



**INFORMATION ASYMMETRY AND INVESTMENT CASH
FLOW SENSITIVITY: EVIDENCE FROM THAILAND**

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**Information Asymmetry and Investment Cash Flow Sensitivity:
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An Independent Study
Submitted in Partial Fulfillment of the Requirements
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Thammasat University
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An Independent Study

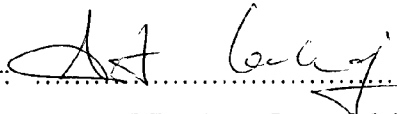
By

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Information Asymmetry and Investment-Cash Flow Sensitivity: Evidence from Thailand

ABSTRACT

This study observes the influence of information asymmetry on Thai firms' investment behavior when firms' internal cash flow is limited. With sample data listed in SET100, effective spread and information entropy are applied to calculate proxy of information asymmetry. The result from effective spread method supports the empirical studies that firms with high information friction will have higher investment-cash flow sensitivity. However, the result analyzes from entropy theory of information shows the different but less reliable outcome which confirms the result of the first method.

INTRODUCTION

A simple method to succeed in financial management is to make firms achieve the highest value based on their capability. The class lecture influences that investment capital deciding by a rational manager should be spent in the positive 'Net Present Value' (NPV) projects. However, the firm with limited capital faces the problem to approach some positive NPV projects. Also a manager in theoretical event supposes to sacrifice some lower NPV projects in order maximize firm's market value.

In the real world, a firm can raise capital by borrowing from outside resources such as money market or capital market. Hence, the firm's financing will not crucial if the outside and inside source of funds are perfectly substitute. The firm realize it's capability to invest in every positive NPV project by using outside funds when it's inside capital is almost spent. On the other hand, the higher cost of funds from outside resource increase the opportunity cost which affect firms' investment decision. The imperfect substitution among inside and outside funds leads to the importance of firms' financing decision.

The well-known study of Modigliani and Miller (1985) mentions that a particular firm with the relaxation of market friction condition finds the perfect substitution between internal and external source of funds. Internal finance is defined as the internal cash flow of firms while external finance sources from many kinds of borrowing from the financial market.

Lots of empirical studies assure the imperfection of real world market. The origin of the wedge between internal and external source of finance is market friction. Asymmetric information is the main factor influent the difference between cost of external and internal finance. Investors with low average information require a higher rate of return to cover information cost or their risk. Therefore, internal and external capital are not perfect substitute. Indeed, external finance creates higher opportunity cost.

The asymmetric information is defined as the unequal in information perceive in the market, which theoretically causes the higher cost of external funds. Information asymmetry can occur by several reasons. For example, some group of investors recognize inside

information while others are not, or firms deny to reveal the information of the positive project since the recognition of other firms will make them lose the opportunity in the good project. If firms use the capital from outside to invest, the investment expenditure should be affected by firms' financing. Base on higher cost of external funds, firms will confront with more pressure to invest external capital rather than internal funds. In other word, financing constraints will influent the sensitivity of firms' investment when firms are lack of low cost finance.

Role of investment-cash flow sensitivity as the topic of argument beyond a long period of time certifies the attention about the firm's investment behavior and competency to access finance. A firm's investment decision with inference to inconsistent as internal low cost funds is nearly empty distinct from class lecture. The firm in the real market need to concern about financing strategy in order to be able to maximize firm's market value.

Objective of this study are finding the effect of the financing constraint on firm's investment expenditure and observing the influence of the financing constraint on firm's investment cash-flow sensitivity by applying two methods; effective spread and conditional entropy, to identify financing constrained firms. As we applied this topic of study to Thai data, the research questions would be "what are the influence of the financing constraint on Thai firm's investment expenditure and the Thai firms' investment capital sensitivity by applying two methods to defined financial constrained firms".

In order to answer these questions, we need to analyze the relationship between the average level of investment spending and the investment-cash flow sensitivity with firms in different level of asymmetric information.

With the concept that asymmetric information is the primary reason of a higher cost of equity capital, Asioglu et al(2007) claimed that their method to identify financially constraints firms by measuring asymmetric information as the proxy is the more direct method to defined firms' financing constraints comparing with previous studies.

Since this paper expands from the study of Asioglu et al (2007), it will benefit Thai firms in the decision on the financing strategy by concerning the consequence of the decision making to the investment of the firms. Also the inspiration beyond the accomplish of the main

hypothesis are persuade Thai firms to increase identical perception in information for all parties and to decrease the inside information in stock market and influent firms to concern about public announcement about their information since firms with higher information asymmetry have lower investment capability if they have low inside cash flow.

The further topics of this paper are the development of this field of study until this period of time. Section 2 is theoretical framework. Section 3 is methodology. Discussion about data used in calculation is discussed in section 4. Empirical result is showed in section 5 and the final part is conclusion.

I. LITERATURE REVIEW

To observe the effect of financial market's characteristic on the gap between external and internal finance, the study of Modigliani and Miller (1958) mentions that in the model omitting the assumption of market friction, the substitution between external and internal finance are almost perfect substitute or the gap of cost between them is not significant.

Moreover, the study of Myers and Majluf (1984) mentioned that market friction create the wedge between cost of external and internal funds in order to cover 'lemons premium'. As many studies believe that information asymmetry is the main origin of higher cost in external capital, there are plenty of empirical studies which were published to support the positive relationship between higher cost of funds from equity market with greater level of asymmetric information. Brennan and Subrahmanyam (1995) claim that securities with high level of asymmetric information are required to generate higher return as the illiquidity cost. Easler and O'Hara (2004) believe that to invest in great private information stock, investors recommend higher return.

The studies mention above leaded to the concept that firms, which need more external funds will reduce their investment expenditure due to higher information cost and increasing in opportunity cost although their investment opportunity is constant. Fazzari et al (1988) study the effect of financing constraints on corporate investment behavior. They classify firms by the ratio of dividend pay. With confident that firms will pay low dividend base on two

reasons 1.) their finance requirement is higher than their internal cash flow and 2.) they have low or negative income. Fazzari et al (1988) define firms with low dividend pay as the high constrained firms which will have high cost of external finance. In the conclusion part of their study, firms with low dividend pay (high constraints) have higher investment-cash flow sensitivity. Therefore, they summarize that firms with higher constraints will have higher investment-cash flow sensitivity when internal funds fluctuate. However, Kaplan and Zingales (1997) disagree with the classifying firms as financially constrained through dividend pay. They criticized that the amount of dividend pay is the choice of the firm, so dividend payout ratio is not a good measurement of financing constraint.

Kaplan and Zingales (1997) define firms' financing constraints with different criteria. Firms were identified as "never constrained" if their internal finance can cover the amount they would like to invest, and "high constrained" if firms' internal cash flow are less than the amount to invest. The result of Kaplan and Zingales (1997) challenge the conclusion of Fazzari et al (1998) that firms with high constrained status have less investment-cash flow sensitivity. Kaplan and Zingales (1997) anxious in the connection between investment-cash flow sensitivity and financing constraints. Allayanis and Mozumdar (2004) wondered that results in the earlier study of Kaplan and Zingales (1997) which reveal that increasing in sensitivity between internal funds distress and investment is not a good interpretation of financially constrained. They eliminated the effects from small amount of observation and found that the weakness in relationship was much decreased.

Cleary et al(2007) introduce model to explain the relationship between asymmetry information and sensitivity of investment amount. They find the higher sensitivity in investment-cash flow sensitivity was influenced by higher level of information friction. Cleary et al (2007) also commented that the contrast in the result of Fazzari (1988) and Kaplan and Zingales (1997) appeared due to the scheme in financial constrained identification. Moyon (2004) claimed that it is difficult to identify financial constraints and confirmed with the relationship between investment amount and method of constrained classification. Asciglu et al (2007) identified level of firms financial constrained by measure the level of asymmetric

information applied from the method of microstructure literature and used it as the representative of financing constraints. Their conclusion to identify financing constraints support classification of the Kaplan and Zingale (1997) but argue with Fazzari (1988) method base on their studied result. Furthermore, Ascioğlu et al (2007) show that higher informational asymmetry increase the sensitivity of investment-cash flow. Since they also applied the method of liquidity estimations expecting them as good proxies, the result from liquidity and microstructure literature are compared. They conclude that all methods applied lead to the same result but result from microstructure literature are more reliable.

Following Asioglu et al (2007) in using effective spread as the proxy for asymmetric information, the result is mixed. The effective spread is also used to represent other concepts. For example, Goyenko et al (2008) uses effective spread to proxy the illiquidity. Copeland et al (1983) and Stoll (1989) mentioned it to represent inventory cost of market maker. For robustness check, this study also applies information entropy as suggested by Hoontrakul et al (2002) as another proxy for the asymmetric information. The comparison of estimation results from the two proxies can shed some light on the appropriate use of the proxy.

Entropy in the very first arose from the physical science in the 19th century (Reddy et al, 2006) and it was expanded into finance as it became the research area of physicists (Baek K. S., 2005). Many empirical studies applied concept of information entropy to financial market. Reddy et al (2006) used entropy to study the manipulation in stock market, Baek S K et al (2005) and Marshinski and Kantz (2002) studied the flow of the information between stock market and financial time series. Molgedey L. and Ebeling W. (2000) used the entropy to measure the predictability of financial time series as they claimed that the predictability of stock return has the origin on the information contain in the historical data with the order of discrete data should not higher than 5 days long. Uncertainty in prediction in their study can refer as asymmetric information.

II. THEORITICAL FRAMEWORK

Asymmetric information

Since the early of 1970, asymmetry information was introduced as a sequent which at least one party can achieve better relevant information than others. One of examples is the theory of lemon market introduced by Akerlof in 1970 which indicates that there is a difference in level of information realized between firms and investors in the market. For instance, firms know in depth information about project in the future and the performance of the firms while investors indeed do not know. Although some investors spend in order to receive information, the information they know cannot match with firms' managers.

Pecking Order theory

With the higher cost of external finance, the pecking order theorem points out that firms will use internal cash flow before access to external source of finance (external debt before outside firm equity). Therefore, firms running out of internal finance will head to external source of funds and will face with the higher required return from outside investors. The outside investors and bank suspect in companies' potential and projects. Therefore, they required for higher return to cover that risk.

Firms normally use their capital to invest in order to make profit and maximize share value. Managers will definitely realize the relationship between investment and pattern of their financing. However, external investors require rate of return based on the level of information friction. Companies with high level of information asymmetry will face with higher required return from investors.

Microstructure Literature

Practically, trading actions in capital market are implemented by both kinds of traders (informed and uninformed). If there is only informed or uninformed trader in the market, all parties in market get the same level of information or market has symmetry information. From assumption that traders are rational and will trade on the information they receive, the gap between bid-ask spread should be zero if all parties in the market can observe information with the same level. The gap between bid and ask price is practically influenced by the rate of

informed trading in the market. Therefore, firms with higher level of information friction will have greater in different between bid and ask price.

Entropy theory of information

From the concept of information entropy, the higher of the system's disorder, the increasing in entropy value. The predictability or order in data (trading volume, price, return and time) of trading transaction in stock market will decrease as the investors receive less reliable information. Since historical data contain some information, investors perceive and are able to make transaction base on it. The high predictability obviously bases on the high information contain in the historical data. The uncertainty of predicting the next stage of data can be calculated as the difference between predictability of two period or the difference in the average information contain in two period of time. The predictability will be high because historical data has an order. The concept matches with the calculation of conditional entropy which is the difference between two-periods of Shannon entropy. Shannon entropy replies about the uncertainty of prediction or information that investors cannot recognized through the period of time. Therefore, the difference between two period of Shannon entropy or conditional entropy is the difference in the level of information investors was unable to recognize or the asymmetric information between those particular two period of time. Therefore, the uncertainty between two periods of time denote information asymmetry emerge in the data set.

III. Methodology

Variable

From the analysis in the paper of Guo and Mech (2000), firm's internal cash and cash flow are financial factors that affect a firm's requirement for external finance. Since the firm will request for external finance for the investment project that surely create the positive return. Therefore, both of them were included as variables in this paper.

Cash Flow scale (CF_t/K_{t-1}) can be estimated as the income without non-main business income plus depreciation and amortization and divide by capital stock at the beginning of the

year. Cash flow is expected to have positive relationship with investment scale since we expected each firm to invest in every positive project if they have enough cash flow.

Cash scale ($Cash_t/K_{t-1}$): can be calculated as cash balance at the end of the year scale by year before capital stock. The correlation between investment and cash scale suppose to be positive as our hypothesis because a firm normally invests in projects which create positive income or cash to firms.

Investment scale (I_t/K_{t-1}) investment (I_t) can be calculated as spending in property plant and equipment including spending in capital leases and construction. Investment scale is the dependent variable in this study.

Capital Stock (K_{t-1}) capital stock was calculated from net plant, property and equipment at the beginning of the year.

Debt Ratio ($Debt_{t-1}$) is the value of long term debt at the end of the year divide by total asset at the end of the year. The correlation of Debt ratio and Investment scale is expected to be negative which since firms with high debt face the stress to spend in some investment projects.

Tobin-Q is used as the proxy of the investment opportunity. The measuring Q variable is

$$Q = \frac{MV(CS) + BV(PS) + CV(LD) + BV(CL)}{BV(TA)} \quad (1)$$

MV represents market value while BV stands for book value. CS is common stock, PS is prefer stock, LD is long-term debt, CL is current liability and TA is total asset.

Our hypothesis on Q variable and investment scale is positive since firms with high investment opportunity normally invest more in order to maximum firms' value.

The level of asymmetry information depends on the difference of information perceive between managers and uninformed traders. Firms with larger size will be closer followed by analysts and have more news coverage. Moreover, firms with larger size tend to have higher investment opportunity, so size of the firms are added as another variable and relationship with investment should be positive.

Interest expense (IntD_t): This variable can be created as the interest expense at the end of the year divide by year end long term debt. The high interest expense make firms reluctant to invest since they face the high opportunity cost from borrowing outside funds. Thus correlation of this variable with dependent variable supposes to be negative.

Measuring level of firms' asymmetric information

Effective spread

In order to measure the level of asymmetric information, the method of effective spread, mean adjusted abnormal trading volume and change in dividend payout will be used

$$\text{Effective spread (ES)} = 2 * \frac{|P - M|}{M} \quad (2)$$

P is the closing price of each day

M is the mid-point of nearest point of contemporaneous period (Bessembinder, 2003)

Value from the calculation will be analyzed in daily. Then daily values are calculated as one year average and put into the formula.

Conditional entropy

Conditional entropy shows the level of asymmetry information or uncertainty of prediction in the next stage base on the past information. It can be calculated as

$$CE_{n+1}(x_1, \dots, x_{n+1}) = -\sum p(x_{n+1} | x_1, \dots, x_n) \log p(x_{n+1} | x_1, \dots, x_n) \quad (3)$$

Molgeday et al (2000) introduced that x_n is the return of the particular stock

$$x_t = \ln(S_t) - \ln(S_{t-1}) \quad (4)$$

They also mention in their study that n using to calculate conditional entropy should less than 5 as they mention that “Beyond n =5 the calculation of the conditional entropy is not reliable due to large statistical errors”

$$p(x_{n+1} | x_1, \dots, x_{n+1}) = p(x_1, \dots, x_{n+1}) / p(x_1, \dots, x_n) \quad (5)$$

The study of Marschinski R. and Kantz H. (2002) mentions that

$$p(x_1, \dots, x_n) = n(x_1, \dots, x_n) / N \quad (6)$$

$n(x_1, \dots, x_n)$ is the number of occurrence of the value inside the data set while N is the length of the time series.

In this study, the probability in equation 6 can be calculated as the appearance of set of historical return. As the number of observing day equals 5, the return of the first 5-day data calculated from equation 4 is grouped with order as the first set of data. The second set of data is the second day return till the return of day six. The probability of set 1 of historical return is measured as the number of set which have the same value of return.

For example, in Figure 1 with 10 day return, the sample of probability calculation is explained. A total of six sets of data can be created which Set 1 has 0.0106, 0.0108, 0.0109, -0.01089 and 0.0109 as subset. Then set 6 contains 5 subset as well. They are 0.0110, 0.0055, -0.0165, 0.0107 and 0.0000. The probability of set 1 therefore is 1 since in six set from sample because there is no other set which has 0.0106 as the first subset, 0.0106 as the second subset, 0.0108 as the third subset, -0.0109 as the return of the forth day and 0.000 as the last return of the group.

[Figure 1 is here]

The value of conditional entropy of every firm in sample is calculated as annual data and is added into the regression.

Interactive term between value calculated from effective spread (ES) and entropic method (CS) with CF/K, Cash/K, Debrat, Q and IntD are added into the formula. Our main hypothesis is the positive correlation between interactive term between cash flow scale and effective spread (conditional entropy) [(CF/K)*ES], [(CF/K)*CE] and the dependent variable.

Moreover, comparative coefficient value between cash flow scale and cash flow interact with asymmetric information value is another main observing consequence.

Univariate Analysis

Univariate analysis is implemented in order to realize the descriptive statistic of each relevant data.

Descriptive statistic of the selected sample is showed in table1

[Table1 is here]

All interested financial factors are included in the model. Moreover, interactive term between variables and value of effective spread and conditional entropy also appear in the table. Higher standard deviation in effective spread lead to expectation that using effective spread create more obvious result since the difference among value are wider.

List of variable to be analyzed

$I_{it}/K_{i,t-1}$ = investment scale

$CF_{it}/K_{i,t-1}$ = scale of cash flow with beginning of period capital stock

$Cash_{it}/K_{i,t-1}$ = cash at the end of the period scaled by beginning of period capital stock

$Debtr_{it}$ = ratio between long term debt and total asset at the end of the year

$Size_{it}$ = size of the firms (log of market value of equity)

$Q_{i,t-1}$ = the value represent firm's investment opportunity

$IntD_{i,t-1}$ = the value of interest expense divide by long term debt at the end of the year

ES_{it} = Effective spread which represent asymmetric information

CE_{it} = Conditional entropy as the proxy of information asymmetry

$X*ES_{it}$ (CE_{it}) = Interactive term with proxy of information asymmetry while X is any interested variable.

Multiple regression

Multiple regression is included to test the relationship between scale of investment and others variables. The model of investment introduced by Fazzari et al (1988) is included to investigate the investment-cash flow sensitivity between firms with different level of financial constrained.

$$(I/K)_{it} = f(X/K)_{it} + g(CF/K)_{it} + \varepsilon_{it} \quad (7)$$

which X in the about model can be representative of factors that are expected to related with scale of investment.

After adding all variables the regression to test occur as

$$\begin{aligned} (I_{it}/K_{i,t-1}) = & \alpha + \beta_1(CF_{it}/K_{i,t-1}) + \beta_2(CF_{it}/K_{i,t-1}) * ES_{it} + \beta_3(Cash_{it}/K_{i,t-1}) \\ & + \beta_4(Cash_{it}/K_{i,t-1}) * ES_{it} + \beta_5(Q_{i,t-1}) + \beta_6(Q_{i,t-1}) * ES_{it} \\ & + \beta_7(Debtr_{it}) + \beta_8(Debtr_{it}) * ES_{it} + \beta_9(IntD_{i,t-1}) \\ & + \beta_{10}(IntD_{i,t-1}) * ES_{it} + \beta_{11}ES_{it} + \beta_{12}Size_{it} + \varepsilon_{it} \end{aligned} \quad (8)$$

With the same concept, the regression using value from entropy method instead of effective spread is

$$\begin{aligned} (I_{it}/K_{i,t-1}) = & \alpha + \beta_1(CF_{it}/K_{i,t-1}) + \beta_2(CF_{it}/K_{i,t-1}) * CE_{it} + \beta_3(Cash_{it}/K_{i,t-1}) \\ & + \beta_4(Cash_{it}/K_{i,t-1}) * CE_{it} + \beta_5(Q_{i,t-1}) + \beta_6(Q_{i,t-1}) * CE_{it} \\ & + \beta_7(Debtr_{it}) + \beta_8(Debtr_{it}) * CE_{it} + \beta_9(IntD_{i,t-1}) \\ & + \beta_{10}(IntD_{i,t-1}) * CE_{it} + \beta_{11}CE_{it} + \beta_{12}Size_{it} + \varepsilon_{it} \end{aligned} \quad (9)$$

From above regression result, α_1 indicated the influence of information asymmetry on dependent variable which should be negative since high information asymmetry will decrease firms' investment expenditure. β_2 indicate the sensitivity of cash flow investment when internal source of funds is low which we expected its value to be positive as firms with high level of asymmetric information have higher sensitivity in investment spending.

IV. DATA

For sample selection, list of SET100 index is the most suitable because the problem of illiquidity in stocks is already eliminated. Data is collected from Datastream with the period of 2001 till 2009. Due to different in nature of business and consistent with cash flow sensitivity literature financial service firms will be excluded from the set of sample.

Bid, ask and closing price using to calculate effective spread and conditional entropy are observed as the daily information while other data using in the regression analysis, such as cash and long term debt are observed as annual data.

V. Empirical Result

The result from the panel multiple regression with random effect is present in table 2.

[Table 2 is here]

The result from the analysis of the panel regression with random effect shows the significant in relationship of Cash flow scale, Cash scale, interact variable between cash scale and effective spread value and value of multiplication between Q variable and value of effective spread.

The negative correlation between cash flow scale and investment scale implies that if firms normally use their internal funds to invest as the first choice which support the pecking order theory. Therefore, cash flow of firms decrease as investment spending increase can be explained that without information asymmetry using external capital and internal funds are perfect substitute.

The positive relationship between cash and investment scale can be explained as firms will invest in the good project which will create return to firms or normally firms in sample will not invest in negative return project.

The positive relationship between interact term between cash flow and effective spread with investment is evidence that firms' reduction in internal funds decreases investment expenditure because they face the information costs when they borrow outside funds.

The negative sign of β_4 lead to the conclusion that firms with high level of information asymmetry and have low return projects will reduce investment expenditure or firms can investment decrease since firms with high information asymmetry require high cash from their investment.

The negative coefficient value of q variable multiply with effective spread value reply that firms with high opportunity and asymmetric information will invest less. We conclude that high information asymmetry reduce firms investment although firms have high investment opportunity.

Finally, the result can be concluded as normally firm's investment decision in the positive NPV project is not affected by cash flow they have because without asymmetry information firms may not face the higher cost from using external capital. However, including the effect of information asymmetry internal cash flow have influent on firms' investment spending. High information asymmetry will decrease firm's investment expenditure although it has high opportunity to invest. Moreover, high information friction affect the firm investment behavior, the result shows the negative return from the investing projects. Moreover, the value of β_1 and β_2 are different. The lower value of β_1 can be explained as the high information asymmetry will increase investment cash flow sensitivity which is the main hypothesis.

Although the analysis with value of conditional entropy do not present the same result as the previous one, the lower R-square value and the unsupported by theories imply that effective spread using in analysis is more suitable.

VI. Conclusion

By using the most effective among three methods in the study of Asioglu et al (2007), this study has the final conclusion which supports Fazzari et al (1988) and Asioglu et al (2007). Financing constraints and information asymmetry reduce firm's capability to invest if internal

cash flow fluctuates since the firm confront with higher opportunity cost. Moreover, information friction reduces firm's investment spending even it has high investment opportunity and return from investing project is significantly change to negative project. Therefore, Thai companies should concern about information announcement and better reduce their information friction because they help to increase return from the project and investment capability.

The application of information entropy reflects the different but low reliable result. The analysis including conditional entropy has lower R-square value. Therefore, effective spread assures by the same result as the model develops from microstructure literature is more suitable method to analyze.

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Figure 1

12/30/2004	0.0106		0.0106	
12/29/2004	0.0108		0.0108	
12/28/2004	0.0109		0.0109	Set 1
12/27/2004	-0.0109		-0.0109	
12/24/2004	0.0109		0.0109	
12/23/2004	0.0110			
12/22/2004	0.0055		0.0110	
12/21/2004	-0.0165		0.0055	
12/20/2004	0.0165		-0.0165	Set 6
12/17/2004	0.0000		0.0107	
			0.0000	

Figure 1: is an example of set creation in order to calculate for probability using in the equation $p(x_{n+1} | x_1, \dots, x_{n+1}) = p(x_1, \dots, x_{n+1}) / p(x_1, \dots, x_n)$

Table 1

	Mean	Standard deviation	Skewness	Kurtosis
$I_{it}/K_{i,t-1}$	0.2615117	0.8024035	8.207396	91.85437
$CF_{it}/K_{i,t-1}$	0.8035734	2.250758	5.241291	33.26596
$Cash_{it}/K_{i,t-1}$	0.442187	1.113356	5.823412	42.81936
$Debtr_{it}$	0.2140694	0.185831	0.6925524	2.752705
$Q_{i,t-1}$	0.5106451	0.2516519	2.116732	15.41398
$Size_{it}$	16.25743	1.439403	0.2537316	3.094516
$IntD_{i,t-1}$	0.4910316	2.776856	9.837948	107.4713
CE_i	0.30715	0.6988215	3.608343	19.29481
$(CF_{it}/K_{i,t-1}) * CE_{it}$	0.0988705	0.6477327	-0.5893387	161.1285
$(Cash_{it}/K_{i,t-1}) * CE_{it}$	0.0612352	0.3183188	11.40274	160.2818
$(Debtr_{it}) * CE_{it}$	0.0586813	0.2025146	6.2119	51.66716
$(Q_{i,t-1}) * CE_{it}$	0.1277687	0.3510532	4.354936	25.25743
$(IntD_{i,t-1}) * CE_{it}$	0.1454126	1.755985	2074976	469.2737
ES_{it}	0.0108561	0.0082809	18.19661	399.7365
$(CF_{it}/K_{i,t-1}) * ES_{it}$	0.0071395	0.0025482	4.777579	28.45961
$(Cash_{it}/K_{i,t-1}) * ES_{it}$	0.0042476	0.0010929	4.91345	3036229
$(Debtr_{it}) * ES_{it}$	0.0024308	0.0015841	20.3682	469.1024
$(Q_{i,t-1}) * ES_{it}$	0.0049124	0.0040628	4.817495	40.0819
$(IntD_{i,t-1}) * ES_{it}$	0.0053824	0.0005876	13.3148	198.3507

Table1: Show the descriptive statistic for all interested variables and interactive term between interested variable and proxy of information asymmetry. There are two proxies in this table: ES is value calculated from the method of effective spread and CE is the value of conditional entropy.

Table 2

	Effective Spread		Conditional Entropy	
α	0.0515		0.1994	
β_1	-0.1678	**	0.044	**
β_2	29.8401	**	-0.145	**
β_3	0.2579	**	0.0633	
β_4	-26.7703	*	-0.0415	
β_5	-0.0635		-0.6352	***
β_6	-51.7512	*	0.35713	
β_7	0.0769		0.3594	
β_8	34.4656		-0.25405	
β_9	-0.0054		0.004	
β_{10}	1.0083		0.1994	
β_{11}	17.4263		-0.095	
β_{12}	0.0168		0.004	
R-Square	0.0651		0.0562	

Table 2 shows the result from the multiple regression with two methods to classified information asymmetry information.