generalized least aquares.
Heteroskedasticity: The variance of the error term is not constant for all observations.	Same as for autocorrelation.	Plot the spread or contraction of the residuals or use the park or Goldfeld-Quandt tests.	If impure, add the omitted variable. Otherwise, redefine the variables or apply a weighted least squares correlation.

Source: Using Econometrics. A.H. Studenmund (1992)

CHAPTER VI

RESULT OF THE STUDY

This chapter represents the research findings and the analysis of the study. The test of hypothesis results discussed in chapter 4 will be clearly shown here. This chapter includes 5 sections. The profile of sample will be discussed in the first part. The second part shows the result of the monthly dummy regression approach. The third part is the result of turn-of-the-year period test (t-statistic). The result of ANOVA to test the relationship between dealer spreads behavior and firm size will be shown in the fourth part. The last part will be the explanation of the result.

6.1 Profile of sample

As mentioned in the previous chapter, the sample firms will be divided into 5 portfolios according to their ranked market capitalization. Then, the average proportional bid/ask spreads will be calculated separately base on their portfolio. Table 6.1 shows the number of sample firms in each portfolio in 5-year sample period and the average bid/ask spreads of each portfolio in each year.

Table 6.1 The number of sample firms and the average proportional bid ask spreads in each portfolio during the sample period of 1996 to 2000

year	Number of sample firms						Average proportional bid ask spreads(percentage%)				
	Portfolio1 (largest)	Portfolio2	Portfolio3	Portfolio4	Portfolio5 (smallest)	total	Portfolio1 (largest)	Portfolio2	Portfolio3	Portfolio4	Portfolio5 (smallest)
1996	83	83	83	83	83	415	0.015	0.024	0.035	0.051	0.058
1997	79	79	79	79	79	395	0.025	0.053	0.061	0.07	0.084
1998	70	70	70	70	72	352	0.058	0.118	0.136	0.148	0.171
1999	67	67	67	67	69	337	0.028	0.083	0.092	0.113	0.142
2000	66	66	66	66	69	333	0.024	0.075	0.077	0.109	0.158

6.2 Monthly dummy regression

For the broad seasonality investigation, the (dummy) variable regression model recommended by Fortin, Grube, and Joy(1989) is applied in this study. The average proportional bid/ask spreads for each month of the twelve months are computed. These monthly average proportional bid/ask spreads are separately calculated for each quintile according to their five-market-capitalization ranked quintiles in order to reduce the within-quintile variability of proportional bid/ask spreads. Then, monthly dummy regression is employed on each of the five quintiles or portfolios separately.

Due to the availability of data (bid price and offer price) form 1996 to 2000, the fact that Thailand had faced the economic crisis in the mid-year of 1997 may has an effect on this seasonality analysis. According to this fact, the seasonal test is performed in 3-sample periods to reduce the effect of Thai economic crisis. The first sample period is the period of 1996 to 1997. The second sample period is from 1998 to 2000. The third sample period is the year 1996 to 2000. The combined period of five-year from 1996 to 2000 is necessary because the test of seasonal pattern has 4-year cycle.

The separate monthly dummy regressions are performed for each portfolio for all these 3 sub-sample periods and the following tables are the results.

Table 6.2 shows the result of seasonality regression coefficients in the first sub-period of 1996 to 1997. The data of monthly proportional bid/ask spreads from 1996 to 1997 are run through dummy variable regression model under the 0.05 level of significance separately portfolio by portfolio.

Table 6.2 The test of Spread Seasonality from Monthly Dummy Regressions for Market Capitalization Value Portfolios for the period of 1996 to 1997

	Market Capitalization Value Portfolio				
	1(largest)	2	3	4	5
January (intercept)	0.01356	0.02543	0.03318	0.04551	0.05305
Febuary	0.00091	0.00351	0.0037	0.00488	0.0045
March	0.00185	0.00567	0.00356	0.00659	0.00457
April	0.00235	0.00668	0.00553	0.00826	0.00699
May	0.00267	0.0062	0.00679	0.00866	0.01465
June	0.01066	0.00902	0.00812	0.00843	0.01075
July	0.0042	0.00984	0.00769	0.00867	0.01835
August	0.00452	0.01361	0.01585	0.014	0.01645
September	0.01413	0.01239	0.02808	0.01307	0.01879
October	0.00661	0.01696	0.01524	0.01765	0.0213
November	0.00812	0.01639	0.01734	0.01947	0.01851
December	0.02305	0.0563	0.06386	0.07028	0.08276
Adjusted R^2	0.42568	0.39638	0.48304	0.58768	0.53584
F	0.80859	0.71637	1.01931	1.55488	1.2594
Sig.	0.63408	0.70598	0.4839	0.22973	0.34784
Durbin-Watson	1.75796	2.07795	2.20527	2.07287	1.95101
VIF	1.83333	1.83333	1.83333	1.83333	1.83333

The result shows that all the probability values of F statistic of all 5 portfolios are higher than the 0.05 significant level. This indicates that there is no seasonal pattern in SET dealer spreads of over the period of 1996 to 1997.

Table 6.3 The results of t-statistic significant values of monthly Dummy Regressions for Market Capitalization Value Portfolios for the period of 1996 to 1997.

	Market Capitalization Value Portfolio				
	1(largest)	2	3	4	5
	t-statisic Sig.	t-statisic Sig.	t-statisic Sig.	t-statisic Sig.	t-statisic Sig.
January(intercept)	0.0921314	0.1647117	0.0771926	0.0771926	0.0169495
Febuary	0.9325794	0.8874424	0.8813432	0.0771926	0.8708074
March	0.0921314	0.8195918	0.8858273	0.8858273	0.868683
April	0.8260933	0.7880687	0.8237852	0.0771926	0.8007945
May	0.8035129	0.8028438	0.7845607	0.7845607	0.5984056
June	0.3289636	0.716948	0.7437508	0.0771926	0.698344
July	0.6956259	0.6926002	0.7568446	0.7568446	0.5108742
August	0.6739134	0.5859142	0.5262218	0.5262218	0.5548189
September	0.2024676	0.6194209	0.2699759	0.2699759	0.5009087
October	0.0921314	0.4985224	0.5420407	0.5420407	0.4466925
November	0.4532007	0.5128347	0.4888777	0.4888777	0.5072247
December	0.4814298	0.3901947	0.2196189	0.2196189	0.9970763

Table 6.3 shows the significant values of t-statistic of all eleven dummy variables in 5 portfolios during the period of 1996 to 1997. All of the significant values of t-statistic are higher than 0.05 significant level, which support the results of F-statistic in table 6.2.

Table 6.4 The test of Spread Seasonality from monthly Dummy Regressions for Market Capitalization Value Portfolios for the period of 1998 to 2000

	Market Capitalization Value Portfolio				
	1(largest)	2	3	4	5
January (intercept)	0.036845196	0.0896089	0.1107756	0.1277463	0.1612039
Febuary	-0.00191296	0.0005126	-0.0064035	-0.009606	-0.0163579
March	-0.00261345	0.0031931	-0.0107115	-0.0137237	-0.0095904
April	0.0000752997	0.0041248	-0.0109306	-0.0047091	-0.0050616
May	0.002970374	0.0022892	-0.0083618	-0.0010911	0.0010515
June	0.002086776	0.0035763	-0.0061948	-0.0086769	-0.0178502
July	0.003453627	0.0079199	-0.0039445	-0.0002905	0.0091058
August	0.001958869	0.0071079	-0.0127816	0.0044776	0.0135157
September	0.000579288	0.0045341	-0.0045836	0.0066881	0.0226456
October	-0.00266554	0.0051539	-0.0134466	0.0017411	-0.0044582
November	-0.00471182	-0.0031286	-0.0166359	-0.0096462	-0.019562
December	-0.0017844	-0.0023046	-0.0168981	-0.0208083	-0.021374
Adjusted R^2	0.022179668	0.0232812	0.0315626	0.1073092	0.2017909
F	0.049489667	0.052006	0.0711083	0.2622736	0.5515736
Sig.	0.999995161	0.9999937	0.9999692	0.9876366	0.8478927
Durbin-Watson	1.995829209	2.1203094	2.2539398	2.0024743	1.9149821
VIF	1.833333333	1.8333333	1.8333333	1.8333333	1.8333333

The results of seasonality test during the period of 1998 to 2000 of the five portfolios are shown in table 6.4. All five portfolios have the significant values of F-statistic more than 0.05 significant level, which means that there are no seasonal influences in SET dealer spreads during the period of 1998 to 2000.

Table 6.5 The results of t-statistic significant values of monthly Dummy Regressions for Market Capitalization Value Portfolios for the period of 1998 to 2000.

	Market Capitalization Value Portfolio				
	1(largest)	2	3	4	5
	t-statisic Sig.	t-statisic Sig.	t-statisic Sig.	t-statisic Sig.	t-statisic Sig.
January (intercept)	0.0037473	0.000	0.000	0.000	0.000
Febuary	0.9071659	0.981042	0.8196438	0.6700151	0.54481
March	0.8734355	0.8823439	0.7031916	0.5434672	0.7218901
April	0.996337	0.8484045	0.6974365	0.8342902	0.8508469
May	0.856338	0.9154909	0.7659993	0.9613235	0.9688295
June	0.8987768	0.8683519	0.8254201	0.7002024	0.5090542
July	0.8333047	0.7138803	0.88827	0.9897	0.7353687
August	0.9049489	0.7420426	0.6495742	0.8423207	0.6164015
September	0.9718261	0.833586	0.8703233	0.7664798	0.4035067
October	0.8709362	0.8112666	0.6327333	0.9383225	0.8684457
November	0.774094	0.8847018	0.5548747	0.6687223	0.4696994
December	0.291338	0.9149234	0.5487012	0.3593424	0.4300553

The results of t-statistic of all eleven months (dummy variable) indicate that all the significant values have the values higher than 0.05 significant level. The significant values of t-statistic in all portfolios do support the value of F-statistic significant value in table 6.4.

Table 6.6 The test of Spread Seasonality from monthly Dummy Regressions for Market Capitalization Value Portfolios for the period of 1996 to 2000.

	Market Capitalization Value Portfolio				
	1(largest)	2	3	4	5
January (intercept)	0.0275318	0.0639385	0.0797387	0.0948535	0.117941
Febuary	-0.0007856	0.0017132	-0.0023613	-0.0038117	-0.0080151
March	-0.0008272	0.0041825	-0.0050025	-0.0055978	-0.0039247
April	0.00098646	0.0051476	-0.004348	0.0004795	-0.0002427
May	0.0028484	0.0038553	-0.0023019	0.0028107	0.0064908
June	0.00551704	0.005755	-0.000468	-0.0018351	-0.0064101
July	0.00375198	0.0086897	0.0007099	0.0032956	0.012803
August	0.00298298	0.0097075	-0.0013297	0.0082882	0.01469
September	0.0059987	0.0076773	0.0084813	0.0092413	0.0211043
October	0.00104318	0.009878	-0.0019733	0.0081049	0.0058468
November	0.00042224	0.0046799	-0.0030474	0.0019995	-0.0043329
December	0.00815004	0.021139	0.0154058	0.0156286	0.0202781
Adjusted R^2	0.02893107	0.023016	0.0225601	0.0231875	0.0371109
F	0.13000586	0.1027996	0.100716	0.1035836	0.1681799
Sig.	0.99957004	0.9998627	0.9998759	0.9998575	0.9985604
Durbin	1.8942556	1.8824768	2.0040828	1.6988516	1.583999
VIF	1.83333333	1.8333333	1.8333333	1.8333333	1.8333333

To complete four seasonal cycles, all 5-year dealer spreads data from 1996 to 2000 are used to run monthly dummy variable regression again to test for the existence of seasonal pattern. The result of all five regressions indicates that there are no statistically important seasonal influences in dealer spreads for the Stock Exchange of Thailand during the period of 1996 to 2000.

Table 6.7 The results of t-statistic significant values of monthly Dummy Regressions for Market Capitalization Value Portfolios for the period of 1996 to 2000

	Market Capitalization Value Portfolio				
	1(largest)	2	3	4	5
	t-statisic Sig.	t-statisic Sig.	t-statisic Sig.	t-statisic Sig.	t-statisic Sig.
January (intercept)	0.0012426	0.000	0.000	0.000	0.000
Febuary	0.9450792	0.9432227	0.9284037	0.8878878	0.8225835
March	0.9421777	0.8619887	0.8490516	0.8359995	0.9125553
April	0.9310732	0.830592	0.8686035	0.9858503	0.9945813
May	0.8028339	0.8726845	0.9302	0.9172013	0.8558987
June	0.6289747	0.8109725	0.9857899	0.9458841	0.8576713
July	0.7423016	0.7181038	0.9784489	0.9029831	0.7203287
August	0.7937303	0.6867951	0.9596453	0.7592821	0.6812933
September	0.5994191	0.749738	0.7470203	0.7326363	0.5555443
October	0.927121	0.6815998	0.9401442	0.7644399	0.8700586
November	0.9704659	0.8457761	0.9076867	0.9410447	0.9035032
December	0.476011	0.3814412	0.5584173	0.5638829	0.5710703

The values of significant value of t-statistic are all higher than the 0.05 significant level. These results also support the result of F-statistic in table 6.6.

Notice that almost all regressions of the fifteen regressions of table 6.2, 6.4,and 6.6 have quite low adjusted R square level. This is not too surprising since the monthly dummy regression equation in chapter 5 explains cross-sectional variability in spreads using calendar variables rather than more fundamental spread determinants such as return variance.

For the validity of Ordinary Least Squares (OLS) assumption, all the three tables (table 6.2,6.4,6.6) are shown the results of Durbin-Watson test value and Variance Inflation Factor (VIF) value. The Dubin-Watson values of the fifteen regressions are all about 2, as well as the value of VIFs, which are also about 2.

6.3 Turn-of-the-year period test (t-statistic)

The research objective also put an interest on a closer look at the turn-of-the-year behavior of spreads. By applying t-statistic, the analysis on this turn-of-the-year period is separated into 2 sub-parts. The first part is presented by table 6.8, which indicates the difference of average bid/ask spreads between the December month and The January month. The second part of the test is shown in table 6.9, which shows the difference of average daily spreads on the first day of the last 5 trading days in December and on the last day of the first 6 trading days in January.

Table 6.8 Average Spreads for December and January for Market Capitalization Value portfolios for Pre-and Post-January 1st, 1998 period.

	Market Capitalization Value Portfolio				
	1(largest)	2	3	4	5
Panel A 1996-1997					
December	0.016	0.038	0.05	0.07	0.077
January	0.017	0.035	0.04	0.051	0.062
t Score	-0.23279	0.87377	1.29863	0.16474	-0.3716
Significant value	0.81622	0.38361	0.19512	0.86927	0.71045
Levene test	0.39542	0.22968	0.06867	0.6868	0.15008
Panel B 1998-2000					
December	0.027	0.064	0.088	0.074	0.11
January	0.018	0.062	0.079	0.092	0.125
t Score	1.21375	0.15513	0.49786	-1.1147	-1.2663
Significant value	0.22703	0.87696	0.61943	0.26709	0.20779
Levene test	0.07125	0.69463	0.28469	0.45968	0.95856

The test of difference between average bid/ask spreads during December and January is applied by using t-statistic at 0.05 significant level. The results are shown in table 6.8 that all 10 cases have a value much higher than 0.05 significant level. Also, all the levene tests of 10 cases have the value higher that 0.05 significant level.

Table 6.9 The average daily spreads at turn-of-the-year for Market Capitalization Portfolio for Pre-and Post-January 1st, 1998 period

	Market Capitalization Value Portfolio				
	1(largest)	2	3	4	5
Panel A 1996-1997					
Day(-5)	0.016	0.035	0.043	0.064	0.06
Day(+5)	0.013	0.029	0.033	0.051	0.057
t Score	0.88301	1.62739	-1.5988	-0.5803	-1.0097
Significant value	0.37868	0.10587	0.11048	0.5622	0.31356
Levene test	0.32015	0.07064	0.16254	0.22147	0.06541
Panel B 1998-2000					
Day(-5)	0.029	0.052	0.079	0.073	0.11
Day(+5)	0.019	0.058	0.09	0.11	0.161
t Score	-0.4217	-0.7235	-0.5737	-0.6995	-1.388
Significant value	0.67345	0.46983	0.56719	0.48486	0.1663
Levene test	0.49472	0.42921	0.90359	0.06685	0.65053
*Day(-5) is the first day of the last December trading day					
*Day(+5) is the last day of the first January trading day					

The result of table 6.6 shows also that all 10 cases have their significant values of t-statistic higher than 0.05 significant level. This shows that there is no significant difference between the average daily spreads of the first day of the last 5 December trading days and the average daily spreads of the last day of the first 6 January trading days. The levene tests of all cases have the value higher than 0.05 significant level.

6.4 Analysis of Variance(ANOVA) test

To fulfill the last objective of the research, the relationship between dealer spreads behavior and firm size is to be tested through the application of ANOVA. The firms are

grouped into 5 portfolios based on their ranked Market Capitalization Value as well as the value of bid/ask spreads of each firm. Table 6.7 shows the result of this ANOVA test. 0.05 significant level of F-statistic is used under the application of ANOVA.

Table 6.10 ANOVA test of the Average Spreads and Market Capitalization Value by Portfolios Pre-and Post-January 1st, 1998 period.

	Market Capitalization Value Portfolio				
	1(largest)	2	3	4	5
Panel A 1996-1997					
Average Equity(Mil.Baht)	28,771.06	3,345.11	1,427.36	640.97	280.68
Average spreads(%)	0.0201	0.0384	0.0478	0.0605	0.0712
F Score	18.20155				
Significant value	0.000				
Levene test	0.499578				
Panel B 1998-2000	1(largest)	2	3	4	5
Average Equity(Mil.Baht)	16,147.75	1,262.32	440.26	187.26	60.32
Average spreads(%)	0.0365	0.0923	0.1015	0.1231	0.15721
F Score	115.523				
Significant value	0.000				
Levene test	0.26187				

The results indicate in both Pre-and Post-January 1st, 1998 period data that the significant values of F-statistic in both 2 cases are lower than 0.05 significant level.

6.5 Interpretation of result

6.5.1 Monthly dummy regression

From table 6.2 all 5 portfolios have significant values of F-values at 0.634, 0.706, 0.484, 0.229, and 0.348 respectively, which are all higher than the 0.05

significant level. These results indicate that there is no significant differences between the average bid/ask spreads of the 11 months (February, March, April, May, June, July, August, September, October, November, and December) when compare with the average bid/ask spreads in January month during the period of 1996 to 1997. The results of t-statistic shown in table 6.3 also confirm the results of F-statistic in table 6.2 that there is no seasonal pattern in dealer spreads in this sub-period.

In table 6.4, the results of seasonal test in average bid/ask spreads during the year 1998 to 2000 are presented. All 5 portfolios have significant levels of F-statistic higher than 0.05 that are 0.999, 0.999, 0.999, 0.988, and 0.848, respectively. Also, the significant levels of t-statistic of all portfolios, presented in table 6.5, do support its F-statistic result. All the significant levels of t-statistic of all 11-dummy-variable months are higher than 0.05. So, the monthly (dummy) variable regression model of these 11-month dummy variables can not be used to identify the seasonality of dealer spreads during the period of 1998 to 2000 or there is no seasonal pattern in dealer spreads during this period of time.

As mentioned at the beginning of this chapter, to complete the 4-year seasonal cycle, the combination of the two sub-periods (1996-1997 and 1998-2000) is necessary. Therefore, in last part of monthly dummy regression, the average monthly bid/ask spreads during the year 1996 to the 2000 are used to run the monthly dummy regression again. The results are presented in table 6.6. All significant values under F-statistic of the 5 portfolios, which all of them have the significant value about 0.999, are much higher than the 0.05 level of statistical significance. The results of significant level of t-statistic for all 5 portfolios in table 6.7 also support the results of F-statistic in table

6.6. Thus, when combining all 5 years together, the results imply that there is no such a seasonality in bid/ask spreads or dealer spreads in Stock Exchange of Thailand.

Although, the results of all three tables (table 6.2,6.4,and 6.6) under monthly dummy regression are not completely identical, still, there are important commonalties. That are, there is a strong evidence of the absence of seasonality in dealer spreads in Thai stock market.

In the part of monthly dummy regression, under the null and alternative hypotheses of;

H_0: b(1) = b (2) =...= b (11) = 0

H_1: any b(i) not = 0 i =1,...,11.

The null hypothesis (H_0) is accept and the alternative hypothesis is rejected, which means that there are no statistically important seasonal influences in dealer spreads or bid/ask spreads of the Stock Exchange of Thailand during the year1996 to the year 2000.

For the Durbin-Watson test, it is used to measure the level of Auto-Correlation. The best value of Durbin-Watson is 2. The Durbin-Watson value is used to measure the correlation of error terms for the different observations. If the value of Durbin-Watson is less than 2 and close to 0, it signifies that the error terms have positive relationship. If the value of Durbin-Watson is more than 2 and close to 4, it signifies that the error terms have negative relationship. In this study, the values of Durbin-Watson are all about 2. That is there is no relationship between the error terms of the model.

The value of Variance Inflation Factor (VIF) is used to measure the Multicollinearlity, which indicates whether there is a relationship among independent variable or not. If the value of VIF is more than five, it means that there is high

correlation among independent variables. In this study, the values of VIF are all close to 2. This suggests that there is no relationship among independent variables in the model.

6.5.2 Turn-of-the-year period test (t-statistic)

The test of dealer spreads behavior during turn-of-the-year period can be separated into two parts. The first part is to test the differences between the average dealer spreads in December month and the average dealer spreads in January month. The second part is to test the difference of mean daily spreads on the first day of the last 5 trading days in December (-5) and on the last day of the first 6 trading days in January (+5). Under the application of t-statistic, the test is also divided into 2 sub-periods, before and after the effect of economic crisis. These separate tests of two sub-periods prevent the possible effect of economic crisis that may have over the statistical result.

For the first part of turn-of-the-year test, the results of t-statistic test are shown in table 6.8. Table 6.8 presents the results of statistical significant values of t-statistic of all 5 portfolios under the two sub-periods of 1996 to 1997 and 1998 to 2000. All 10 significant values of t-statistic are higher than 0.05 significant level. These results indicate that there is no difference between the mean of dealer spreads in December and the mean of dealer spreads in January of both two sub-periods

In the second part of turn-of-the-year test, 10 significant values under t-statistic of the two sub-periods are shown in table 6.9. All 10 significant values are higher than 0.05 significant level, which imply that the average daily spreads of the first day of the

last 5 trading days in December (-5) and the average daily spreads of the last day of the first 6 trading day in January (+5) are not significantly different.

Therefore, the turn-of-the-year behavior of bid/ask spreads or dealer spreads in the Stock Exchange of Thailand during the year 1996 to the year 2000 is not found in this research.

The significant value of Levene test is used to test the equality of variance of each sample group. If the significant value of Levene test is more than the significant level, it means that the variances of each sample groups are equal. In this study, the significant values of Levene test are all higher than 0.05 significant level, which means that the variances of sample groups are equal.

6.5.3 Analysis of Variance(ANOVA) test

Under ANOVA test, the test is also divided into two sub-periods (from 1996 to 1997 and from 1998 to 2000) to prevent the economic effect that may have on the results. ANOVA test is applied to test the relationship between dealer spreads behavior and firm size. The results of the ANOVA test of both 2 sub-periods are presented in table 6.10.

For the first sub-period (1996 to 1997), the result of the F-test shows that the F-value is equal to 18.20155 and the significant level is equal to 0.000. This result implies that the firm-size factor has a significant effect on the dealer spreads during the period of 1996 to 1997.

The F-value and significant level of the second sub-period (1998 to 2000) are also shown in table 6.10. The F-value of this second sub-period is equal to 115.523 and

the significant level is 0.000. The result indicates that there is also a significant effect on dealer spreads due to the firm-size factor during the year 1998 to the year 2000.

The null and alternative hypotheses under ANOVA approach are:

H_0: $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$

H_1: not all μ's are equal

As a result of F-statistic shown above, the above null hypothesis (H_0) is rejected and the alternative (H_1) is accepted.

How the firm-size factor effect the dealer spreads can be observed through table 6.10 also. When looking at the firm-size factor, which is classified by market capitalization values, and compare them with the dealer spreads in each portfolio. The smaller the firms size (the lesser the market capitalization value), the higher the value of average proportional dealer spreads. This can be observed in both two sub-periods.

The result of ANOVA test identify the result of significant effect that firm size has on dealer spreads or bid/ask spreads in the Stock Exchange of Thailand during the period of 1996 to 2000.

As explained in the previous part, the significant value of Levene test is used to test the equality of variance of each sample group. If the significant value of Levene test is more than the significant level, it signifies that the variances of each sample groups are equal. In this ANOVA study, significant values of Levene test of 5 portfolios for both two groups are higher than 0.05 significant level, which means that the variances of sample groups are equal.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

This chapter contains two parts. The first part is conclusion part, which summarize the entire findings in this research. The second part is the part of recommendation to both investors and other researchers.

7.1 Conclusion

In this study, the results of the research can be divided into 3 parts. The first part is the part of seasonality test in SET bid/ask spreads. The second part is turn-of-the-year test in SET bid/ask spreads. The last part of the tests is to test the relationship between the SET bid/ask spreads and firm size.

The test of seasonality in bid/ask spreads or dealer spreads is run separately based on both portfolios (5 portfolios) and 3 sub-periods of 1996 to 1997, 1998 to 2000, and 1996 to 2000. The results of monthly dummy regression show the value of F-statistic that 14 out of 15 cases have significant value greater than 0.05 significant level. Only one case, the first portfolio of the second sub-period (1998-2000) shows the F-statistical value less than 0.05 significant level. However, the t-statistic value of this portfolio does not indicate any seasonal pattern in bid/ask spreads of this portfolio. So, the test of seasonality in SET bid/ask spreads can be concluded that there is no seasonal pattern found in SET bid/ask spreads during the period of 1996 to 2000.

Turn-of-the-year test in SET dealer spreads is the second part of tests here. This turn-of-the-year test can be divided into 2 parts. The test of differences between the average dealer spreads of SET in December month and the average dealer spreads of

SET in January month is the first part of the test. This test is performed separately based on 2 sub-periods (1996 to 1997 and 1998 to 2000) and 5 portfolios. The results of t-statistic show that all the significant values of 10 cases are higher than 0.05 significant level, which indicate that there is no differences between the mean dealer spreads of SET in December month and the mean dealer spreads of SET in January month. The second part of turn-of-the-year test is to test the difference of mean daily spreads on the first day of the last 5 trading days in December (-5) and on the last day of the first 6 trading days in January (+5). This test also performs separately base on 5 portfolios and two sub-periods like in the first part. The results of t-statistic also show that there is no difference between the average proportional dealer spreads of SET in these two periods.

The last section of the test is to test whether the firm size factor has a significant effect on the mean proportional spreads of SET. The test is run separately based on two sub-periods of 1996-1997 and 1998-2000. The F-statistic of ANOVA shows the same results in both two separated periods. The values of F-statistic of the two cases have significant value less than 0.05 significant level. These results indicate that the firm size factor has significant effect on SET proportional dealer spreads. The observation result also signify that the higher the proportional bid/ask spreads the smaller the size of firm, which is measured by the value of market capitalization of each firm. This can be supported by the reason of the infrequent trading and the higher risk of small-firm security, which can lead to the higher dealer spreads or the higher transaction cost in the small-firm security. Moreover, there may be less explicit costs, such as costs of investigating and monitoring a firm, which may be higher for the smaller firms.

7.2 Recommendation

In this last section, researcher would like to propose some recommendations to business persons as the investors and to other academic researchers for further research with the hope that this will be benefit to both them.

7.2.1 Business Persons

As the investors, the high return from the investment is usually expected. At the same time, all investors also expect that the market price in security market will provide the best estimate of value and that the process of valuation will become one of justifying the market price rather than being directed toward obtaining a reasonable estimate of this value. That is the investors want to invest their money in the security market where the securities are "fairly priced" and one can not beat the market except by the good luck or inside information. That is everyone has an equal chance to gain or lose in trading securities. To have fair security trading market, any regularities or patterns of anything related to the capital market returns should not exist in the capital market. These regularities can raise the inequality in security trading of the investors by allowing those investors who do the valuation well to be able to make 'higher' returns than other investors.

Bid/ ask spreads or dealer spreads are part of the transaction costs, which would incur to the investor as they buy or sell their securities in the capital market. So, bid/ask spreads, as a part of the transaction cost, can also effect the rate of return on security investment of the investors. The findings of this research can be both a benefit and a suggestion to the business persons, as the investors, that no one can use the seasonal pattern in bid/ask spreads to generate higher returns in securities than other. This is

because, from the analysis, there is no seasonality in dealer spreads exists in Thai stock market during the period of 1996 to 2000.

The other findings in this research that can be a benefit to the business person is the finding of the relationship between bid/ask spreads and firm size that the firm size factor has a significant effect on the dealer spreads. The results of this test show also that the larger the firm-size (the higher the market capitalization), the smaller the average proportional spreads and vice versa. This suggests the business persons, as the investors, that they can avoid paying high bid/ask spreads (transaction cost) to the dealer by choosing the stock of larger companies.

Also, Barnea & Logue (1975) and Stoll (1978) find that the proportional bid/ask spreads has a positive relationship with risk factor like the 'price variance' of stock. This means that the higher the value of proportional bid/ask spreads, the higher the chance of facing the variance in price of stock. So, to avoid the risk of variation in stock price, as other things being equal, the investors would be suggested to buy stocks of the larger firms rather than the smaller firms that have a higher value of proportional bid/ask spreads.

7.2.2 Further Research

The findings of this research indicate that there is no seasonal pattern and turn-of-the-year effect in dealer spreads of Thai stock market, although the relationship between bid/ask spreads and the firm size is found. These findings can be used to present as an empirical evidence for Thai stock market from the year 1996 to the year 2000 to other financial researchers. This empirical evidence shows that, during the period of 1996 to 2000, the bid/ask spreads, as a part of the transaction cost, can not be

used to explain the abnormal high stock returns on January whether or not this January effect do exist in Thai stock market during this period or not. This can lead to the suggestion to other researchers that there may have other factors, which cause the abnormal high return in January that they need still to find out.

The results of this research find that there is no seasonal pattern in the proportional bid/ask spreads of Thai stock market during the year 1996 to the year 2000 for both before and after economic crisis sub-period. Also, the results in other part of this research are also processed separately based on years before and after Thai economic crisis, and there is no effect shown in all results. Nevertheless, researcher would like to recommend to add more years to do the further research as the bid and offer price data are more available in the Stock Exchange of Thailand. This will allow the further research to have more years to complete 4-year seasonal cycle.

Apart from the more years of data would be suggested to add, applying the new methodology in finding the seasonal component proposed by Eleswarapu and Reinganum (1993) would also be recommended. Their methodology to find out the seasonal component in bid/ask spreads is to apply Fama-Macbeth type regression shown in page 379 of their study to investigate the relation between average returns and bid/ask spreads in January and non-January months. However, the exact formation procedure of the model requires eleven years of complete return data for a stock, which also have to be ranked and divided into group based on both beta and average spread. Thus, to perform this valuable further research, it requires more years of bid and offer price data and more investment in term of money and time.

APPENDICES

Appendix I (Cross-Sectional empirical studies of bid/ask spreads)
Table 1

Study	Price	Number of shareholders	Trading volume	Institutional investors	Competing dealers	Number of Markets	Price Variance	Systematic risk	Unsystematic Risk
Demsetz(1968)[a]	+	-	-			0			
Tinic(1972)[d]	+		-[c]	-		-[b]	0		
Tinic&West(1972)	+		-		-		0[e]		
Benston&Nagerman[f] (1974)	+	-		+	-			0	+
Barnea&Logue (1975)[g]			-				+[H]		
Stoll(1978)[i]	-[g]		-		-		+	+	+
Hamilton(1978)[j]	+	-&0[k]		-	-		+&0[e]		
Hamilton(1976)[l]	+	0		-		-			

+ = Significantly positive at 5% level
- = Significantly negative at 5% level
0 = Not significantly different than zero at 5% level
[a] Number of shareholders and trading volume were tested in separate equation.
[b] A measure of dispersion of trading in different markets was used.
[c] A variable measuring trading continuity was also significantly negative.
[d] Tinic (1972) also included variables of number of other stock handled by the dealer (significantly positive) and capital/number of transactions (insignificant).
[e] Measured as high price-low price over average price.
[f] Systematic and unsystematic were tested in separate equation.
[g] Proportioanl spread (spread divided by price).
[h] Risk measure from *Financial World.*
[i] Stoll (1978) also tested trading volume/outstanding shares (significantly positive) and average daily inventory change of dealer (significantly positive);price variance was tested separately from systematic and unsystemetic risk.
[j] Hamilton (1978) also tested number of shares closely held (significantly negative)
[k] Results are two different years.
[l] Hamilton (1976) also tested average shares per shareholders (significantly negative) and average shares per institutional investor (insignificant)

Source: Morse and Ushman(1983) p.250

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