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GRADUATE COLLEGE

EQUITY BUYING BY CORPORATE INSIDERS AND FILING OF ANTIDUMPING COMPLAINTS

A Dissertation

SUBMITTED TO THE GRADUATE FACULTY

In partial fulfillment of the requirements for the

degree of

Doctor of Philosophy

By

Hae Me Nam
Norman, Oklahoma
1999

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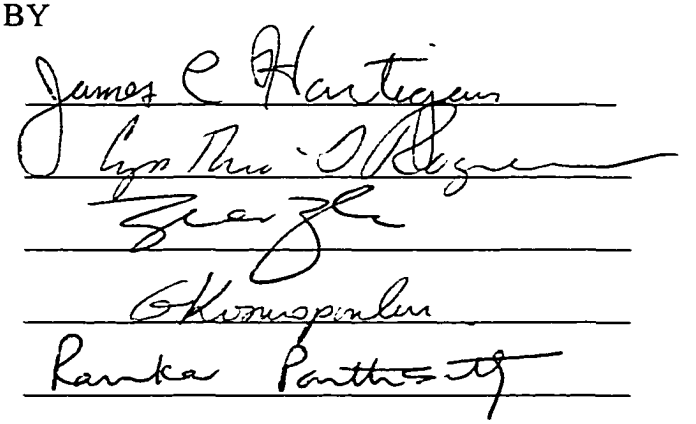
EQUITY BUYING BY CORPORATE INSIDERS AND FILING OF ANTIDUMPING COMPLAINTS

A Dissertation APPROVED FOR THE
DEPARTMENT OF ECONOMICS

BY



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There were many days when I didn't think I'd make it. I sometimes even questioned my desire to obtain a Ph.D. in Economics. I didn't think I was cut out to be an economist, so I would ask myself, "what am I doing?" It's something my Chair, Dr. Hartigan once said, "Nammette, I got my Ph.D., so I won't have to drive a cab". The only difference is that Dr. Hartigan is a well renowned, respected economist in his field. Me, I'm just barely making it but his statement made sense to me. I'm not really qualified to do anything else, so why not this?

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I. INTRODUCTION:

The term insider trading refers to stock transactions made by corporate officers, those individuals who are responsible for the overall operations of the firm. They are the main decision-makers with access to information about their firms' prospects before any current or potential asset holders. Many securities investors believe that corporate insiders use such information to buy and sell their own firm's stock at favorable times, reaping significant profit.[1]

The Securities and Exchange Act of 1934 and the rules promulgated thereunder regulate individuals or corporate entities from engaging in certain activities such as insider trading. Under this Act, corporate insiders are required to report to the Securities Exchange Commission (SEC) any insider trading activity. The purpose of the Act is to eliminate or reduce the unfair advantage that corporate insiders possess. The SEC may investigate insider trading activity, especially if trading occurs before public announcements of certain information regarding a firm's operations or prospects are made. However, not all insider trading on insider information triggers SEC investigation.

Insider information that may not trigger SEC investigation is the filing of antidumping (AD) complaints. Our contention is that insiders can use filing of AD complaints as insider information and benefit from trading on this information. Under the Antidumping Act of 1921, if a U.S. firm accuses a foreign firm of dumping in the U.S. market, the Commerce Department must compare the price of the goods in the home market of the foreign firm and the price those goods are sold in the U.S. market. If the

[1] Our dependent variable represents insider buying rather than selling because buying is a clear signal. Insider buying discloses information on how insiders view the expected future value of the firm. Selling, on the other hand, is a noisy signal because it can represent pessimism about the expected future value of

U.S. price does not reflect "fair market value," as determined by the Commerce Department, the foreign firm can be found guilty of dumping.[2]

A guilty verdict imposed on a foreign firm is assumed to protect the domestic firm from foreign competition thus, making the domestic firm more attractive to investors. If this assumption is accurate, then we can further assume that corporate insiders with access to information regarding the filing of AD can benefit from it. Because decision to file for AD complaints is non-public information, corporate insiders can earn rent by purchasing equity before or at the time of filing if it is found to be valid.

We examine this by observing the relationship between the purchases of equity share by corporate insiders and the filing of AD complaints. By examining this relationship, we can address certain policy issues. It allows policy makers to consider issues they might not have considered otherwise. Furthermore, it provides information on insider trading behavior.

The effect of trade policies upon factor returns has been of interest to international economists since the Stolper-Samuelson (1941) Theorem.[3] Because our observation stems from investigating trade protection and its relation to AD petitions, there is great interest to international economists.

In this study, we address trade policies in the form of AD petitions and insider buying behavior. Recall that our contention was that corporate insiders can potentially benefit from AD petitions if insiders buy before or at the time of filing. The potential benefit for insiders from AD petitions exist because filing of AD complaints can protect

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the firm. Insider selling can also occur for reasons unrelated to the insiders' view of the prospectus of the firm.

[2] "A guide to antidumping laws: American's Unfair Trade Practice" Bryan T. Johnson (1992).

the firm from foreign competition, thus making the equity of the firm more valuable. Therefore, if insiders buy securities before filing of AD complaints becomes public information, insiders can potentially earn rents.

In addition to the trade issue, this study is the first research to focus on the buying activities of insiders in the context of AD investigations. Because insiders are more likely to be better informed about their firm's prospects than other asset holders, we can also assert that insiders have access to information regarding the effect of international competition and the possible introduction of AD duties on the firm's vitality.[4]

Previous studies have focused on analyzing whether or not security holders of firms involved in AD investigations earn abnormal returns. However, this is the first to investigate the relationship between insider buying and filing of AD complaints.

Prior studies that examined the relationship between AD investigations and abnormal returns have been conducted by economists such as, Hartigan, Perry and Kamma (1986, 1989, 1998), Krupp and Pollard (1996), Lenway, Rehbein and Starks (1990), and Rehbein and Starks (1995). Each study utilized an event study analysis to assess whether or not security holders of firms involved in AD investigations earn abnormal returns. Because there are investors with varying degrees of information, event studies do not reveal how the most informed participants view the AD petition; therefore, event study analysis is not appropriate for our study.

Lastly, our interest in studying the relationship between insider buying activity and filing of AD complaints concerns the integrity of the securities market itself. SEC

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[3] Stolper-Samuelson theorem states that under the assumption of perfectly mobile capital, the real return to capital will either rise in all sectors or fall in all sectors depending on the country's factor endowments.
[4] See Maur (1998). He has documented that the highest executive levels of a firm are responsible for any AD disputes.

proscribes trading by corporate insiders upon material information that is not yet in the public domain.[5] If insiders trade securities before an announcement such as earnings, mergers or acquisitions are made the SEC is more likely to investigate insiders for insider trading. Therefore, to comply with the SEC prohibition, firms typically impose a "quiet period," usually a month prior to an announcement. During this period, insiders are not allowed to trade. Subsequent to the announcement, they are permitted to buy or sell within approximately two weeks.

From these premises, our concern is whether or not an AD petition triggers SEC investigation if buying takes place. In other words, is the AD petition considered private information that falls in the same category as earnings, mergers or acquisitions; and if so, does the SEC also proscribe insiders from trading before the filing of AD complaints? It is not the sort of factual disclosure for which a quiet period is usually imposed. However, it may provide the opportunity for insiders to gain valuable information at the expense of other traders. If the SEC proscribes insiders from trading during the filing of AD petitions, firms can also impose a quiet period during the filing of AD complaints.

Previous studies of insider trading have focused on whether or not insiders earn abnormal returns including the examination of the extent to which insider trading conveys private information to the market. Examples include Baesel and Stein (1979), Damodaren and Liu (1993), Elliot, Morse, and Richardson (1984), Finnerty (1976), Givoly and Palmon (1985), Seyhun (1986), and Udpa (1996).

Besides our contention that a relationship exists between insider buying and filing of AD complaints, we also provide evidence regarding other market and firm

[5] By material information, we mean information, which would cause a reasonable investor to buy or sell the stock.

characteristics that are related to such insider activity. We not only use filing of AD complaints in our model, but we also employ firm and market indicators, such as price, earnings per share, market capitalization, debt-equity ratio, and S&P 500 index. Our rationale for using such measures is to verify that insiders, like any other informed investors, study these variables when making an equity purchase. As such, it contributes to that literature as well as that of administered protection.

We invoked Fixed Effects Conditional Logit (FECL) and Random Effects Probit (REP) model to perform our study. We find that our results are robust to either specification regarding a significant positive relationship between insider buying and filing of AD petitions. Our study is presented as follows: Chapter II is the literature review; Chapter III is the methods and data; Chapter IV is the results; and Chapter V is the conclusion.

II. LITERATURE REVIEW:

A. USE OF FINANCIAL DATA TO ASSESS TRADE POLICY

1. INTRODUCTION:

The effect of trade policies on various aspects of U.S. economy has always been the subject of interest to many international economists. One interest in particular is the effect of trade policies on the U.S. stock market because it discloses the value of the policy to firm. To examine the impact of trade policies on the U.S. economy, many economists use the Capital Asset Pricing Model (CAPM) with event study analysis. The CAPM is a theoretical model that estimates a normal relationship between stock market rate of return and individual firm's rate of return. The CAPM in conjunction with an event study analysis can be used to study stock market behavior.

There are two types of event study analysis. The first type is based on a constant parameter. In this type of analysis adjustment of beta parameter is not possible (e.g. beta parameter being the slope coefficient). The purpose of using CAPM with event study analysis is to capture the abnormal behavior of the market based on certain event or events. For example, Hartigan, Kamma and Perry (1986) employed an event study with a constant parameter to examine the relationship between trade protection and stock market behavior. They wanted to observe if requests for trade protection and subsequent administrative decisions had any impact on the market value of the common stock. In this mode the appeal for protection and the subsequent administrative decisions are different events.

The problem with this method is that with a constant parameter only one event can be considered at a time. To compute the impact of different events on the stock

market, for example, we would have to estimate separate models for each event. The single coefficient estimate provides information on one event.

Another problem with event study analysis that uses a constant parameter is that it lacks information updating. Updating information is important because one event, although not directly impacting market behavior may be a direct cause of another event which directly affects market behavior. Without updating information only the direct event can be observed thus producing results that is either overstated or understated.

The second type of event study analysis allows the estimated coefficient to vary with different events. It estimates a separate coefficient for every different event within a model consequently; separate estimations are not necessary. Thompson (1993) employed this method to estimate the parameters of each event that was relevant to the implementation of the United States – Canada, free trade agreement (FTA). She observed if each such event had an impact on the implementation of FTA and on the value of common stock.

This type of event study is more advantageous since it considers all the different events and estimates the coefficients accordingly. However, such method has its own drawbacks. There is no objective method for the selection of events. Two people doing the same study may select different events to get to their results. Regardless, this type of event study analysis is very useful because it allows different perspectives on the effects of trade policies on the economy and presents diverse ideas for policy makers.

2. Event Studies with a Constant Parameter

Hartigan, Perry and Kamma (1986) published the first paper that examined the relationship between stock market abnormal returns and trade protection. In this article,

Hartigan, Perry and Kamma (HPK) explored how trade administered protections, such as an escape clause, can affect the price of a firm's common stock. They employed both time series and cross sectional analysis to observe the relationships between trade protection and abnormal performance. The CAPM is used for both time series and cross sectional analysis.

HPK used time series analysis to observe if an appeal for protection and the subsequent administrative decision had an impact on the market value of common stock. They gathered information regarding weekly returns of selected firms before a petition for protection was filed to examine the effects of filing a petition on the value of common stock. First, they employed the following CAPM to estimate the normal returns:

$$R_{iw} = \alpha_i + \beta_i R_{mw} + U_{iw}$$

where,

R_{iw} is the weekly return to security i at time w;

α_i is a constant;

β_i is the systematic risk to security i;

R_{mw} is the weekly rate of return for the market portfolio; and

U_{iw} is the error term.

Next, they calculated abnormal returns by taking estimated parameters from the above regression to compute the residuals for each firm, two weeks before the filing of a petition and extending it through four weeks after the final decision. The results from this computation represented the abnormal performance for each firm. The residuals were calculated by using the following equation:

$$R_{iw} - \hat{\alpha}_i + \hat{\beta}_i R_{mw} = \varepsilon_{iw}$$

Lastly, they computed the average residual by adding the residuals of each firm and dividing it by all the firms in the industry to represent the mean abnormal performance for each industry. To adjust for any price changes during the investigative period, HPK calculated the Cumulative Average Residual (CAR) for each industry. The CAR was calculated by adding the average residuals over a period, which was before the filing of a petition to the date of final decision.

To test any impact of the petition on the value of a firm's common stock, HPK used time series estimators of the standard deviation from the average residuals to calculate the t-statistics. The t-statistics were used to analyze the statistical significance of CAR. The analysis showed that the statistical significance of CAR varied across industries. Overall, the impact of protection effected only few industries. This indicated that the protection might affect the valuable of common stock for few industries. But the general statement that protection causes abnormal return could not be made.

HPK further tried to explain industry abnormal performance by using cross sectional analysis by employing a series of regressions. They regressed three different sets of equations for three different events. These three events were week of U.S. International Trade Commission (USITC) decision, four weeks after USITC decision and four weeks after final decision. They first regressed the average industry residual returns to the following independent variables: International Trade Commissions' (ITC) decisions, import penetration (M), net operating profit from sales of the petition products (π) and the sales of the petitioned products as a percentage of total industry sales (S1 and S2). This was done to observe the abnormal returns during the week of USITC decisions.

To observe the effect on the value of the common stock after the USITC decision, they regressed the average CAR with the same independent variables described above. The CARs were regressed four weeks after the pertinent decision as follows:

$$CAR_{it} = \alpha_i + \beta_{1t}D + \beta_{2t}M + \beta_{3t}\pi + \beta_{4t}S1 + \beta_{5t}S2 + u_{it}$$

where

CAR_{it} is the Cumulative Average Residuals for industry i at time t;

α_i is constant;

β's are the parameters;

D is a dummy variable, assigned a 1 if a USITC decision was affirmative and a 0 otherwise; and

u_{it} is the error term.

Lastly, HPK included a new variable, PROT to their regression model to show the impact of the third event. The variable, PROT was assigned a value of zero for a negative USITC or Presidential decision, and a value of one for a positive Presidential decision.

The regression results from the first event produced statistical significance for three of its coefficients, ITC, S1 and π. The coefficient estimates for M and S2 were not significant. HPK explained the insignificance by stating "that the level of imports may not be important in determining the benefits from protection and that protection may not be sufficient to rescue an industry that concentrates its output in a narrow range of products."

In their 1989 paper, HKP employed the same capital market model to investigate the distinction between threat of injury and actual injury decisions on the stock market.[6] In order to examine this distinction, they observed how dumping decisions (either threat or actual injury) affected the value of a firm's common stock. They hypothesized that in the threat of injury category, an affirmative decision would induce the effected firms to earn abnormal returns, whereas, an actual injury will have no effect on the firm's earnings.

To prove this hypothesis they acquired data for stock prices from firms that reported dumping complaints, including those firms judged to be potentially affected by the alleged dumping. They used the normal market model to estimate the weekly rate of returns. The weekly returns were from fifty-six weeks before the petition to five weeks before the filing date. The estimated parameters were then set to calculate the residuals for each firm in each week from two weeks before to two weeks after the decision week for each of the three events.

Next, they calculated the average weekly residual by adding all residuals of the firms from each petition, and then calculating the Cumulative Average Residual for each petition for each administrative decision. They used this result as their calculated test value to see if any of the events were significant.

The results of the analysis showed that the firms would earn an abnormal return to an affirmative preliminary USITC decision only if threat of an injury is the criterion. For the final USITC decision (actual injury criterion), there was no indication that the firms would earn an abnormal return. An actual injury decision generates no statistically significant results. The rationale for this is that the final injury decision lacks the shock

[6] Captial market model and market model are used interchangeably with CAPM.

element. It is no longer a surprise, since all the other decisions are public knowledge and therefore the market would be able to predict accordingly.

On the other hand, abnormal returns corresponding to a threat with affirmative preliminary decision was evident because firms can trade on speculation. Since the probability that a final decision is greater with a threat with an affirmative preliminary decision, the firms would actively trade based on an expectation that the final decision would be an affirmative decision.

3. Event Studies With Varying Parameter:

To better understand the effects of United States-Canada free trade agreement (FTA), Thompson (1993) examined the relationship between stock market behavior and the news of the FTA. Like Hartigan, Kamma and Perry (1986), Thompson also employed a market model to determine whether the events that led to FTA would have any impact on the value of firm's common stock. The purpose of her paper was to observe whether or not FTA news had a significant impact on the stock prices and what these stock market reactions implied about the anticipated industry-level adjustment to free trade. She used an event study to estimate the abnormal returns during the events, which had the most influential impact on the implementation of FTA.

In order to test for this relationship, she lists six events, which she felt had the most impact on whether or not the FTA would be implemented. The events are: (1) threat to deny fast-tract authorization; (2) approval of fast-tract procedure; (3) negotiations were discontinued; (4) agreement was reached; (5) Turner gains popularity during the general election campaign and vows to abrogate the agreement if elected; and (6) Mulroney regains popularity and wins the election. For each of the event periods

(known as an event window), she estimated the abnormal returns by calculating the residuals. She used the following model to calculate the normal returns for each event window:

$$r_{it} = \alpha_i + \beta_i r_{mt} \sum D_{itd} \gamma_{id} + \varepsilon_{it}$$

where,

r_{it} is the daily return to portfolio i at time t;

α_i is constant;

β_i is the systematic risk to portfolio i;

r_{mt} is the daily return to market portfolio;

D_{itd} is the dummy variable, assigned 1 for the dth day in event window e and 0 otherwise;

γ_{id} represents the abnormal return; and

ε_{it} is the error term.

The coefficient estimate γ_{id}, represents the abnormal return for each portfolio i. She added all the abnormal returns over event window e to compute the cumulative abnormal return, CAR_{ie}.

She tested for two different sets of hypothesis. Her first hypothesis was that FTA news had a significant impact on the stock prices. The second hypothesis was that the abnormal behavior in stock prices was attributed to new information regarding the anticipated impact of the FTA.

She tested for the significance of whether or not FTA news had an impact on the stock prices by testing the significance of all six events (joint hypothesis). To allow for joint hypothesis testing, she estimated the abnormal returns for all of the N industry

portfolios simultaneously within a system of seemingly unrelated regressions for each event. She used this estimate to perform an F-test, which determines whether or not the null hypothesis should be rejected. If the null hypothesis, which states that all of the cumulative abnormal returns for a given event window e are equal to zero, was rejected, than there was statistical evidence that the FTA news had an impact on the stock prices.

The second hypothesis was based on the results of the first hypothesis. If she observed that any of the events proved statistically significant, she took the statistically significant events to test if the abnormal behavior in stock prices are attributed to new information regarding the anticipated impact of the FTA rather than other new information learned during the event window.

In order to test such hypothesis, Thompson computed total cumulative abnormal return (TCAR). The TCAR was computed by first estimating the cumulative abnormal returns for two sets of industries. First included those industries that were hypothesized to be positively affected by the FTA. Second included industries that were hypothesized to be negatively affected by the FTA. She added the cumulative abnormal returns within each set of industries to compute the TCAR for each event window. The TCARs were used to observe whether or not the null hypothesis that TCAR is equal to zero was significant. If the TCAR is not equal to zero, than null hypothesis can be rejected, which means that there is statistical evidence that these events would attribute to changes in expectations about the FTA.

From her joint hypothesis test, she found that abnormal returns corresponding to three different events were jointly significant and consistent with her hypotheses. This meant that out of six events, only three events, which led to the agreement of

implementing FTA showed any significance. She used these three events to determine whether the abnormal returns for these events would attribute to changes in expectations about the FTA. To test the significance of this hypothesis she used the TCAR and found that TCARs corresponding to event four was statistically significant, indicating that event four attributed to changes in expectations about the FTA.

For this article, Thompson used daily returns data for her estimations and made an assumption that these daily returns are normally distributed with mean 0 and variance σ^2. The weakness with using such data is that the daily data are not usually normally distributed, which means that statistical inferences such as t-test cannot be used. Also utilizing daily data lacks certain information due to 'nonsynchronous trading'. By 'nonsynchronous trading' we mean that there is no break in the trading activity. It doesn't allow time to let certain information or event to affect the stock prices therefore the daily returns do not provide the most accurate data.

In a similar study, Thompson (1994) employed an event study method to examine whether abnormal stock market returns corresponding to FTA news are consistent with comparative advantage and economies of scale theory. Comparative advantage predicts that the Canadian industries using their relatively abundant factors intensively should benefit from the FTA. On the other hand, economies-of-scale theory suggest that Canadian firms operating in industries where the average plant scale is small, relative to the corresponding U.S. industries would experience economic loss due to FTA.

To observe the consistency of such hypotheses, Thompson used the same six major events that she employed in her 1993 paper. She used these events and estimated the following model:

$$R_{it} = \alpha_{il} + \beta_{il} r_{mt} + \sum D_{os}(\alpha_{is} + \beta_{ir} r_{mt}) +$$

$$\sum D_e(\delta_{oe} + \gamma_e(\delta_1 \theta_{il} / \theta_{ik} + \delta_2 \theta_{in} / \theta_{ik} - \delta_3 \theta_{is} / \theta_{ik} q_i^{us-c})) + \varepsilon_{it}$$

The first part of the equation is your normal market model [$\alpha_{il} + \beta_{il} r_{mt}$]; the second part of the equation [$\sum D_{os}(\alpha_{is} + \beta_{ir} r_{mt})$] represents a change in the security's relationship with the market; and the third part represents comparative advantage and economies of scale. The first two variables (θ_{il}/θ_{ik} and θ_{in}/θ_{ik}) are the labor to capital and natural resources to capital ratio, respectively. These variables represent the comparative advantage hypothesis. The last variable, $\theta_{is}/\theta_{ik} q_i^{us-c}$, which indicates the plant scale, represents the economies of scale hypothesis. The D_e is a categorical variable with vectors of 1, 0 or –1 to signify the event windows. If event window e increases the perceived probability that the agreement would be implement, a one is assigned, whereas, if it decreased the perceived probability than it is assigned –1, otherwise it's 0.

To observe if any of the FTA events had any impact on relative factor shares and relative plant scale, Thompson employed two different regression models to estimate the parameters. The regression models she used were a non-linear least squares estimation procedure (NLS) and non-linear seemingly unrelated regression (SUR). Three different approaches were used to compute two different sets of estimates.

In her first two approaches, she acquired firm specific data and used the NLS and SUR models to compute the gamma coefficients. She acquired the industry portfolio data for her third approach and used NLS to compute the coefficients. The first set of

estimation included only the last three events and the second set of estimates included all six events in the event window. The event windows are separated into a full event window and a one-day event window. The estimation period was for one year prior to the first event window and end on the last day of the last event window.

The gamma coefficient estimates represent whether or not statistical evidence is present for each event window. Recall that the concept of comparative advantage and economies of scale predicts that some industries will benefit from FTA whereas, others might not. In this paper, Thompson predicted that the Canadian industry that used their abundant factors (natural resources) intensively would benefit from the FTA, whereas, the Canadian industries where the average plant scale is small relative to the U.S. would experience a loss.

In her estimations, she found the labor intensity coefficient from three-event sample was generally positive. The positive results indicate the relative strength of the news learned during the event window. If the FTA news released during an event window was overshadowed by other new information learned during that window, a negative estimate may result. Furthermore, since only one coefficient estimate showed statistical significance, it is consistent with the hypothesis that Canada has neither a comparative advantage nor disadvantage when it comes to labor. This conclusion was made based on the weak results.

Next, she examined the hypothesis on whether or not Canada has a comparative advantage in production of natural resources. From the estimates, she found that the natural resource intensity coefficient to be positive and to be statistically significant for all but one of the estimations. The positive results indicate that the investors expected

natural resource intensive firms to benefit from the FTA. The statistically significant results, on the other hand, represent a strong indication that Canada has a comparative advantage in production of natural resources.

The last observation was on the premises of economies of scale hypothesis. She found that the coefficient estimate of the plant scale variable was consistently negative and was statistically significant for most of the estimations. These results suggest that Canadian industries where average plant scale is small compared to the U.S. would expect to experience economic loss during the adjustment to free trade, which is consistent with the economies of scale hypothesis. All the above results are from the estimates of three-event sample. The results from the six-event sample were also consistent with the comparative advantage and economies of scale hypothesis.

Lenway, Rehbein and Starks (1993) also employed an event study analysis to examine the impact of protectionism on firm wealth. To observe such impact they explored the history of trade policy issues in the steel industry. They formed two separate hypotheses. The first hypothesis was to test if the announcement of the imposition of trade protection had any impact on steel firms' equity values. The second hypothesis was to test for the potential change in a firm's risk characteristics.

They list six events they felt had an expected impact on the steel firms' share prices. Lenway, Rehbein and Starks (LRS) employed the following market model to estimate the impact:

$$R_{It} = \alpha_I + \alpha_I D_j + \beta_I R_{mt} + \beta_I R_{mt} d_j + \sum_t W_{Ijt} E_{jt} + u_t$$

where,

R_{It} is the daily return on portfolio I at time t;

D_j is the dummy variable, equal to 1 for every day after the announcement date until the last observation in the sample, otherwise 0;

β_I is the systematic risk;

R_{mt} is the return to market portfolio;

E_{jt} is a dummy variable assigned a 1 if event j occurs during t, otherwise 0; and

U_t is the error term with expected value of zero.

This portfolio approach model estimates the average industry reaction to changes in trade protection. LRS also employed the unconstrained approach model:

$$R_{it} = \alpha_i + \alpha_i D_j + \beta_i R_{mt} + \beta_i R_{mt} d_j + \sum_t W_{ijt} E_{jt} + u_t$$

to estimate a separate coefficient for every firm for every event. The main difference between portfolio approach and unconstrained approach model is that the dependent variable, R_{it} is the return on shares of firm i at time t.

In order to test whether the announcement of protective measures has an effect on the equity value of the firms involved LRS observed the coefficient estimates for the dummy variables that represented different events. The estimates from the portfolio approach produced statistical significance for the initial imposition of the Trigger Price Mechanism (TPM) and Voluntary Export Restraints (VER) Agreement with Europe. Furthermore, the results of the estimated values are positive, which is consistent with the assumption that the TPR and VERs have positive impact on the steel industry. The TPR was implemented to protect the steel industry from foreign competition and VERs were imposed to restrict imports. The estimates for other events produced insignificant results.

The estimates from the unconstrained approach revealed that some firms showed statistical significance for events that led to TPM and VER. There were only four out of

twenty-one firms that produced statistical significance and fifteen firms that resulted in expected sign (i.e. positive) upon announcement of the TPM program. This suggested that four firms earned a significant abnormal return and fifteen of the firms had abnormal return in the expected direction. The estimation based on the second hypothesis concerning systematic risk showed inconclusive results.

Hartigan and Zhu in their 1998 Working Paper attempted to address the issue of how to assess material injury from antidumping petitions. They contended that the "material injury from dumping should be assessed in the context of the entity of a firm, rather than a narrowly circumscribed product line."[7] Furthermore, they argued that the investigators of antidumping petitions should examine age distribution of a firm's physical capital, its access to financial capital, and the rate of innovation in the industry before making any injury determination.[8] However, due to the confidentiality of firm specific data in material injury investigations, they were not able to do a thorough examination to support their argument.

Instead they used a market model with event study analysis to show that affirmative decisions in a trade investigation reduce the risk of holding a pertinent firm's security. By demonstrating this, they contented the external cost of financial capital is lowered for the firm. Because the cost of capital has been reduced, investment in capital becomes more profitable for the firm. Therefore updating its physical capital makes the firm more competitive and less vulnerable to dumping, which means that it is less likely to be materially injured by dumping. In other words, if HZ are able to demonstrate that an affirmative decision in an AD investigation reduce the risk of holding the security of a

[7] See page 3.
[8] See page 4.

petitioning firm, then indirectly, they can imply that material injury should be assessed in a manner suggested by them.

The following market model was used to estimate beta coefficient, which represents the level of risk involved in a financial investment in an enterprise:

$$r_{it} = \alpha_{io} + \beta_{io} r_{mt} + \sum(\alpha_s + \beta_{io} r_{mt}) D_s + \sum(\beta_e D_e) + \varepsilon_{it}$$

The dependent variable is the weekly rate of return for each petitioned firm and the independent variables are S&P 500 index return and dummy variables. The first dummy variable of the equation $[\sum(\alpha_s + \beta_s r_{mt}) D_s]$ represents a change in security's relationship with the market and the other $[\sum(\beta_e D_e)]$ represents the abnormal return. The D_s was assigned a one for observations between the event s and the preceding event window; and zero otherwise. The D_e was assigned one during event window e if the decision was affirmative and zero otherwise.

The events they considered were institutional procedures. For instance, once trade protection is petitioned, the USITC makes its preliminary material injury assessment. If the decision from this is positive, the Department of Commerce (DOC) makes its preliminary dumping decision. The DOC makes its final dumping decision. If the DOC's final dumping decision is positive, the USITC makes its final material injury decision. However, if negative decisions resulted during any of the decision making process, the investigation is terminated. These are the four events that Hartigan and Zhu (HZ) considered.

HZ used these events to estimate the risk coefficient associated with each event. They used SUR model to estimate the coefficients and analyze the value of estimated parameter for beta. Their main purpose was to observe the beta coefficient which

"discloses the responsiveness of a firm's security price to a market index".[9] In other words, a high value of beta represents a relatively risky security whereas a low value represents a less risky or safe security. The dummy variables represent investigation decisions, therefore the inclusion of the dummy variable would explain the effect it has on the value of beta. A firm's risk may change due to a decision made by the administrative parties.

Their final outcome produced from the SUR model showed some support for their hypothesis. Their hypothesis was that affirmative decisions in a trade investigation reduced the risk of holding a pertinent firm's security. All coefficient estimates, β_s, which represents the risk factor in the security's relationship with the market, showed statistical significance, indicating that each event were significant in assessing the riskiness of a security. Furthermore, HZ found that with an affirmative DOC preliminary and final decision, a positive impact on securities in relations to the market was evident. Thus, creating an abnormal performance for a firm. Lastly, they discovered that antidumping investigations might reduce the risk associated with holding a security by petitioning firms. This was consistent with their initial contention.

Brander, in his (1993) paper also examined the FTA between U.S. and Canada, and analyzed its implication on the stock market. He believed that the implementation of the FTA would result in abnormal stock market behavior. Brander looked at two different relationships. First he observed people's reactions regarding the implementation of the FTA by studying the poll results. Using these poll results he analyzed the Canadian stock market behavior. Second, he examined the 'trade mechanism' hypothesis. The 'trade mechanism' hypothesis states that the stock market

[9] See page 12.

reacts abnormally from investors' expectations about potential gains from the implementation of the FTA.

The implementation of the FTA depended upon whether or not a Conservative Party was elected. If Canadians elected a person from the Liberal Party, the probability of the FTA being implemented was very small. To observe the first relationship, Brander acquired Gallup polls and an average poll variable from other major pollsters before the election to examine whether the poll results had any impact on the Toronto Stock Exchange (TSE). If the poll results announced a favorable outcome for the Conservative Party, Brander hypothesized that the TSE index would go up.

Brander employed the following model to examine relationship between poll results and TSE:

$$T_i = \alpha_o + \alpha_L T_{i-1} + \alpha_P P_i + \alpha_N N_i + \alpha_R R_i + e_i$$

where,

T_i is the TSE index at time i;

T_{i-1} is lagged value;

P_i is the election poll results at time i;

N_i is the NYSE index;

R_i is the interest rate;

α's are the parameters; and

e_i is stochastic error term.

He ran two separate Ordinary-Least-Squares (OLS) regressions; one using the Gallup Poll and the other using the average poll data. The coefficient estimates produced from the OLS regression yielded high levels of statistical significance. However, Brander

found that the error term was serially correlated, indicating that the results from the OLS regression was no longer a good estimator. To correct for serial correlation, Brander allowed the error term to be a first-order autoregressive (AR1) process. He employed the Cochrane-Orcutt procedure to correct for the serial correlation:

$$T_i = \alpha_o + \alpha_L T_{i-1} + \alpha_P P_i + \alpha_N N_i + \alpha_R R_i + \rho e_{i-1} + u_t$$

where ρ is the error autocorrelation coefficient and u is normal white noise.

From this regression equation, Brander found that all but one coefficient estimate produced statistical significance. The coefficient estimate for interest rate, α_R was the only estimate that showed statistical insignificance. The adjusted R^2 was also very high indicating that the regression was a good fit. Furthermore, in comparing the coefficient estimate for Gallup Poll against average poll, Brander found that the Gallup poll coefficient estimate showed higher statistical significance. This suggested that investors might have been more responsive to the Gallup poll than to other polls.

To address the 'trade mechanism' hypothesis, Brander re-specified the OLS model by using subindices from the TSE. The data for the dependent variable, T, consisted of industrials, forest and paper products, energy and real estate. Brander predicted that the energy index would most likely be affected positively by the FTA because of the comparative advantage hypothesis. In addition, energy producers strongly supported the FTA. Moreover, he contended that the real estate index would not be very sensitive to FTA, because real estate is a non-traded good. According to the 'trade mechanism hypothesis' a stronger poll coefficient in the energy regressions would be evident and a weaker poll coefficient from the real estate index.

Using the OLS model, Brander regressed each of the subindices to the same explanatory variables (i.e. Gallup poll, interest rate, lag, etc.), and found that the results were very weak. The calculated t-statistics were all very low with an exception of the regression for the industrial index. The weaknesses in results were explained by possible miss-specification in the model. Brander considered two different methods to correct such miss-specification. First, he looked for non-stationarity in the variables.[10] To correct for non-stationarity, Brander transformed the data by taking the first order difference and then regressing the values. From these estimates, he found that the regression results were quite good except for the real estate regression.

Second, he used rate of return data for the dependent variable instead of the TSE index to correct for possible miss-specification in the model. Whether using rate of return data was more appropriate depended upon error distribution and functional forms. From this result, he found that the significance of the poll variables tended to be slightly less than in the first difference regression. Overall, the estimations were as predicted and consistent with the trade mechanism hypothesis.

In conclusion we find that certain events that lead to changes in trade policies can impact the stock market. We observed such behavior by employing the CAPM with event study analysis. For example, HPK (1986, 1989) determined that certain trade protection polices can influence stock market returns. This study used the residuals derived from CAPM. The residuals were then used to estimate the abnormal returns. This kind of study was an example of an event study with constant parameter.

[10] If the estimated variables are found to be non-stationary, the t-statistics can be misleading. A stochastic process is said to be stationary if its mean and variance are constant over time and the value of covariance between two time period depends only on the distance or lag between the two time periods and on the actual time at which the covariance is computed. See Gujarati (1995).

Next, we reviewed the concept of varying parameters. This is also an event study but it permits the use of different events in one model. Thompson (1993, 1994), Hartigan and Zhu (1998) and Lenway, Rehbein & Starks (1993) all employed the event study analysis with varying parameters. They examined the stock market and its reactions based on different events that reflected changes in the trade policies. They all employed the CAPM and its residuals to estimate the abnormal returns for different events. From these studies, we found that firms' abnormal returns are influenced by the announcements that can potentially change trade policies.

B. USE OF FINANCIAL DATA TO INVESTIGATE INSIDER TRADING:

1. INTRODUCTION:

Because insiders are more aware of the overall operations of their firm, it is valid to assume that insiders' have greater potential to benefit from stock transactions. Although, the SEC tries to prevent insiders from earning abnormal returns by trading their own firms' securities, insiders can still benefit from such activity. The SEC regulates insider trading by investigating any big purchases or sales, especially if these activities occurred before announcements of earnings, mergers and acquisitions. Furthermore, to level the playing field, public firms are required by the SEC to provide full and fair disclosure of information about their firm's operations.

To show that insiders do benefit from having access to private information, many different studies have been performed. In this section, we review several empirical studies that examine insider trading on private information.

2. INSIDER TRADING WITH PRIVATE INFORMATION:

It is evident that an informed investor can expect to earn a higher rate of return on their investment then an investor who is not as well informed. Furthermore, an investor with access to private information should earn a higher rate of return then any other investor. Private information is usually first available only to corporate insiders which means that these insiders can use such information to gain advantage in the market. Further such information may be incompletely disclosed.

Elliott, Morse and Richardson (1984) examined the relationship between insider trading and information announcements. In this study they observed insider-trading behavior surrounding public information disclosures. They hypothesized that insiders with non-public information would engage in a profitable trading strategy. They performed three different studies to prove this hypothesis. First, they investigated insider trading surrounding public announcements. Second, they focused their study on extreme insider trading before public announcements and third, they performed a multivariate test.

In order to determine the insider-trading behavior surrounding certain public announcements, Elliott, Morse, and Richardson (EMR) list eight events to represent the information announcements. Four of the events were considered "good news" events and the remaining four events were "bad news" events. The "good news" events consisted of large earnings increases, large dividend increases, bond rating increases and merger announcements. The "bad news" events included large earnings decreases, large dividend decreases, bond rating decreases and bankruptcy announcements.

EMR took the annual population frequencies of insider trading surrounding these announcements and used a binomial test to determine whether or not statistical

significance existed. The time period employed were twelve months before each announcement, the month of the announcement and the twelve months following each announcement. Based on the binomial test out of eight events, five showed statistical significance. They also found that reduced selling and/or greater buying was observed before merger announcements and before large earnings and dividends increases, which was consistent with their hypothesis. On the other hand, they also observed reduced selling before two "bad news" events, which was inconsistent with their hypothesis.

From their binomial test, they also found evidence of active strategy in all three of the good-news cases and passive strategies in two of the bad-news cases. If news was good news, insiders would buy (active strategy) whereas with bad news (passive strategy) insiders would either sell or delay trading.

Second they investigated the extreme insider-trading behavior before information events. They contended that extreme insider trading activity before information events would yield greater abnormal returns. The extreme insider trading was defined as follows: the number of sellers exceeding the number of buyers by three or more for a given month and vise versa. Based on this definition, the probability of extreme insider trading for sellers and buyers was calculated. From this calculation, they compared the probabilities and tested for significance. The results of these tests suggested that there wasn't any particular pattern of extreme insider trading which was consistent with the prior use of public information signals.

Lastly, they performed a multivariate test to observe insider-trading behavior based on the events listed above. They used a multivariate test to account for various information events that may occur within the same time period. EMR employed a Logit

model for the sample of extreme buying and selling months for the subsequent twelve months. They used the maximum likelihood estimator (MLE) to fit the following Logit model:

$$P = (1 - \exp\{-\gamma X\})^{-1}$$

where

$$\gamma X = \gamma_o + \gamma_1 EARN + \gamma_2 DINC + \gamma_3 DDEC + \gamma_4 BRINC + \gamma_5 BRDEC$$

P is the probability that extreme buying occurred;

γ is a vector of coefficients, γ_0 through γ_5;

X is a vector of explanatory variables;

EARN is a continuous measure of earnings change; and

DINC, DDEC, BRINC and BRDEC are all dummy variables.

DINC represents a dividend increase and is assigned 1 if dividend increased more than 100% and 0 otherwise. DDEC represents a dividend decrease and it is assigned 1 if dividend decreased more than 50%, otherwise 0 is assigned. BRINC and BRDEC both represent bond ratings. BRINC is bond rating increase and is assigned a 1 if bond rating increased and 0 otherwise. BRDEC is bond rating decrease and is assigned a 1 if it decreased and 0 otherwise.

The dependent variable was a discrete variable with a 1 if there was extreme buying and 0 if extreme selling occurred. EMR predicted that the coefficient estimates, γ_1, γ_2 and γ_4, were greater than zero, whereas γ_3 and γ_5 were less than zero. The results from the MLE revealed that four out of five coefficients were signed as expected, which meant that the computed coefficient estimates all had correct signs except for the coefficient estimate for BRINC. Furthermore, they found that only two of their

coefficient estimates produced statistical significance. The BRINC coefficient estimate, which produced an unexpected sign was the most significant relative to its standard error. The statistical significance for DINC and BRINC coefficient estimates indicated that the dividend and the bond rating increases influence insider-trading activity.

In a similar study, Joesph E. Finnerty (1976) examined the value of insider information. In this paper, he used a multivariate analysis to observe the relationship between insiders' trading and the subsequent announcement of financial and accounting results. To examine this relationship, he compiled company data and data on individual insiders' transactions. The company data consisted of 1,043 firms extracted from the New York Stock Exchange (NYSE) for the year 1967-1972 period. He manipulated the data into 49 variables.

He also acquired transaction files for insiders. This data identified the company and individual insider. It gave the number of shares traded, the number of shares held at the end of the month, the date of the transaction, and a buy-or-sell code. His observation consisted of 854 companies. Furthermore, he used this data to place the companies into one of two classes, a buying or a selling group. He selected five periods during 1971 which were January to December 1971, April to December 1971, July to December 1971, October to December 1971, and December 1971.

Finnerty used the following index to represent the insiders' activity:

$$X_{j,t} = \sum_{M_j} \frac{S_{i,j,t} - B_{i,j,t}}{H_{i,j,t}}$$

where,

M_j is the number of insiders trading in company j;

$S_{i,j,t}$ is the number of shares sold by the i^{th} insider of j^{th} company during time t;

$B_{i,j,t}$ is the number of shares bought by the i^{th} insider of the j^{th} company during time t; and

$H_{i,j,t}$ is the number of shares held by the i^{th} insider of the j^{th} company at the end of time t.

To determine the buying or selling categories for particular period, he used the following criteria:

$X_{j,t} < 0 =$ buy (Group 1)

$X_{j,t} > 0 =$ sell (Group 2)

Next, he reduced the independent variables from 49 to total of 32 by performing a correlegram analysis. The correlegram analysis was performed to identify the most closely related variables and thus eliminating the extraneous independent variables. He retained any variable whose correlation coefficient with any other variable was greater than 0.400. He contended that by using such analysis, he "got the most information possible from the fewest independent relationship inherent in the original data."[11]

He separated these 32 variables into six identifiable sets of linear combinations comprising the original variables as follows: (1) size, (2) financial leverage, (3) earnings, (4) operating leverage, (5) capital intensiveness, and (6) dividends. He used these six factors as inputs to the Multiple Discriminant Analysis (MDA). The second set of inputs to the MDA was classified as either buying or selling group. A discriminant function was used to assign companies to a specific group during the five periods of 1971.

The estimated coefficients from the linear discriminant function for each factor provided the relative importance of these variables in assigning group membership.

[11] See page 209.

Greater the coefficients, the more important the variables. He also employed a univariate t-test to evaluate the difference between insiders' buying and selling.

He found that insiders usually sell securities of larger companies with smaller earnings and smaller dividends whereas insiders buy securities from smaller companies with greater earnings and greater dividends. From factor analysis, he found that size, earnings, capital intensiveness and dividend produced statistical significance, whereas financial leverage and operating leverage were insignificant.

His last endeavor was to assess the strength of the relationship between private information and insiders' trading behaviors. A classification matrix was generated for each of the periods. Finnerty contended that "the greater the model's ability to classify an insider's transaction as a purchase or sale on the basis of future performance, the greater the indication that insiders relied on their expectations of the future values of these variables when they are deciding to trade."[12] From the results generated from the two-way classification matrix, he found that December 1971 was a better time for buyers and sellers than for January 1971. This is an indication that the closer to the profile year, the stronger the relation between insiders' transactions and future operating results. [13] Finnerty contended that the rational for such results was due to the insider's lessened uncertainty about the near future.

A study by Baesel and Stein (1979) investigated the profitability of insider trading activities based on the value of information. They hypothesized that insiders with access to more valuable information would earn higher returns from insider trading. To test this

[12] See page 210.
[13] See pag 211.

hypothesis, they constructed three subsamples from their data, which consisted of 111 large TSE listed industrial firms from year 1968 to 1972.

The first two subsamples consisted of two different groups of insiders, ordinary insiders and bank directors. Ordinary insiders included officers or directors of the firm, as well as beneficial owners of 10% or more of the firm's stock. The subsample consisting of ordinary insiders were selected by taking a firm from 111 firms and recording the trading activity of OI during a month. If this same firm did not have any trading activity during that month, another firm was randomly drawn. This continued until five firms, which had insider activities, were selected for each month. This process resulted in 580 trades.

The bank directors included corporate insiders from the 111 large firms who were also directors of Canadian chartered banks. This subsample was constructed by using insider trades made by the bank directors in securities of other companies. The trades made by bank directors in their own bank were not included in the sample because of lack of information. From this they observed 405 trades.

The third subsample, called a control sample consisted of 300 trades in a 60-month period. This subsample was constructed by taking a sample set consisting of 5 randomly selected trades in the 111 firms for each month. The control sample was used to represent the firms that may have done better than the market as a whole due to successful management. Including the control sample eliminates or reduces potential survivorship bias in the data.

Baesel and Stein (BS) argued that bank directors have access to more valuable information then any typical corporate insider. From this assertion, their hypothesis can be rephrased to state that bank directors would earn higher returns than any other insider from insider trading activity. To test this hypothesis, they constructed portfolios of securities for each of these three subsamples and used the CAPM as follows:

$$R_{p,t} = \alpha_{p,t} + \beta_{p,t} R_{m,t} + e_{p,t} \qquad (1)$$

where,

R_p represents actual risk premium;

α_p represents systematic deviations of return;

β_p represents systematic risk; and

e_p is a random error term with mean zero and variance σ^2

To observe whether or not the bank directors profitability was greater than other insiders, BS computed the abnormal returns for each of these subsample groups, by acquiring the residuals from equation (1) and estimating the following coefficients:

$$\hat{\varepsilon}_{p,t} = R_{p,t} - E(R_{p,t})$$

and,

$$E(R_{p,t}) = \hat{\alpha}_{p,t} + \hat{\beta}_{p,t} R_{m,t}$$

where,

$\hat{\alpha}$ *and* $\hat{\beta}$ are OLS estimates from equation (1); and

subscript p stands for ordinary insiders, bank directors and control sample

BS normalized the residuals from this model to correct for differences in timing of returns. The normalized residuals were constructed to produce a test of the significance of the return deviation for the one-month holding period τ months after the

portfolio was formed.[14] To normalized the residuals, BS first took one-month residual τ months after the portfolio formation as follows:

$$\hat{\varepsilon}_{p,t,\tau} = R_{p,t,\tau} - E[R_{p,t,\tau}]$$

where, τ signifies the elapsed months since portfolio formation. Next, BS standardized the residuals by using an estimate from the residual standard deviation for the 60 months prior to month t as follows:

$$\hat{S}_{p,t} = \sum_{n=t-61}^{t-1} \frac{(R_{p,t,n} - \hat{R}_{p,t,n})^2}{58}$$

where,

$$\hat{R}_{p,t,n} = \hat{\alpha}_{p,t} + \hat{\beta}_{p,t} R_{m,t}$$

The normalized residual is then presented as follows:

$$\hat{n}_{p,t,\tau} = \frac{\hat{\varepsilon}_{p,t,\tau}}{\hat{s}_{p,t}}$$

where, $n_{p,t,\tau}$ was one month normalized residual from a portfolio which has been held for τ months since portfolio formation.

To observe the hypothesis that the bank directors would earn a higher rate of return then the ordinary insiders, they analyzed the results from the normalized residuals. Their null hypothesis was that the normalized residuals (i.e. abnormal returns) for a 12-month holding period for the ordinary insiders were equal to bank directors. They used the standard difference of means for two normal populations with unknown variance to test for significance.

[14] "Value of information: information from the profiability of insider trading". Journal of Financial and Quantitative Analysis. (1979).

From this they found that the calculated t-statistic was significantly high, indicating that the null hypothesis could be rejected. By rejecting the null hypothesis, BS concluded that the bank directors earned higher return from insider trading. They also observed the residuals for buys and sells together on average over the 12-months after the trades and found that the buys by the bank directors yielded higher percentage as compared to ordinary insiders, whereas with sells it was reversed. That is, sells by the ordinary insiders yielded higher percentages. This result affirmed their hypothesis that unusual profits were earned by the bank directors.

Next, they analyzed the timing of when abnormal profits were earned. Their interest in analyzing the timing was to examine the semi-strong form of the efficient market hypothesis. According to this hypothesis abnormal profits could not be earned from publicly announced information.

To examine whether this hypothesis was true, they observed whether or not insiders earned abnormal profits before or after the release of announcements. BS employed the normalized residuals that provided an estimate of abnormal returns τ months after purchase to investigate the timing.

The calculated t value was statistically insignificant for most of the residuals suggesting that the abnormal profits were earned following the release of announcements. Furthermore, the low t-value indicated that unusual profits were earned several months after the trade. From these results, BS concluded that the efficient market hypothesis was inconsistent.

Numerous studies, such as Chang and Suk (1998), Lorie and Niederhoffer (1986), Pratt and DeVere (1970), Jaffe (1974), and Finnerty (1976) have been done to show

inconsistencies in the efficient market hypothesis. H. Nejat Seyhun (1986) attempted to reconcile the efficient markets hypothesis by correcting for any biases that may have occurred in the previous studies and examining the relationship between expected losses of uninformed traders to that of informed traders.

Seyhun found two potential biases from previous insider trading studies, which may have contributed to the inconsistent conclusions of the efficient market hypothesis. First, previous studies generally assumed that all insider trading information became publicly available within two months. However according to market efficiency hypothesis stock price reaction occurs at the time information becomes public. By assuming that there was at least two-month delay in information availability, stock price reaction was also expected to occur after the two-month delay, thus permitting abnormal returns after public information, which is inconsistent with the market hypothesis. To correct for this bias, Seyhun used the actual dates insiders first reported their transactions to the SEC and the dates insider trading information was published.

Second, Seyhun argued that using the CAPM might have resulted in potential biases in measuring the expected return. This contention was based on recent studies that documented the flaws in the CAPM.[15] Because previous studies used CAPM to prove the inconsistencies of market efficiency hypothesis, Seyhun argued that the results of these studies must be viewed with caution.

Next, he attempted to observe the relationship between expected losses of uninformed traders to that of informed traders by investigating the bid-ask spread and insiders' abnormal profits. In analyzing this relationship, Seyhun contended that recent

anomalies concerning the efficient market hypothesis could disappear if the expected loss to informed traders was taken into account by including the bid-ask spread as an additional cost of trading.[16]

To show how bid-ask spread could be reflected as an additional cost of trading, Seyhun argued that market makers would always lose out to informed investors. Because market makers cannot distinguish between informed and uninformed investors, to make up for losses, market makers' bid-ask spread would be greater. By setting a higher bid-ask spread, he minimized his losses. He could earn from uninformed traders what he lost to informed traders. This implied that there was a positive relation between the bid-ask spread and the informed traders' abnormal profits. Moreover, if informed traders had access to more valuable information, the bid-ask spread would be higher than otherwise.

Seyhun argued that ignoring the relationship between the bid-ask spread and the expected loss to informed traders could lead to an overstatement of the realizable return to any active trading rule.[17] By demonstrating this positive relationship, an allowance for the expected loss to informed traders could be made by including the bid-ask spread as an additional cost of trading. The cost, then can be deducted from the gross abnormal return to deflate the overstatement of the realizable return.

To examine the positive relationship between bid-ask spread and the expected loss to informed traders, Seyhun gathered insider trading data from the SEC for 1975 to 1981 period. Total of 790 firms was used. Their daily returns were extracted from the Center for Research in Security Prices (CRSP). Out of 790 firms, 21 firms were

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[15] Work by Banz (1981) and Reinganum (1981) showed that the CAPM based residuals are on average positive for small firms, and negative for large firms. Seyhun argued that this systematic bias in CAPM residuals can lead to biases in estimating abnormal returns in insider trading studies.
[16] Page 211.

subtracted since they did not report any insider trading during the investigative period, therefore the total actual number of firms used for this study was 769. From these firms, he grouped them by its size and by the identity of insiders.

Seyhun employed the CAPM to measure the expected returns to securities. From this model he acquired the residuals to estimate the abnormal return as follows:

$$PE_{i,t} = (r_{i,t} - (\hat{\alpha}_i + \hat{\beta}_i r_{m,t}))W \qquad for\ t = -199,300$$

where,

$r_{i,t}$ is return to security i on day t;

$r_{m,t}$ is the market rate of return at time t;

$PE_{i,t}$ is the prediction error for security i at time t from 199 days before to 300 days after each event day;

β and α are estimated parameters from an ordinary least squares regression of $r_{i,t}$ on $r_{m,t}$; and W is a dummy variable equal to one if the number of buyers exceed the number of sellers in a month, minus one if the number of sellers exceed the number of buyers.
If the number of sellers equal the number of buyers, then that month was excluded from the observation. An event day was considered the last insider trading day in each month.

From the prediction error estimates, Seyhun computed the average prediction error (APE) for time t, APE_t as follows:

$$APE_t = \frac{1}{K_t}\sum_{i=1}^{K_t} PE_{i,t} \qquad for\ t = -199,300$$

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[17] Page 192.

where K_t is the number of prediction errors on event day t.

To test for significance, Seyhun calculated the t-statistics by taking the APE_t and dividing it by sample standard error σ (APE) as follows:

$$t(APE_t) = \frac{APE_t}{\hat{\sigma}(APE)}$$

Furthermore, the APE series showed a stationary of third-order autoregressive process as follows:

$$APE_t = \delta + \Phi_1 APE_{t-1} + \Phi_2 APE_{t-2} + \Phi_3 APE_{t-3} + u$$

To correct for nonstationarity, Yule-Walker equation was used.

Next, Seyhun computed the cumulative daily average prediction error (CAPE) from event day t_1 to event day t_2. This was calculated by adding all the daily APE as follows:

$$CAPE(t_1 t_2) = \sum_{t=t_1}^{t_2} APE_t$$

The t-statistics for the cumulative daily APE was computed as follows:

$$t(CAPE(t_1 t_2)) = \frac{CAPE(t_1, t_2)}{\hat{\sigma}(CAPE(t_1, t_2))}$$

Seyhun computed estimates from CAPE for the overall sample for purchases and for sales. His contention was that insiders would earn a positive abnormal return if insiders bought stocks before favorable information was announced. Likewise, if insiders refrained from buying until after the unfavorable announcement of information, the insiders would earn a negative abnormal return.

From his estimates, Seyhun found that during the 100 days following the insider trading day, stock prices rose abnormally by 3% for purchases and decreased by 1.7% for sales with t-statistics of 4.4 and –2.7 respectively. This indicated that insiders buy stocks before the release of favorable information and sell before the release of unfavorable information. Furthermore, he found that insiders wait until after unfavorable information was announced before buying stock and wait until after favorable information before selling stock. This finding was based on the CAPE estimates during the 100 days prior to the insider trading day. The estimates from this fromula suggested that the stock prices declined abnormally by 1.4% with t-statistics of –2.1 for purchases and rose abnormally by 2.5% with t-statistics of 4.0 for sales.

Seyhun also examined the bid-ask spread by using a regression analysis. He took the CAPE estimates for 1 to 50 days following the insider trading and 1 to 100 days following the insider trading day and regressed it to firm sizes. The dummy variables represented different firm sizes. He ran 6 different regressions based on the size of firms to observe the relationship between insiders' abnormal profits and firm size. Out of these regressions, he found that insiders from small firms earn greater abnormal returns then the insiders in large firms. Furthermore, the regression analysis on probability of trading against insiders and the log of firm size showed negative relationship. That is, the probability of trading against insiders decreases with increasing firm size.

Overall, the above six regressions were an indication that the expected losses to insiders decreased with the size of the firm. These results showed enough evidence to attest to the assumption that the informed traders do impose significant costs on uninformed traders. Moreover, the results were consistent with the hypothesis that there

is a positive relationship between bid-ask spread and the informed traders' abnormal profit.

He performed one more analysis to show that the bid-ask spread would be higher if informed traders had access to more valuable information. First, he examined whether insiders with superior information would earn higher return. He argued that insiders with access to more valuable information have potential to earn higher profits. He investigated this analysis by using a generalized least squares regression to estimate CAPE on types of insiders. In order to distinguish the type of insiders, Seyhun grouped them into five different categories: officers, directors, officer-directors, chairmen of the board of directors, and large shareholders.

Seyhun assumed that the chairman of the boards of directors and officer-directors possessed more valuable information regarding the prospects of their firm. His results produced significantly higher returns for the chairman and officer-directors, suggesting that insiders who were more familiar with overall operations of the firm trade on more valuable information

To confirm that insiders with superior information earn higher returns, he regressed the CAPE on the dollar value of trading. However the results showed that the dollar value of insider trading was not related to the value of insider information. He explained that this inconsistent result was that insiders in large firms and large shareholders of all firms trade on less valuable information.

From all these results, Seyhun concluded that the market efficiency hypothesis was consistent. To confirm this, he examined the abnormal profits of outsiders who mimic insiders. He explored this activity by analyzing the outsiders trading behavior

following the first day insiders' reports were received by the SEC and the day the Official Summary became publicly available. To observe the abnormal return of outsiders who mimic insiders, Seyhun compared the outsiders' abnormal profits to that of bid-ask spread for 100 shares plus the commission fee. He found that, net of these trading costs, outsiders do not earn abnormal profits, thus establishing that market efficiency hypothesis holds.

Chang and Suk in their 1998 article attempted to examine the effects of secondary dissemination of information on stock prices. They defined secondary dissemination of information as any information that has been made publicly available to outsiders. To examine whether secondary dissemination of information impacts stock prices, Chang and Suk (CS) examined the stock price reactions to publications of the Wall Street Journal's (WSJ's) "Insider Trading Spotlight" (ITS) column. They considered WSJ's publication of insider trading to be secondary dissemination.

CS asserted that the insider trading information from WSJ was secondary dissemination because the WSJ published insider transactions after it received its information from the SEC. They claimed that the SEC reports were the first public disclosure of information because the SEC was the first agency to receive reports on insider trading making this the primary dissemination. Their first hypothesis was that the stock prices would react based on SEC reports. Second, they assumed that stock prices might not react to secondary dissemination of information because insider trades were revealed on the SEC filing date. Primary dissemination would leave little or no discernible price reaction to the secondary dissemination of information (WSJ reports).[18] Contrary hypothesis to this assumption was that the primary dissemination of information

might be limited to a small number of investors thus making a secondary dissemination more relevant. To show how insider trading information was conveyed to the market, they also examined the price movement before the insider-trading day until after the WSJ publication day.

CS acquired a sample observation of 707 insider trades from the ITS column. The 707 observations were open market trades from NYSE, American Stock Exchange (AMEX) and over-the-counter (OTC). The daily stock return data were acquired from the Center for Research in Security Prices (CRSP) tape. From this 707 trades, 377 were sales and 330 were purchases.

In order to observe whether WSJ's publication of insider trades had an impact on stock prices, CS computed the abnormal stock returns by employing the usual market model. They used 200 days for their estimation period and 19 days prior to insider-trading day through 22 days after the WSJ report day to represent their event period. They computed the cumulative abnormal returns to examine how the information on insider trades was disseminated to the market. CS used CAR to represent the stock price reactions or stock performance. To observe this behavior, they used three different events for total sales and purchases, sale and purchases individually: insider-trading day (TD), the SEC filing day (FD) and the WSJ report day (WD). Recall from previous studies that the CAR was computed by estimating the residuals and then adding the average prediction errors.

Their results for an event period 20-day prior to and up to the insider trading day was significant for total sample which included insider sales and purchases. For subsamples which included insider sales and purchases separately, the CAR was also

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[18] See page 2.

significant suggesting that insiders do trade on private information. Moreover, they found that CAR three-day after the insider-trading day was significant for total sample observation and subsample observation of purchases. However, they found subsample observation of sales insignificant, indicating that insider trading gets partially revealed to the market through private channels.

To observe stock price reactions during the interim period, they computed the CAR for event period four days after the insider-trading day (TD+4) through one day before the SEC filing day (FD-1). They found that CAR from the total sample and subsample of sales were significant whereas subsample containing purchases were insignificant. Two different implications were made based on these results. The first implication was that insiders were continuously receiving insider-trading information during this period. An alternative suggestion was that insiders bought stocks before the public announcement of favorable news and sold before the public announcement of unfavorable news.

CS found that the CAR was significant when the total sample for the second event, which was the period after the receipt of the insider-trading report by the SEC (FD, FD+2) was computed. The CAR showed marginal significance when computed from subsamples. These results were consistent with their assumption that stock prices would fluctuate during the first public disclosure of insider trading.

Next they observed whether or not stock prices would react to secondary dissemination. They examined the CAR for the interim period from three days after the SEC filing day (FD+3) through two days before the WSJ report day (WD-2) and found no indication of abnormal stock performance for this interim period. However, when

they examined the CAR for the four-day period surrounding the WSJ report day (WD-1, WD+2), CS found statistical significance suggesting that the ITS column has information content. This was consistent with one of their hypothesis that stock prices can react to secondary dissemination of information. They contended that stock prices would react to secondary dissemination of information only if the initial public disclosure attracts limited attention by the market.

In addition, they performed three tests to assess the sensitivity of their results. First, they tested to see if any of the above results were due to confounding news announcements in the WSJ. To analyze this, CS acquired news announcements other than the report contained in the ITS column and computed the CAR to represent abnormal performance in the stock market. They found that this result was not sensitive to the confounding announcements

The second sensitivity test they performed was to investigate the price movement within the boundary of bid-ask prices. They examined such behavior by excluding observations with prices less than or equal to $10 because low priced stocks are more likely to be affected by high bid-ask spreads and are less frequently traded. The results based on these sample observations showed that the prior results were not simply driven by price movement within the boundary of unchanged bid-ask prices.

Finally, they examined whether the abnormal return around the WSJ report day merely reflected a delayed price adjustment. To observe this possibility, CS deleted from their observation WSJ report day too close to the SEC filing day. From this test, they found that the price reactions were due to WSJ publication and not from slow dissemination of information.

To confirm their study CS took one step further and examined the relationship between insider trading and insider information using different data. They used trading volume to observe whether an abnormal trading activity occurs. Daily trading volume data was obtained for individual firms from the CRSP and NASDAQ master files. They employed the market model to estimate the cumulative abnormal volumes around the insider trading day, SEC filing day and WSJ report day. From these estimates, they found that the release of insider trading information was related to an increase in trading activities, which was consistent with other insider trading studies.

Under the Act insiders are prohibited from using private information to earn abnormal profit. SEC regulates insiders trading activity to prevent insiders from gaining advantage of the market. To prevent insiders from gaining advantage of the market insiders are required to report to the SEC when any stock transactions are made. However, even with this kind of scrutiny, numerous studies such as Elliott, Morse and Richardson (1984) Finnerty (1976) Baesel and Stein (1979); Seyhun (1986) and Chang & Suk (1998) have documented that insiders continue to gain advantage of the market by using information that's not publicly available. These studies are significant because it provides evidence that the insiders earn abnormal profit regardless of government regulation.

We also found from our review, that insiders who possess superior information earn greater abnormal profits confirming that the regulation of insider trading is ineffective. BS and and Seyhun documented these results. In addition to providing evidence that insiders receive benefits from private information, these studies produce other significant materials that are closely related to the topic of insider trading. For

example, BS and Seyhun produced analysis on efficient market hypothesis. BS found efficient market hypothesis to be inconsistent whereas, Seyhun proved otherwise. EMR and Seyhun also found that insiders have tendency to buy securities of small firms and sell securities of large firms. CS produced information on secondary dissemination of information by observing insider trading information from the WSJ and finally, Finnerty analyzed the value of information. In conclusion, we find that insiders use private Information to gain advantage of the market.

III. DATA AND METHODS:

A. DESCRIPTION OF DATA

The insider trading data used in our study comes from the *CDA Investnet: Insider's Chronicle.* Monthly data was used to analyze the relationship between AD petitions and insider trading activity. The monthly data was collected from sixty-two firms for the period of 1985-1987. See Appendix for our sample observation. Our data is a panel consisting of T x N matrix where T is our time period and N is the number of firms.

The *Insiders' Chronicle* is a weekly publication with the listings of insiders, their title, numbers of shares bought and sold, date of the activity, the number of shares owned and the market where the stock is exchanged. From this data, we extracted information regarding insiders and their purchases and the date of these purchases. Because the date of the purchase was a weekly report, the data was aggregated in the weekly report to convert it into monthly figures.

Furthermore, the monthly data for an individual firm's specific information such as stock prices, outstanding shares, price-earnings ratio, earnings-per-share, and Standard & Poor's Index are from *Security Owner's Stock Guide* for the years 1985–1987. We also employed the *Ward's Business Directory* to select public firms.

There are number of determining factors that insiders consider before making any investment decisions. Some of these factors such as mergers and acquisitions are highly confidential information and are not accessible. Thus in our study we account only for common observable factors: (1) price, (2) market capitalization, (3) debt/equity ratio, (4) earnings per share and (5) S&P 500 index to represent the explanatory variables. All of

these variables measure health of firms and the market.

1. The price (P) variable that we used is the market price from the last trading day. The market price used may not be the price paid by the insiders. We did not use the price paid by insiders because there were two buyers on different dates in a month, thus having two different prices. The (P) variable was included in our model because most investors are interested in a stock share price. The share price provides certain information on how well the firm is operating.

2. The market capitalization (MKT) represents firm's size: the bigger the firm, larger the market capitalization. Larger MKT does not necessarily mean that the firm is healthier; however, we make the argument that larger firms are safer investments.[19]

3. The debt-equity ratio (DBT) was used to measure the health of the firm. It represents how well the firm is doing. Our assumption was that greater the debt a firm has, greater the risk involved in investing in that firm.[20]

4. Earnings-per-share (EPS) also measures the health of the firm; however, we contended that greater the earnings, safer the investments.[21]

5. To measure how well the overall market was performing, we used the S&P 500 index (SP). To be consistent, we also used the SP from the last trading day. Generally, the SP is used as a gauge to measure the soundness of the stock market. By using the SP, we contended that investors invest when they expect the SP to be high.

Because the main focus of our study was to observe the relationship between AD complaints and insider purchases, we used the filing of AD complaints as another

[19] The MKTis computed as follows: P * CSO = MKT, where CSO stands for common shares outstanding.
[20] The DBT is computed as follows: debt/CSO = DBT.
[21] The EPS is computed as follows: P/PE = EPS, where PE stands for price earnings ratio. We do not use the PE as one of our explanatory variables for two reasons. First, using PE and EPS in the same model may

independent variable. We used the filing date as a dummy variable where one was assigned if filed and zero otherwise. The data for the AD petitions came from the United States International Trade Commission (USITC) investigation reports for years 1985-1987. The USITC investigation reports identify the firms affected by petitions filed under Section 731. From this data we extracted firms that were publicly traded in the three major stock exchanges: the NYSE, the American Stock Exchange, and the NASDAQ.

For the monthly data, we acquired sixty-two public firms from year 1985 to 1987. We chose the monthly data because it captured the timing. That is, the monthly data would capture the timing of insiders' purchases based on private information - in this case, the AD complaints. This permits us to investigate the impact, if any, of insiders using information regarding AD complaints to trade.

The annual data was not considered because the variation in timing between insider buying and filing of AD complaints was high. In other words, if we used the annual data we would expect to see correlation between insider buying and filing of AD complaints regardless of when these activities occurred (e.g. if insiders bought in month of February and filed AD complaints in month of November).[22] We also opted not to use the weekly data because there were too many zeros in our observations thus making it impossible to estimate the parameters.

We deleted any firms that either went public or private during the investigative period. We also eliminated firms involved in mergers and acquisitions during this period.

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show correlation among the independent variables. Similarly, using PE and P in the same model may show correlation among the independent variables.

Thus, our cross sectional data, which consisted of various firms, was the same for each time period. In other words, our monthly data consisted of sixty-two firms in thirty-six periods, making our data a balanced panel data that was a T x N matrix with k-variables.

B. METHODS

The essence of this paper is to examine whether AD petitions could be considered private information thus, impacting insider buying behavior. Our null hypothesis is that there is no relationship between insider buying and AD petitions. From our empirical analysis, we are able to observe whether or not relationship exists between our dependent and independent variables and whether or not positive or negative relationship exists between our dependent and independent variables.

To observe such relationships, we used a maximum likelihood estimator (MLE) - our data was a panel with a discrete dependent variable. Our dependent variable could only assume two values: one, if an event occurred and zero otherwise. Because our data consisted of discrete, categorical, qualitative-choice responses, we employed the following discrete response models: the Fixed Effects Conditional Logit (FECL) Model and the Random Effects Probit (REP) Model.

The FECL and REP Models are used to handle models involving dichotomous response variables where our dependent variable Y assumes only two values: one if a buying event occurred and zero otherwise. By employing these models, we are observing the conditional probability that an event will occur given our independent variable X, [i.e. P = E(Y=1/ X)]. Furthermore, the FECL and REP Models are probability models that has two features: (1) as X increases, P = E(Y=1/X) increases but never steps outside the

[22] The timing gap between purchases and filing AD complaints may be large but if these two activities occurred in the same year, a one is assigned for both the dependent and the independent variable, thus

0-1 interval; and (2) the relationship between P and X is nonlinear, that is "one which approaches zero at slower and slower rates as X gets small and approaches one at slower and slower rates as X gets very large."[23] We attempted to find whether buying behavior was a function of AD petition filings by using STATA program.[24]

1. Fixed Effects

The Fixed Effects model takes into account the effects of those variables that are specific to individual cross-sectional units but stay constant over time, and the effects that are specific to each time period but are the same for all cross sectional units.[25] The FECL Model allows conditions on only one form of heterogeneity; therefore, in our model, we only account for the individual specific effect. Although the FECL allows conditions on only one form of heterogeneity, we should pick up the time effect by when the petition occurs.

In the Fixed Effects Model, we assume that the individual specific effect, α_i is correlated with X and that the cumulative distribution of the error term is logistic. Furthermore, the Fixed Effects technique for the Logit Model does not require us to specify a particular distribution for α conditional on X.

In specifying a discrete non-linear model in the Fixed Effects method, the estimated β coefficient, which is the slope parameter, is inconsistent. The MLEs for α_i and β are not independent of each other for discrete models when T is fixed. Therefore, inconsistency of estimated α_i is transmitted into the MLE for β. Thus, even if N

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allowing for possible correlation.

[23] See Gujarati.

[24] We also estimated our results using LIMDEP and found our results to be inconclusive. That is the computation from the REP Model continued to show error messages due to high number of zeros suggesting a positive definitive.

[25] See Cheng Hsiao.

approaches infinity, the MLE of β is inconsistent. One way to correct for such inconsistencies in β parameter is to find functions Ψ that are independent of the incidental parameters and have the property that when α_i are the true values, the function Ψ converge to zero in probability as N tends to infinity.[26]

We used the Chamberlain's FECL Model. That is, we assume that there is an underlying response variable Y_{it}^* defined by the regression relationship:

$$y_{it}^* = \lambda' X_{it} + u_{it}$$

where

$u_{it} = \eta_i + v_{it}$, *and*

$y = 1$ *if* $y_{it}^* > 0$, *and* 0 *otherwise.*

η_i *is the individual specific effect; and*

v_{it} *is the stochastic error term*

Therefore, the FECL Model is as follows:

$$\Pr ob(y_i / \sum_{t=1}^{T} y_{it}) = \frac{\exp[\beta' \sum_{t=1}^{T} x_{it} y_{it}]}{\sum_{d \in \tilde{B}_i} \exp(\beta' \sum_{t=1}^{T} x_{it} d_{it})}$$

$$\text{where } \tilde{B}_i = \left([d_{i1}, \ldots, d_{iT}] / d_{it} = 0 \text{ or } 1 \text{ and } \sum_{t=1}^{T} d_{it} = \sum_{t=1}^{T} y_{it} \right)$$

From this equation, we observed the relationship between insider trading and AD petitions for our monthly panel data as follows:

$$\Pr ob[y_i = 1] = \frac{\exp\{\lambda' X\}}{1 + \exp\{\lambda' X\}}$$

[26] See Cheng Hsiao.

where,

$$\lambda' X = \beta_1 AD_{it} + \beta_2 P_{it} + \beta_3 EPS_{it} + \beta_4 MKT_{it} + \beta_5 DBT_{it} + \beta_6 SP_t \quad (1)$$

where,

Prob[y=1] is a probability of one if an insider buys and zero otherwise;

λ is a vector of coefficients;

X is a vector of explanatory variables, where

AD_{it} is a dummy variable with one if firm i filed a petition at time t, zero otherwise;

P_{it} is a price of stock for firm i at time t;

MKT_{it} is a market capitalization for firm i at time t;

SP_t is the S&P 500 index at time t;

EPS_{it} is the earnings per share for firm i at time t; and

DBT_{it} is the debt-equity ratio for firm i at time t.

In this model the error term u_i takes into account the firm specific effect and v_{it} takes into account the overall cross sectional and times series effect. That is the v_{it} is the usual stochastic error term. The v_{it} represents the effects of the omitted variables that are peculiar to both the individual units and time periods.[27] In other words, v_{it} is the error term which is independently identically distributed (iid) with mean zero and variance σ_v^2 I_{nT}. We further assume that u_i is iid random variable with mean zero and variance σ_u^2.

2. Random Effects:

An alternative approach to the FECL Model is the REP Model. The Random Effects approach assumes the incidental parameter α_i is independent of the explanatory variable X. The individual specific effect in a Random Effects Model is part of the error term and it is uncorrelated with the regressors. Unlike the FECL Model, we must specify a distribution for α conditional on X. The Log-Likelihood Function for the REP Model becomes:

$$LogL = \sum_{i=1}^{N} \log \int\prod_{t=1}^{T} F(\beta' x_{it} + \alpha)^{y_{it}} [1 - F(\beta' x_{it} + \alpha)]^{1-y_{it}} dH(\alpha / \delta)$$

where H is a random sampling of a univariate distribution and δ is an index of a finite number of parameters. Maximizing the above equation with respect to β and δ under weak regularity conditions will give consistent estimators as N tends to infinity.

To estimate our model, we used the univariate Probit model for a binary outcome with the Random Effects as follows:

$$y_{it}^{*} = \beta_{*}' x_{it} + \varepsilon_{it},\ i = 1,...,N; t = 1,...,T; \beta = \frac{\beta_{*}}{\sigma_{\varepsilon}}$$

where,

$\varepsilon_{it} = a_i + v_{it}$

$y_{it} = 1 \text{ if } y_{it}^{*} > 0 \text{ and } 0 \text{ otherwise};$

where,

a_i *is the individual specific effect or the firm effect; and*

ε_{it} *is purely a random effect*

From this we specified our model as follows:

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[27] See Cheng Hsiao.

$$\Pr ob(y=1) = F(\beta' x)$$

where

$$\beta' x = \delta_0 + \delta_1 AD_{it} + \delta_2 P_{it} + \delta_3 EPS_{it} + \delta_4 DBT_{it} + \delta_5 SP_t \qquad (2)$$

As with the FECL Model the REP Model has the same explanatory variables. In essence, we ran the same fitted regression using two different methods. These two models were used to estimate the relationship between insider buying activity and AD petitions. If we find a significant relationship between the buying behavior of insider i with AD petitions we would reject our null hypothesis.

The difference between the Fixed and the Random Effects is that the Fixed Effects considers individual specific effect α_i to be correlated with X, whereas the Random Effects assumes otherwise. Furthermore, the primarily distinction between the Logit and the Probit Model is the distribution function. The logistic distribution is very similar to the t-distribution with seven degrees of freedom, while the normal distribution is a t-distribution with infinite degrees of freedom. The common concept between the two are the error term for both models take into account the individual specific effect, which in our case is the firm specific effect. Equation (1) and (2) examined the interaction between buying behavior and all the variables that measured the health of a firm and the market. The rationale behind running such different regression was to observe the significance of each beta coefficient and to observe the robustness.

Although, FECL and REP Models are not directly comparable, we observed that the FECL Model produced better estimates. The FECL and REP Models are not directly comparable because the variance of the standard normal variable (the basic random

probit) is one, whereas the variance of the logistic distribution is $\frac{\pi^2}{\sqrt{3}}$ where π equals approximately 22/7.[28]

3. Predicted results from the general model:

Another aspect of interest was whether the estimated values showed positive or negative signs. Equation (1) and (2) express the relationship between insider trading and the filing of AD petitions. In estimating equation (1) and (2), we expected the coefficient estimates of DBT and P to have an inverse relationship with an insider buying event, whereas we believed the coefficients of AD and SP to have a positive relationship. EPS and MKT on the other hand could either be negative or positive.

We assumed that the estimated coefficient for EPS would be positive if insiders were buying on the premises of high earnings. One of the factors that measure the strength of a firm is high EPS. Thus, if an insider was interested in investing in a firm, the insider would want high EPS.

On the other hand, we contend if insiders considered filing of AD complaints before purchasing securities, the coefficient estimates for EPS would be negative. The firms who filed AD complaints are more likely to result in affirmative injury decision if the firms had lower earnings. In other words, investigators of AD petitions are inclined to favor petitioners who had low earnings then those firms with high earnings. Therefore, an insider interested in buying securities based on firms' health would want EPS to be high. However if an insider basis his decision to buy securities on AD petitions, then the insider would want a low EPS.

[28] See Gujarati.

The estimated coefficient for MKT can be positive because there are greater number of insiders in bigger firms, meaning firms with large market capitalization would have more directors, vice presidents, etc. Thus, there would be a positive relationship between insider buying and the MKT, because more insiders mean more insider activity.

On the other hand, the estimated coefficient for MKT can also have an inverse relationship with insider buying behavior for two reasons. A study by Finnerty (1976) contended that insiders of small firms tended to purchase more then insiders of large firms and that insiders of large firms tended to sell more. Further study by EMR (1984) and Seyhun (1986) affirmed that smaller firms have prices that are less efficient in aggregating information. Therefore, insiders are able to take advantage of their private information and make abnormal returns. This means that insiders buy more from smaller firms. From these contentions, we assert that smaller the market capitalization, more insider activity therefore, an inverse relationship exists between market capitalization and insider buying activity.

Second, a petitioning firm's products are more likely to constitute a higher percentage of smaller firm's output than a large firm; therefore, the filing of petition matters more for a small firm than a large firm. In which case, insiders purchasing securities based on AD information should want market capitalization to be lower making the estimated coefficient for MKT negative.

We expect a negative sign for the estimated coefficient of P and DBT because it is clearly advisable to invest in a firm that has low debt and a low security price. The expected sign for the estimated coefficient for AD and SP should be positive. The probability of insider buying based on AD petition should be positive because our

contention was that insiders bought from the information regarding filing of AD petitions. Furthermore, the estimated coefficient for SP should also be positive because SP measures the overall well being of the market. Therefore, if SP was high, the probability of an insider buying should also be high, since high SP means stronger market.

4. Model Re-specifications:

We asserted that P, EPS, MKT, DBT and SP are indicators that guide insiders in making investment decisions. In other words the explanatory variables are observable instruments that measures the health of the market as well as the firms. These independent variables were selected based on the assumption that most informed investors at minimum would examine these variables before making any buying decisions.

An informed investor interested in creating an investment portfolio would more than likely investigate the health of a firm as well as the over-all market. The SP was used to capture the market performance. The P, MKT, DBT and EPS, fundamental measures of the health of firms, were used to represent the strength or weakness of the firms.

We were also interested in re-specifying equation (1) and (2) to compute several different estimations by reorganizing some of the independent variables. The rationale behind this decision was to observe the significance of the estimated coefficient by either including or excluding certain explanatory variables. For instance, we re-specified our Logit and Probit Model as follows:

Fixed – Effects :

$\Pr ob(y = 1) = F(\lambda' X)$

where,

$$\lambda' x = \beta_1 AD_{it} + \beta_2 P_{it} + \beta_3 DBT_{it} + \beta_4 SP_t \quad (3a)$$

$$\lambda' x = \beta_1 AD_{it} + \beta_2 P_{it} + \beta_3 EPS_{it} + \beta_4 SP_t \quad (3b)$$

Random – Effects :

$\Pr ob(y = 1) = F(\beta' x)$

where,

$$\beta' x = \delta_0 + \delta_1 AD_{it} + \delta_2 P_{it} + \delta_3 DBT_{it} + \delta_4 SP_t \quad (4a)$$

$$\beta' x = \delta_0 + \delta_1 AD_{it} + \delta_2 P_{it} + \delta_3 EPS_{it} + \delta_4 SP_t \quad (4b)$$

Equation (3a), (3b), (4a) and (4b) allowed us to generate two separate regression models: one with just DBT and the other with EPS variable. It is clear that both EPS and DBT measure the health of firm. However EPS measures the health of a firm from the earnings perspective, whereas, the DBT variable measures the health of a firm from the debt aspect. A certain appeal to separating these two variables was so that we could observe the interaction of the dependent variable (insider buys) with either the debt-equity ratio or earnings per share. By excluding the EPS variable in equation (3a) and (4a), we can determine whether the estimated coefficient for DBT variable would produce greater or lesser significance. Additionally, it allowed us to observe if any significant change was revealed in the estimated AD coefficient.

After regressing the equations (3a), (3b), (4a) and (4b) we were able to determine which variable (DBT or EPS) insiders were more prone to investigate before any investment was made. By running these two separate regressions, we discovered if insiders were more interested in a firm's debt or its earnings.

Our next re-specification of the model was to capture the timing. If we observed the estimated coefficient for AD from equation (1) and (2) to be significant, than we would be able to assert that there was a relationship between insider buying and AD petition. However equation (1) & (2) did not express the timing of purchase. The timing is important because it measured insider's ability to use the information to his/her advantage before it became public. In other words, an insider using AD petition as insider information to invest has the potential of earning rents if the insider bought before the AD petition was filed.

If we assumed that an insider has access to private information (i.e. the petition filing date) then it follows that an insider would buy his/her share of stock before or right at the time private information becomes public (i.e. firm files a petition). Otherwise, the information becomes less valuable. Thus, for those insiders who have access to the time of filing of a petition, the potential of earning rent is very high.

Our contention is that insiders with foreknowledge of the filing date would buy before or at the time of the petition to earn an abnormal profit. To test if such timing had any significance we re-specified the above model by leading it up to two months as follows:

Fixed – Effects:

$$\Pr ob(y=1) = F(\lambda' X)$$

where,

$$(\lambda' X) = \beta_1 AD_{i(t+1)} + \beta_2 AD_{i(t+2)} + \beta_3 P_{it} + \beta_4 DBT_{it} + \beta_5 EPS_{it} + \beta_6 MKT_{it} + \beta_7 SP_t \qquad (5)$$

Random – Effects :

$$\Pr ob(y=1) = F(\beta' X)$$

where

$$\beta' X = \delta_0 + \delta_1 AD_{i(t+1)} + \delta_2 AD_{i(t+2)} + \delta_3 P_{it} + \delta_4 DBT_{it} + \delta_5 EPS + \delta_6 MKT_{it} + \delta_7 SP_t \qquad (6)$$

$AD_{i(t+1)}$ & $AD_{i(t+2)}$ are the lead value up to two months representing the timing of when the petition gets filed. For example, an insider buys at time t, knowing in advance that AD petition will be filed at time (t+1) or (t+2), which is represented by AD1 or AD2. The estimates from this model will identify whether or not insiders are earning rents. If the estimated coefficients of AD1 and AD2 are positive and significant, we interpret this to mean that insiders are using AD petition information to invest in securities, thus earning rents.

Basically, from these estimates we inferred that insiders used the filing of AD petition to earn rents. The rationale behind such assumption is as follows: It is presumed that insiders have access to private information that can be used to insiders' advantage. It is also presumed that trade protection, such as AD petitions can induce firms to earn an abnormal return as documented by numerous studies, such as HKP (1986, 1989), LRS (1990) and others. If the above two assumptions are true, then an insider with access to a petition filing date can buy his/her own firms' stocks before or right at time of filing with the expectation of earning abnormal returns.

Insiders expect to earn a higher rate of return by buying stocks before the price of stock increase. If a firm becomes attractive to investors after the news break, then it can be assumed that the price of the stock will increase. If the final decisions of the petition are positive or affirmative, than the firm filing the petition is protected making this firm more attractive to investors. The old adage 'buy low, sell high' applies here. An insider can buy before the protection, when price of stock is at its market value then sell after the protection announcement becomes public, when the price of stock increases.

It's also possible to benefit even if the final decisions of the petition are negative. Staiger and Wolak (1994) contended that the process filers could benefit from forcing foreign rivals to undergo the investigative procedure, irrespective of the resolution of the case. Thus regardless of the outcome of the final decision, insiders can earn rents by buying before the filing of AD complaints.

With our monthly construction, we cannot utilize information as to which event preceded the other in our statistical tests. Thus we introduce lead variables of AD complaints to indicate purchases one month and two months in advance of the month of filing. We selected two-month leads for two reasons. First, we found that there were multiple filings from same firms within a three-month interval and to have led more than two months meant that timing would be stacked thus creating dependence from one month to another.[29] Second, we felt that insiders interested in maximizing their return would be as accurate as possible in timing. Insiders engaged in active trading to earn rents, pay close attention to the best time to invest. For insiders to wait to invest in securities three months or longer before the actual filing date seems unreasonable.

Finally, we took into account the interaction between AD petitions and firm size. Our contention is that AD petitions has greater impact on smaller firms since smaller firms are inclined to produce more homogenous products. For example, if a large firm who produces diverse products filed an AD petition, the final decision would not have as great an impact than if a small firm that only produced one product filed the petition.

We coded our MKT into three dummy variables: one if a firm was small a size cap; two if a firm was a mid-size cap; and three, if a firm was a large cap. We

determined the size of MKT by the guidelines printed on the 'Morningstar'. Once we coded our data, we entered a command that would provide an interaction term between AD petitions and MKT. We then ran the following regression for both Logit and Probit:

Fixed – Effects:

$$\Pr ob(y=1) = F(\lambda' X)$$

where,

$$\lambda' X = \beta_1 AD_{it} + \beta_2 P_{it} + \beta_3 EPS_{it} + \beta_4 MKT_{it} + \beta_5 DBT_{it} + \beta_6 SZS_{it} + \beta_7 SP_t \qquad (7)$$

Random – Effects:

$$\Pr ob(y=1) = F(\beta' X)$$

where

$$\beta' X = \delta_0 + \delta_1 AD_{it} + \delta_2 P_{it} + \delta_3 EPS_{it} + \delta_4 MKT_{it} + \delta_5 DBT_{it} + \delta_6 SZS_{it} + \delta_7 SP_t \qquad (8)$$

where

$SZS = AD * (Size\ of\ the\ mkt\ capitalization)$

SZS is the interaction term between AD petitions and the size of the MKT. If the estimated coefficient for SZS showed positive significance than we predicted the probability of insider buys based on the above assumption.

In conclusion, we acquired monthly data to observe the relationship between insider trading and AD petitions. The rationale behind using monthly data was that it captured the duration of insider buying behavior and the filing of AD petitions. Because this was a non-linear regression, we used the MLE employing the Conditional Logit and Probit Model for the Fixed and the Random Effects estimates, respectively. Furthermore, we re-specified the conditional Logit and Probit Model to account for the timing of AD petitions' filing date plus the interaction term. We employed STATA program to produce all our estimations.

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[29] These were 64K and 256K DRAMS, and EPSOMS. They were filed in June, September, and December. We tested the sensitivity of our results to the deletion of these petitions from our set, and found only

IV. RESULTS

As stated in our Method's section, we predicted that the relationship between AD petition and insider buy is positive. In addition, the specific signs for estimated coefficients of EPS and MKT were unclear, because it could take on a positive or negative sign depending on the insiders' motive. The individual results of each re-specified estimate from both Conditional Logit Fixed Effects and Probit Random Effects Model are presented. Moreover, we discovered that our Conditional Logit and Probit Models for insider buying behavior fit the data relatively well; many of the coefficient estimates generally had the expected signs for both Fixed and Random Effects. We also found that the results from the REP Model and the FECL showed robustness.

A. Estimating the general model:

Equation (1) and (2) represent the general model where the dependent variable buy was regressed with the following explanatory variables: AD, P, EPS, MKT, DBT, and SP. The estimation from this model represents the relationship between insiders' buy to that of AD, P, EPS, MKT, DBT, and SP.[30] We contend that insiders who are considered most informed will study at minimal these variables before any purchase decision is made. Moreover, we assert that the EPS, DBT and MKT are reliable indicators in measuring the health of firms whereas SP measures the health of the market.

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marginal effects on our coefficients, and no effects upon levels of significance.

[30] Our estimation in this study was not to estimate the growth rate but insider's buying behavior. Furthermore, our data is a panel data with the dependent variable being a discrete variable and not continuous. Therefore, we didn't consider the variables, such as price, market capitalization and Standard and Poor's 500 index in terms of nonstationarity – a time series problem. We have attempted to take log and log differences of these variables and ran the same above regressions and found that the coefficient estimate of AD showed statistical significance at 5% with t-ratio produced from FECL and REP at 2.148 and 2.618, respectively. However, the coefficient estimate for log difference in price exhibited statistical insignificance. Although, the S&P coefficient estimate (t-ratio computed from FECL and REP at –2.023 and –2.007, respectively) produced statistical significance at 5% the estimated value was negative

We compared the estimates generated from the FECL Model to that of REP Model. We are searching for two different interpretations from these estimates. First, we examine whether our estimated values are positive or negative and second, we are interested in whether or not the estimated coefficients are significant. If our estimated values show positive sign then we interpret it to mean that relationship between the dependent and independent variables are positively related. In comparing the results from our Fixed and Random Effects, we find significant differences in parameter estimates, which were expected (see chapter on Methods). Recall for the FECL, we used the conditional MLE methods by considering the likelihood function conditional on sufficient statistics for the incidental parameters. The REP Model, on the other hand, replaces the probability function for y conditional on α by a probability function that is marginal on the incidental parameter, α.[31]

In both the Logit and the Probit Models, P and SP coefficients show the expected signs with statistical significance at 5% and 10%. The coefficient estimates for EPS and DBT indicate statistical insignificance with both the Fixed and the Random Effects. We infer from these results that our explanatory variables, P and SP are reliable suggesting that a relationship exists between insider buy and our explanatory variables, P and SP. The EPS and the DBT, on the other hand, are poor indicators in explaining the insider buying behavior. This is inconsistent with our hypothesis that debt and earnings are good guidelines in gauging the health of firms.

Our interpretation regarding the signs, we observe as predicted that the estimates produced from both the Fixed and the Random Effects Model for the DBT coefficient is

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suggesting that insiders bought when the market index was low which was inconsistent with our hypothesis.

negative. Our intuitive sense was that insiders interested in earning rents were less likely to invest in firms that had high DBT. Therefore, as expected, we observe an inverse relationship between the estimated DBT coefficient and insider-buy.

The coefficient estimate for EPS is positive indicating a positive relationship between insider buy and EPS. This is consistent with one of our assumptions, in which insiders decision to buy depended on whether a firm has reported high earnings. See Table 1.

Table 1

FECL				REP MODEL			
Variable	Coefficient	t-statistic	p-value	Variable	Coefficient	t-statistic	p-value
				Constant	-1.1473	-5.922*	0.000
					(0.19375)		
AD	0.3324	2.380**	0.017	AD	0.2447	2.877**	0.004
	(0.13965)				(0.08504)		
P	-0.01073	-2.304**	0.021	P	-0.00269	-1.635***	0.102
	(0.004656)				(0.001644)		
MKT	-3.48E-11	-1.310	0.190	MKT	-5.89E-12	-1.001	0.317
	(2.6E-11)				(5.88E-12)		
EPS	-0.01957	-1.332	0.257	EPS	0.0081	0.984	0.325
	(0.01728)				(0.0273)		
DBT	-5991.39	-0.745	0.456	DBT	-2325.86	-0.692	0.489
	(8040.279)				(3363.26)		
SP	0.005638	3.529*	0.000	SP	0.00229	2.934*	0.003
	(0.001598)				(0.00178)		
				Rho	0.22395		
					(0.03830)		
Log Likelihood	−1022.9562			Log Likelihood	−1221.2881		
Chi2	18.63			Wald Chi2	15.20		

* Significant at 1%
** Significant at 5%
*** Significant at 10%
Standard errors are in the parentheses.

We could also observe from Table 1 that the MKT coefficient estimate from both the Fixed and the Random Effects exhibit statistical insignificance. The signs are

[31] See Chang p. 165.

consistent with our assumption because we argued that the estimated value for the MKT could be either positive or negative.

Finally, in analyzing our main hypothesis, we find that the coefficient estimate for AD produced statistical significance at 5% from both the Fixed and the Random Effects. We infer from this that insiders consider filing of AD petitions when making a decision to buy securities. In other words, a relationship exists between insider buy and filing of AD petitions.

B. Examining DBT, one of the variables that measures the health of firms:

We next examine the relationship of insider buying with the same independent variables as in our general model (equation 1 and 2), except that we re-specified the model by separating the DBT and the EPS variables. Table 2 shows the results from estimating equation (3a) and (4a), which is a re-specification of equation (1) and (2) without the EPS variable. Note that the purpose of excluding the EPS variable was to examine whether insiders were more inclined to investigate the debt of a firm then its earnings, that is DBT and EPS are two different measures of looking at the health of a firm.

As with our general model we find that the AD coefficient is statistically significant at 5% for both the Fixed and the Random Effects, indicating that correlation exists between insider's purchasing behavior and filing of AD petitions. Moreover, the estimated value for AD shows expected positive sign. The SP coefficient estimate also shows statistical significance at 5% with the expected signs. The coefficient estimate for P produced from the Fixed Effects shows statistical significance at 5% however the results generated from the Random Effects show statistical insignificance. The

inconsistency in the results is likely due to the differences in the distribution function from the FECL Model to that of the REP Model.

Now, to examine the relationship between insider buys with DBT, we look at the estimated coefficient for DBT. Our contention is that firms with high DBT are more vulnerable to bankruptcies. A firm with high debt has greater interest payments and if a firm is not able to pay the interest, the likelihood of filing for a bankruptcy increases. Therefore, we predict an inverse relationship between DBT coefficient estimate and insider buy.

Table 2

FECL				REP MODEL			
Variable	Coefficient	t-statistic	p-value	Variable	Coefficient	t-statistic	p-value
				Constant	-1.0878	-5.995*	0.000
					(0.18146)		
AD	0.3197	2.292**	0.022	AD	0.23625	2.776**	0.006
	(0.1395)				(0.08512)		
P	-0.01017	-2.194**	0.028	P	-0.00253	-1.499	0.134
	(0.00463)				(0.001686)		
MKT	-3.38E-11	-1.268	0.205	MKT	-5.71E-12	-1.005	0.315
	(2.66E-11)				(5.68E-12)		
DBT	-6017.963	-0.749	0.454	DBT	-1913.27	-0.524	0.600
	(8037.394)				(3650.992)		
SP	0.00519	3.348*	0.001	SP	0.00214	2.796**	0.005
	(0.00155)				(0.000766)		
				Rho	0.2239496		
					(0.0383022)		
Log Likelihood	-1029.425			Log Likelihood	-1228.1134		
Chi2	16.87			Wald Chi2	15.20		

* Significant at 1%
** Significant at 5%
*** Significant at 10%
Standard errors are in the parentheses.

First we observe whether the coefficient estimate for DBT shows significance. In examining our estimates we find that the results generated from both the Fixed and the Random Effects reveal statistical insignificance suggesting that there is no relationship between insider buy and DBT.

We also find that there is a minimal change in the Fixed Effects estimates of DBT generated from our general model to that generated from this model. However, we notice that the coefficient estimate for DBT changed significantly for Random Effects estimate from –2325.855 to –1913.271 and our t-ratio decreased from -0.692 to -0.524. In other words, the differences between coefficient estimate for the DBT produced from the general model and this model is very significant.

Second, we look at the signs for the estimated values and find that the estimates from both the Fixed and the Random Effects Model show expected signs for the DBT coefficient, which discloses a negative relationship.

C. Examining EPS, another fundamental measure that gauges the health of firms:

The estimates we are concerned with in equation (3b) and (4b) are to observe the earnings perspective. The explanatory variables are similar to our general model but this time we excluded the DBT variable. We are interested in the EPS variable and how it conforms to our model. Earnings are another measure of looking at the health of firms. As with our other models, we use both the Fixed and the Random Effects to estimate the parameters.

As before, in comparing our results produced from our general model to this model, we find that there is infinitesimal change in the EPS coefficient estimate from the Fixed Effects Model, whereas the EPS coefficient estimate from the Random Effects shows significant change from 0.0081 to 0.0075. Our AD and SP coefficients continue to show statistical significance at 5% and above the 5% level. As before, the estimated

coefficient for P is inconsistent. The FECL Model produced statistical significance for the coefficient estimate of P whereas the REP Model displayed statistical insignificance. See table 3.

Table 3

FECL				REP MODEL			
Variable	Coefficient	t-statistic	p-value	Variable	Coefficient	t-statistic	p-value
				Constant	-1.1431	-5.873*	0.000
					(0.19464)		
AD	0.33426	2.402**	0.016	AD	0.2471	2.908**	0.004
	(0.1391)				(0.08495)		
P	-0.01072	-2.305**	0.021	P	-0.00262	-1.584	0.113
	(0.004654)				(0.00165)		
MKT	-3.43E-11	-1.292	0.196	MKT	-5.78E-12	-0.990	0.322
	(2.65E-11)				(5.83E-12)		
EPS	0.0197	1.139	0.255	EPS	0.00751	0.857	0.391
	(0.017298)				(0.008759)		
SP	0.00565	3.538*	0.000	SP	0.00228	2.907**	0.004
	(0.001597)				(0.000785)		
				Rho	0.22411		
					(0.03912)		
Log Likelihood	-1025.6602			Log Likelihood	-1223.8859		
Chi2	18.19			Wald Chi2	16.56		

* Significant at 1%
** Significant at 5%
** Significant at 10%
Standard errors are in the parentheses.

We first examined the Fixed Effects estimates for the EPS coefficient and found that it is statistically insignificant, which meant that the EPS might not be a viable indicator in insiders' decision to purchase securities. In other words, statistical insignificance indicates that insiders looking to invest may not consider EPS as an important factor.

Next, we observe the EPS coefficient estimate that is generated from the Random Effects Model and found that the Random Effects also produces insignificant results. Our regression without the DBT variable shows that the coefficient estimate for EPS is statistically insignificance. As we can observe from Table 1 and Table 3, the t-ratio

decreased from 0.984 to 0.857. The following results might suggest that the EPS is a bad representative of what insiders investigate before investing or it could mean that insiders assess material injury from AD petitions.

Contrary to our assumption, we find that the regression equation for DBT and EPS are both poor indicators in determining what insiders consider before making a decision to invest in securities. We find that the MKT coefficient estimate is also inadequate in explaining the insider buying behavior. The statistical insignificance of DBT, EPS and MKT are explained by how these variables are computed. Because P is embedded in computation of these variables, insiders may just investigate share price. The P variable has all the necessary information for insiders to decide on whether to buy or not buy. To examine whether P alone is sufficient, we ran the regression with just AD, P and SP as independent variables. See Table 3.1

Table 3.1

FECL				REP MODEL			
Variable	Coefficient	t-statistic	p-value	Variable	Coefficient	t-statistic	p-value
				Constant	-1.098	-6.077*	0.000
					(0.1807)		
AD	0.3223	2.320**	0.020	AD	0.2383	2.810**	0.005
	(0.1389)				(0.08484)		
P	-0.01018	-2.198**	0.028	P	-0.00252	-1.530	0.126
	(0.00463)				(0.00164)		
SP	0.00458	3.124*	0.002	SP	0.00205	2.726**	0.006
	(0.001465)				(0.00075)		
				Rho	0.22169		
					(0.03703)		
Log Likelihood	-1032.9951			Log Likelihood	-1231.2308		
Chi2	14.68			Wald Chi2	15.10		

* Significant at 1%
** Significant at 5%
** Significant at 10%
Standard errors are in the parentheses.

There is only a minimal change in the coefficient estimate of P. It is statistically significant at 5% from the FECL Model, whereas with REP Model it is statistically insignificant. From the FECL Model, we can conclude that just investigating P may be sufficient.

D. Insiders' potential to earn rents:

Thus far our regression equation estimate was to observe the differences between DBT and EPS. We also observe whether AD coefficient estimate is statistically significant and positively related to insider buy. In this section, we examine whether insiders earn rent by using the petition filing information. Our assertion is that insiders who has access to petition filing date could earn rents by buying securities before the actual filing date. We contend that if a relationship exists between insider purchases and filing of AD complaints then, we can also assert that insiders use this information to earn rents.

Our regression equation (5) and (6) represent the assertion that insiders earn rent from the petition filing information. As stated earlier, we led the AD value only up to two months. We feel that two months is sufficient because insiders' decision to purchase securities did not rest solely on filing of the petition. Therefore, for insiders to make purchases three to four months in advance based exclusively on the filing of petition seemed unreasonable. In other words, market fluctuates on a daily basis therefore for insiders to buy equity three to four months in advance entirely on the date of filing of petition, might lead to unprofitable outcome. Making purchase decisions one to two months before the filing of petition seemed rational for this reason. See Table 4

Table 4

FECL				REP MODEL			
Variable	Coefficient	t-statistic	p-value	Variable	Coefficient	t-statistic	p-value
				Constant	-1.0795	-5.470*	0.000
					(0.19734)		
AD1	-0.08865	-0.607	0.544	AD1	-0.00833	-0.094	0.925
	(0.14601)				(0.08824)		
AD2	-0.26314	-1.764***	0.078	AD2	-0.1248	-1.385	0.166
	(0.14915)				(0.09013)		
P	-001004	-2.155**	0.031	P	-0.00271	-1.530	0.126
	(0.00466)				(0.001771)		
MKT	-3.61E-11	-1.354	0.176	MKT	-5.38E-12	-0.901	0.367
	(2.67E-11)				(5.97E-12)		
DBT	-4958.442	-0.611	0.541	DBT	-1994.994	-0.470	0.636
	(8120.829)				(4247.422)		
EPS	0.01961	1.131	0.258	EPS	0.00826	1.002	0.316
	(0.01734)				(0.008243)		
SP	0.005368	3.363*	0.0010	SP	0.0022	2.771**	0.006
	(0.00159)				(0.000795)		
				Rho	0.23826		
					(0.04152)		
Log Likelihood	-1024.0367			Log Likelihood	-1224.2961		
Chi2	16.36			Wald Chi2	10.00		

* Significant at 1%
** Significant at 5%
** Significant at 10%
Standard errors are in the parentheses.

From the regression, we find that AD1 coefficient estimates generated by using the FECL Model show statistical insignificance with t-statistic of –0.607 whereas, the coefficient estimate for AD2 showe statistical significance with t-statistics of –1.764. This suggests that there is a relationship between insider buying and filing of AD complaints two month in advance. However, the negative sign shows that there is an inverse relationship between insider buying and AD2 indicating that likelihood of insiders buying is less with the knowledge of the filing date of AD complaints two months before the actual filing date. This does not make intuitive sense. Our hypothesis that insiders use information regarding filing of petition to earn rents may be false. An

alternative explanation as to the negative result may be that insiders are trying to avoid SEC scrutiny.[32]

The results generated from the Random Effects show statistical insignificance. Furthermore, it also shows negative signs for AD1 and AD2 suggesting that insiders do not buy securities one to two months in advance, instead insiders buy securities at the time of filing to earn rents.[33]

As with our other models, we find that the coefficient estimate for SP remains statistically significant. The P coefficient estimate continues to show mixed results, however our contention that relationship exists between insiders purchasing behavior and price of securities and market index is true. Moreover, we find that the coefficient estimates for DBT, EPS and MKT continue to show statistical insignificance.

E. Interaction between AD petition and the MKT:

Our final analysis is based on the assumption that insiders' buying is related to interaction between AD petition and size of firms. We contend that the filing of a petition has greater impact on smaller firms then larger firms, therefore smaller firms should have more insider activity. This contention stems from the general assumption that smaller firms produce more homogenous product.

For a firm that produced one or two outputs, the filing of AD petition has greater impact then those firms that produced diverse products. For example, if a large firm that

[32] We are not certain as to what triggers SEC investigation. We are relatively certain that SEC will investigate insider trading especially if insiders trade during certain important public information announcements such as earnings and/or mergers and acquisitions. Therefore, it is possible that the filing of AD complaints may trigger SEC investigation.

[33] We have tried to arrange our data to show whether or not insiders bought before the filing of AD petitions by coding our dependent variable one if insiders bought before the filing and 0 otherwise. The problem with such coding was that we weren't able to distinguish which filing was associated with which buying because in some instances there were multiple filings. We have also tried to code early and late filings but it showed inconclusive results.

produces diverse product filed an AD petition for one of its outputs, the impact of a positive injury decision on this firm is very minimal. This is because large firms do not depend only on this one product to remain competitive. On the other hand, an affirmative injury decision can potentially have a huge positive impact on small firms that produce homogenous products. Therefore, we assert that insiders aware of the filing of trade protection would purchase more equity from smaller firms then large firms.

We are interested in whether or not insiders investigate such association. If insiders considered the filing of a petition and its impact on the size of firms, which we denoted as SZS, then an inverse relationship should exist between the coefficient estimate for SZS and the dependent variable, insider buy. From this assumption, we conclude that greater insider activity transpired from smaller firms that files for trade protection then large firms.

In both our Fixed and Random Effects estimations, we find that the SZS coefficient estimate is statistically significant at 1%, which is a strong indication that insiders do investigate the association between the AD petition and the size of firms. We also find that the coefficient estimate is negative, which is what we predicted. Our coefficient estimate produced from the Fixed Effects Model is interpreted as follows: the log of the odds in favor of insiders buying from small size firms was –0.729; for mid-size firms, the log of the odds decreased by –1.458; and for large firms the log of the odds in favor of insiders buying decreased by -2.187.[34] See Table 5.

[34] The percentages are computed by taking our dummy variable, where 1 is assigned for small-cap; 2 is assigned for mid-cap; and 3 is assigned a large-cap, and multiply it by the coefficient estimate. Thus, we have -0.74*1 = -0.74 to represent small size firm; -0.74*2 = -1.48 decrease in percentage; and –0.74*3 = -2.22 decrease in percentage.

Analysis from our Random Effects model also shows that SZS coefficient estimate is statistically significant at 1%. Furthermore, we find that the coefficient estimate is negative representing the inverse relationship. Our Random Effects estimates show that on average, the probability index that insiders buy from small firms decreased by –0.419 for mid-size firms the probability index decreased by –0.838; and for large firms the probability index decreased by -1.257.[35]

Table 5

FECL				REP MODEL			
Variable	Coefficient	t-statistic	p-value	Variable	Coefficient	t-statistic	p-value
				Constant	-1.1148	-5.706*	0.000
					(0.1954)		
AD	1.5515	4.231*	0.000	AD	0.9366	4.295*	0.000
	(0.3667)				(0.2181)		
P	-0.01069	-2.285**	0.022	P	-0.00256	-1.561	0.119
	(0.00467)				(0.00164)		
MKT	-3.67E-11	-1.374	0.169	MKT	-3.29E-12	-0.596	0.551
	(2.67E-11)				(5.53E-12)		
SZS	-0.7294	-3.538*	0.000	SZS	-0.4129	-3.421*	0.001
	(0.2062)				(0.12073)		
DBT	-5951.95	-0.708	0.479	DBT	-2428.46	-0.690	0.490
	(8400.89)				(3519.91)		
EPS	0.01879	1.090	0.276	EPS	0.00748	0.890	0.373
	(0.01724)				(0.00078)		
SP	0.00548	3.416*	0.001	SP	0.00212	2.705**	0.007
	(0.00161)				(2.72E-3)		
				Rho	0.2293		
					(0.0409)		
Log Likelihood	-1016.3624			Log Likelihood	-1215.2925		
Chi2	31.82			Wald Chi2	29.06		

* Significant at 1%
** Significant at 5%
** Significant at 10%
Standard errors are in the parentheses.

The coefficient estimates for AD and SP remains statistically significant at 5% whereas, the P coefficient estimate continues to show mixed results. In comparing the results produced from our general model to this model, we find that the estimates from

[35] The percentages are computed as same as it is computed from the FECL model.

both the Fixed and the Random Effects show significant change in the AD coefficient estimate. The t-ratio from the Fixed Effects increased from 2.380 to 4.231 whereas minimal changed occurred in our other estimates. The t-statistics from the Random Effects also increased from 2.877 to 4.295. We also find that the EPS and DBT coefficient estimates remain statistically insignificant but show correct signs.

F. Summary:

In summary, we find that our assumption that a relationship between insider buying and AD petition is apparent. All our calculated t-statistics for the AD coefficient is statistically significant at 5% thus rejecting our null hypothesis. Furthermore, we find that insiders receive a benefit from the AD petitions when insiders buy at the time of filing. We are not able to find conclusive evidence from our AD lead values.

The P and SP coefficient estimates produced from the Fixed Effects continuously produce statistical significance at 5%. The coefficient estimate for P generated from the Random Effects Model, however show mixed results. The SP coefficient estimate continues to show statistical significance from the Random Effects Model. From these results, we conclude our hypothesis that insiders at a minimum would investigate the firms' current share price and the market index. We also find that both P and SP coefficient estimates produced expected signs. Our assertion is that coefficient estimate for P is inversely related, whereas the SP coefficient estimate has positive relation with the dependent variable, buy.

Our coefficient estimate for MKT show statistical insignificance indicating that an association between insider-buy and firm size might not exist. However, when we included a new variable, SZS, that represented the filing of AD petition and the size of

the MKT, we find that the coefficient estimate produced statistical significance at 1%. This informs us that sizes of firms are significant when insiders consider purchasing equity based on filing of AD petitions.

Lastly, the coefficient estimates for EPS and DBT, two different indicators that measure the health of firms show statistical insignificance. These results indicate that insiders may consider injury requirements from filing of AD petitions or it could mean that insiders only consider share price when investing since EPS and DBT are both computed with P. The signs from these estimates, however, are consistent with our assumption. That is we assert that DBT coefficient estimate will produce a negative sign whereas the EPS coefficient estimate can take on either a negative or a positive sign.

V. CONCLUSION:

The focus of our study was to find a relationship between filing of AD petitions and equity share purchases by corporate insiders. We found that such study was interesting for at least three reasons. First, it examined whether or not corporate insiders received benefits from filing of AD petitions, thereby addressing concerns about trade policy.

Second, it clarified some concerns regarding SEC regulatory policy that was not addressed in the past. SEC regulates insider trading by investigating any significant insider trading activity, especially after an announcement of corporate information such as earnings, mergers or acquisition. Insiders are regulated from such activity so that they would not benefit hugely from private information. Our study examined whether or not filing of AD complaints should be considered material.

Lastly, we were interested in this study because there were no previous studies conducted concerning the relationship between insider buying and filing of AD complaints. Contributions in this area of the literature were mostly concerned with whether or not shareholders involved in AD complaints earn abnormal returns.

In generating our results we utilized FECL and REP Model. Our dependent variable was a discrete dummy variable with one if insider bought and zero otherwise. The explanatory variables consisted of AD petitions, which were also a dummy variable; EPS; DBT; P; MKT; and SP.

In regressing the model, we expected to observe positive coefficient estimate for AD and SP and a negative coefficient estimate for DBT and P. For EPS and MKT coefficient estimate, our expected sign was either positive or negative. Our coefficient

estimate for EPS could have either positive or negative value depending on if AD petition was filed. The MKT coefficient estimate also depended on whether or not AD was filed; however, there were other assumptions associated with the MKT, which explained either the negative or the positive sign.

We produced estimates to observe several questions that arose while examining the relationship between purchases made by corporate insiders and filing of AD petitions. Our first estimate was to observe a relationship between insider buying and filing of AD, P, EPS, DBT, MKT, and SP.

In estimating this model, we found statistical significance at 5% for AD coefficient, indicating a possible relationship between insider buying and filing of AD. We also found that P and SP coefficient estimates were both generally statistically significant, whereas the MKT EPS and DBT coefficient estimate showed statistical insignificance.

Overall, we found evidence indicating that a relationship existed between corporate insider's decision to purchase equity and filings of AD petitions. Our assumptions about informed investors investigating the market measures seemed evident. We found that most of these variables were statistically significant with our dependent variable, buy. We also found that most of these variables produced expected signs, indicating that there may be substance to our assumptions. We also re-specified our models to generate several different estimates.

It is clear that both EPS and DBT measure the health of firms, therefore, in our next two estimations, we separated the EPS and DBT from the explanatory variable. Our

interest in separating these two variables were to see if corporate insiders when purchasing equity were more inclined to depend on a firm's debts or a firm's earnings.

Our second estimation consisted of all the same variables as our first except that we excluded the EPS from our explanatory variable. From this model, we found that the AD, P and SP all were generally statistically significant with expected signs, whereas, MKT and DBT coefficient showed statistical insignificance. The results were consistent with our first estimation.

In our third estimation, we excluded the DBT from the explanatory variable to observe how well EPS fits into the model. From the results generated from this, we found that the EPS coefficient estimate was statistically insignificant for both Fixed and Random Effects, indicating that corporate insiders may not investigate the earnings of a firm before purchasing equities. The coefficient estimates for AD, P and SP continued to show statistical significance, whereas, MKT coefficient estimate did not.

The purpose of the fourth estimation was to observe whether or not insiders earned rent. In order to observe such behavior, we specified our model to include lead periods for AD variable. Our assertion was that insiders could receive benefit from AD petitions if insiders purchased equity before or at the time of filing. If insider buying was observed one or two months before the filing of a petition, we could conclude that insiders earned rent.

Our lead estimation produced from both the Fixed and the Random Effects for AD1 showed statistical insignificance. The lead estimation for AD2 produced statistical significance with Fixed Effects but not with Random Effects Model. However, the signs for the estimates were negative suggesting that insiders buy less with knowledge of filing

of AD complaints two months in advance. This does not make intuitive sense thus our conclusion was that insiders buy at the time of filing to earn benefit from filing of the AD complaints or insiders are trying to avoid SEC scrutiny. The coefficient estimates for P and SP generally remained statistically significant whereas the DBT, EPS and MKT coefficient estimate continue to be insignificant.

Our final estimation was to observe the interaction between AD filings and MKT. We contended that corporate insiders when using AD filing as source of information were more likely to purchase equity from small size caps than large size caps. Our assertion was based on the assumption that AD filings have greater impact on small size firms than large firms because small firms produce more homogenous products. We also made a contention that there is a pricing inefficiency among small size firms; therefore, insiders are more likely to invest in small size firms.

To control for such behavior, we generated a new variable, SZS, where SZS represented the interaction term between AD filing and size of the MKT. In order to generate such variable, we coded the MKT into a dummy variable, where 1 was assigned for small cap; 2 for mid-size cap; and 3 for large cap. We then, took the AD variable and multiplied it by our new coded variable to come up with SZS. Our estimation showed that the coefficient estimate for SZS was statistically significant indicating that corporate insiders were more likely to purchase equity from a small size firm when AD filing was involved.

Thus far, we have found that the MKT coefficient estimate was statistically insignificant indicating that MKT may be a poor representative of the explanatory variable. However, in our last estimation there was evidence indicating that market size

may matter. Moreover, we found that the AD, P and SP coefficient estimates generally remained statistically significant attesting to our assumption that relationship between insider buy and AD, P and SP exist. The DBT and EPS remained statistically insignificant.

Overall, we found evidence indicating that a relationship existed between corporate insider's decision to purchase equity and filing of AD petitions. Our assumptions about informed investors investigating the market and share price such as SP and P seemed evident. Although our contention that insiders examine EPS and DBT before purchasing equity showed inconclusive results, we conclude that EPS and DBT are good indicators in measuring health of firms. We however did find that most of these variables produced expected signs, indicating that there may be substance to our assumptions.

APPENDIX

CASE 1	ROCK SALT	FILE DATE: 1/28/85
	MORTON DOMTAR	
CASE 2	HEAVY WALLED RECTANGULAR	FILE DATE: 3/25/85
	ACME CYCLOPS COPPERWELD KAISER STEEL	
CASE 3	IRON CONSTRUCTION CASTINGS	FILE DATE: 5/13/85
	VULCAN	
CASE 4	STEEL WIRE NAILS	FILE DATE: 6/5/85
	CONTINENTAL STEEL NORTHWESTERN STEEL ATLANTIC	
CASE 5	DRAMS	FILE DATE: 6/24/85
	ATT ADVANCED MICRO DEVICES IBM INTEL MICRON TECHNOLOGY UNITED TECH NATIONAL SEMICONDUCTORS MOTOROLA TEXAS INSTUMENT	
CASE 6	CAST IRON PIPE FITTINGS	FILE DATE: 7/31/85
	ITT	
CASE 7	CANDLES	FILE DATE: 9/4/85
	LENOX GENERAL HOUSEWARES	
CASE 8	ANHYDROUS SODIUM METASILICATE	FILE DATE: 9/16/85
	PENNWALT DIAMOND SHAMROCK	
CASE 9	ERASABLE PROGRAMMABLE READ ONLY MEMORIES	FILE DATE: 9/30/85
	ADVANCED MICRO DEVICE INTEL MOSTEK MOTOROLA NATIONAL SEMI CONDUCTOR ROCKWELL INTERNATIONAL SEEQ TECHNOLOGY TEXAS INSTRUMENTS	
CASE 10	DRAMS 256	FILE DATE: 12/6/85
	ADVANCED MICRO DEVICE	

	ATT IBM INTEL MICRON TECHNOLOGY MOSTEK MOTOROLA NATIONAL SEMI CONDUCTORS TEXAS INSTRUMENT	
CASE 11	HYDROGENSTED CASTOR OIL	FILE DATE: 12/28/85
	UNION CAMP	
CASE 12	BUTT WELD PIPE FITTINGS	FILE DATE: 2/24/86
	LADISH	
CASE 13	UNFINISED MIRROR	FILE DATE: 4/1/86
	DOWNEY GLASS	
CASE 14	TUBELESS STEEL DISCS	FILE DATE: 5/23/86
	ACCURIDE MOTOR WHEEL	
CASE 15	UREA	FILE DATE: 7/16/86
	AGRICO CHEMICAL AMERICAN CYANIMID FIRST MISSISSIPPI CHEMICALS TERRA CHEMICALS W R GRACE	
CASE 16	TAPERED ROLLER BEARINGS	FILE DATE: 8/25/86
	TIMKEN INGERSOLL RAND FEDERAL MOGUL	
CASE 17	MALLEABLE CAST IRON PIPE FITTINGS	FILE DATE: 8/29/86
	ITT	
CASE 18	WELDED CARBON STEEL PIPE & TUBE	FILE DATE: 10/2/86
	HUGHES KAISER	
CASE 19	FORGED STEEL CRANKSHAFTS	FILE DATE: 10/9/86
	WYMAN-GORDON CUMMINS ENGINE ATLAS INDUSTRIES	
CASE 20	PORTLAND HYDRAULIC CEMENT	FILE DATE: 10/30/86
	IDEAL BASIC INDUSTRIES KAISER CEMENT	
CASE 21	COLOR PICTURE TUBES	FILE DATE: 11/26/86
	GENERAL ELECTRIC NORTH AMERICAN PHILIPS	
CASE 22	POTASSIUM CHOLORIDE	FILE DATE: 2/10/87
	AMAX INTERNATIONAL MINERALS & CHEM KAISER CHEM	

	KERR-MCGEE LUNDBERG	
CASE 23	MICRO DISKS	FILE DATE: 2/26/87
	MINNESOTA MINING & MANUFACTURE	
CASE 24	STAINLESS STEEL BUTTWELD PIPE	FILE DATE: 4/2/87
	LADISH	
CASE 25	INTERNAL COMBUSTION ENGINE	FILE DATE: 4/22/87
	ALLIS CHALMERS CATERPILLAR CLARK EQUIPMENT	
CASE 26	BRASS SHEET & STRIP	FILE DATE: 7/20/87
	OLIN REVERE COPPER DIVERSIFIED INDUSTRIED UNITED TECH	
CASE 27	NITRILE RUBBER	FILE DATE: 9/1/87
	BF GOODRICH GOODYEAR	
CASE 28	GRANULAR POLYTETRAFLUOROETHYLENE	FILE DATE: 11/6/87
	DU PONT ALLIED SIGNAL	

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