Examining the relation between bid ask spread and the cost of shareholders’ equity

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ABSTRACT
The aim of the study is to examine the relation between bid ask spread and the cost of shareholders’ equity of the listed companies in Tehran stock exchange. The research covers the listed firms in Tehran stock exchange during 2008 to 2012. Bid ask spread, the cost of shareholders’ equity, and firm size and book value to market value ratio were determined as independent, dependent and control variables of the study, respectively. The statistical population of the research includes all listed companies in Tehran stock exchange during 2008 to 2012. The statistical sample of the research includes 76 samples which were selected based on the systematic elimination method. T-statistics and F-Fisher model were used to examine the significance of the variables and the whole efficacy of the model, respectively. The results showed that there is a significant relation between bid ask spread and the costs of shareholders’ equity.

KEY WORDS: Bid ask spread; The cost of shareholders’ equity; Tehran stock exchange.

INTRODUCTION
The cost of shareholders’ equity is the important and effective factor in decision-making in most managerial and financial decisions and regarding this scale is an essential practice (Farzin et al., 2010). There have been offered various factors for the cost of shareholders’ equity in accounting and financial literature. Earnings predictability, earnings sustainability and timeliness of earnings are some of these factors. Whatever predictability, sustainability and timeliness increases, it is expected the cost of shareholders’ equity to be decreased (Kordestani & Majd, 2007). The other factors impacting on the cost of shareholders’ equity are risk of reported information or information asymmetry that is highlighted by many of firms’ managers. There are various studies playing essential role in determining the cost of shareholders’ equity (Batsen; Batsen & Pelambeli; Fronsis et al.; Loise & Verijian, 2000). However, investors are interested in estimating expected future return on their investment (capital cost) with the help of reported information. They expect suitable return in place of opportunity and accepting investing risk (Hey et al., 2013).

The sources of Iesi & Ehora, 2004; Grosman & Stiglits, 1980; Liland, 1992; Wang, 1993) focus on the theoretical relation between information asymmetry, the cost of shareholders’ equity and lack of solidarity in conclusion. For example, Liland (1992) & Wang (1993) note that increasing informed investors in economy may reduces capital cost, because information asymmetry in markets may lead to false selection (adverse selection) in transactions and liquidity providers increase capital cost in order to protect themselves against adverse selection risk (Grosman & Stiglits, 1980; Liland, 1992). Wang (1993) used capital assets pricing model to prove that asymmetric information have two effects on assets’ prices. Firstly, uninformed investors need to take a second risk to compensate the problem of unsuitable selection due to trading with informed traders. Secondly, informed business causes prices to be known, hence the risk taking would be generally reduced. Liland (1992) understood that on average, allowing...
transaction based on secret information may cause information asymmetry in economy, despite the fact that a person with access to secret information (interior) is existed (like managers) and increases stock prices. Although, he didn’t offer his analysis about capital cost, higher stock prices averagely equals with firms' decreased capital costs (Kordestani & Majdi, 2007).

Investors should predict precisely their expected return regarding to measurement scales of information asymmetry in order to make better decisions. In the research literature, there are two groups of measurement for information asymmetry:
1- Measurement based on market: It includes bid ask spread (Vankatesh & Chiang, 1986) and false selection (Hey et al, 2013).
2- Measurements based on accounting: It includes the research's cost and development to sale ratio (Barth et al, 2001; Barth & Kaznik, 1999) and the quality of tailored accrual numbers (Francis et al, 2005).

While prior studies examined firms' disclosure method and required rater of return about the relations between information and capital cost, this investigation focuses on the impact of information asymmetry. Based on the mentioned subjects, the main issue of the current research investigates the relation between bid ask spread and the cost of shareholders' equity of the listed companies in Tehran stock exchange.

Research background:
Kordestani & Fadaei (2012) examined the correlation among information asymmetry and capital structure of the listed companies in Tehran stock exchange. Their findings indicated that there is a negative significant relation between information asymmetry and long term debt changes, and positive significant relation between fiscal deficit and long term debt changes. On the other hand, there is no significant relation between information asymmetry, financial leverage, and also between information asymmetry and financial leverage changes.

Nazari et al, (2012) examined the relationship among information asymmetry and dividend policy. The results indicated that there is a direct relation between information asymmetry and dividend policy, and the theory is consistent with signaling theory of dividend policy. To ensure the accuracy of the obtained results, also, the impact of other factors such as size, profitability and risk on the amount of dividend are examined.

Setayesh et al, (2013) investigated the impact of information asymmetry on the cost of the listed companies in Tehran stock exchange. The results of 94 firms during 2004 to 2011 using panel data indicate that there is a significant relation between information asymmetry and two scales of capital cost, i.e. the cost of common stock capital and debt cost, but there is no significant relation between information asymmetry and two other scales of capital cost, i.e. retained earnings and weighted mean of capital cost.

Bolo & Hassani Elghar (2014) investigated the relation between earnings quality, information asymmetry and the cost of shareholders' equity. The obtained results showed that there is significant positive correlation between information asymmetry and the cost of shareholders' equity, and a significant negative relation between information asymmetry and earnings quality. Also, the obtained results of this test rejected the significant relation between earnings quality and the cost of shareholders' equity.

Autore & Kovacs (2010) examined the relation between shareholders' equity and temporary change of information asymmetry. In this research, the firms were highlighted which resulted in this relationship. The results suggested that when information asymmetry is currently less than before, it is more possible that firms issue shareholders' equity in return of debt.

Armstrong et al, (2011) dealt with the influence of information asymmetry between investors on the cost of shareholders' equity with regarding to standard risk factors. Their findings indicated that when market is not existed in a whole competitive situation, information asymmetry has positive relation with the cost of shareholders' equity with regarding standard risk factors, and when market is in absolute competitive condition, no relation would be observed.

Fu & Kraft (2012) investigated the correlation between financial reporting, information asymmetry and the cost of shareholders' equity. The results showed that the greater the number of financial reporting, the lower information asymmetry and the cost of shareholders' equity, and the relation is more vigorous according to the internal nature of financial reporting selection. According to focus on forced changes of financial reporting, the obtained results are identical.

Levi & Zhang (2013) examined the impact of temporary increase of information asymmetry on the cost of shareholders' equity. Their results suggested that temporary information asymmetry impacts on investors seeking liquidity and market would be experienced risk.

Research methodology:
In bid ask spread in capital markets that distribution of information is asymmetrically done, the seller wants higher price for their stocks and buyer suggests average price for per share due to lack of enough information about assessing the stock. In financial literature, the unusual distance between bid and ask spread is the representative of information asymmetry among buyers and sellers (Vakili Fard et al, 2010). Therefore, if people have enough private information about market, part of the mentioned distance is due to information
asymmetry (Ohara & Oldfield, 1986). Increased difference among ask and bid spread is a merely informative phenomena that is related to higher information asymmetry, consequently, to increased costs of shareholders’ equity (Miloram & Geleshten, 1985; Howang & Honse, 1996). Hence, the research’s hypothesis is as follows:

- There is a significant relation between bid ask spread and the cost of shareholders’ equity.

Statistical population and sample:

The research’s statistical population includes all listed companies in Tehran stock exchange during 2008 to 2012. Regarding to the nature of the research and some imbalance among the listed companies in Tehran stock exchange, the systematic elimination method will be used. The following condition is used to determine the statistical population of the research:

1- They should be part of banks, financial institutions, investment companies, holding and leasing, because the relation of the studied components in this research may be different and no generated to others due to their special nature.
2- Firms should have been listed before 2008 in Tehran stock exchange and should not have left there during 2008 to 2012.
3- The fiscal year should be ends in 19-3-… to observe the comparability.
4- The firms should have not been experienced corruption in trading and their transactions should have acceptable number.
5- The firms should have not changed their fiscal year during 2008 to 2012 and their financial statements and information should be available.

The statistical population of the research is 76 firms which were selected based on the following relation:

\[
Z_1= 95\% \text{ confidence level} \\
N= \text{Population volume} \\
d= \text{Sampling error} \\
\sigma^2 = \text{Population variance}
\]

The research’s regression model:

Based on the research’s hypothesis, the research’s model is as follows:

\[
COEC_{it} = \alpha + \alpha_1SPREAD_{it} + \alpha_2 \text{Beta}_{it} + \alpha_3 \text{Size}_{it} + \alpha_4 \text{BM}_{it} + \varepsilon_{it}
\]

The measurement method of the research’s variables:

Bid ask spread:

Ask price for but and sell is different by investors as information asymmetry is existed. This may leads to information asymmetry has direct relation with bid-ask prices. The model of this spread was introduced by Vinkatesh & Chiang in 1986. The model is:

\[
SPREAD_{it} = \frac{1}{D_{it}} \sum_{d=1}^{D_{it}} \frac{(ASK_{id} - BID_{id})}{(ASK_{id} + BID_{id})/2}
\]

In which:

- SPREAD_{it}: the range of bid and ask spread of firm stock i in the year t;
- ASK_{id}: the best (minimum) bid price for daily stocks of firm i;
- BID_{id}: the best (maximum) ask price for daily stocks of firm i;
- Dit: the days of year t in which the best bid and ask prices are available for the firm i.

The estimation process of bid ask spread is in a way that daily information of bid ask prices for each sample are firstly extracted during each year, then the "maximum ask price" was determined as the "best ask price", and the "minimum bid price" was determined as the "best bid price".

1- Both bid and ask prices in determined day should be available for the related firm.
2- Offering bid and ask prices should be provide during stock exchange trading formal meeting (from 9:00 A.M to 12:00 A.M).
3- The difference between the maximum bid price and the minimum ask price in the determined day should not be negative.

Next, the average of obtained numbers are considered as bid ask spread of those firm during that year for various days of each studied year in the sampled firms.
The cost of shareholders' equity:

To measure the cost of shareholders' equity, one of Gordon's pattern or capital assets pricing model is selected based on its higher reliability.

Gordon's pattern:

In this pattern, the expected return of shareholders (the cost of shareholders' equity) is calculated as the below (Gordon, 1960):

\[ K_e = \frac{D_1}{P_0} + g \]

Ke: Shareholder' expected rate of return.
D1: The next year expected return.
P0: Stock price at the beginning of a year
\( g \): It is the expected growth rate. It should be noted that the expected growth rate is calculated based on geometric mean of sale growth rate.

Capital assets pricing model:

This pattern regards stock return as a function of market risk and is based on the following relation (Sharp, 1964):

\[ E(r_i) = r_f(1 - \beta_i) + \beta_i E(r_m) \]

In which:
E (ri): The expected rate of return of share i;
Rf: Risk-free rate of return;
\( \beta_i \): The sensitivity of stock return changes to market return changes
E (rm): It is the expected return of a market.

Beta:

To measure this variable, covariance of stock return of firm i and market portfolio divided by the variance of the market portfolio in the year t is used.

Firm size:

To measure this variable, sale logarithm of firm i in the year t is used.

Book to market value ratio:

To measure this variable, book to market value ratio in the firm i in the year t is used.

Data analysis method:

Firstly, to determine whether time series \( x_t \) is stationary process (zero accumulation times) and/or divergent (one accumulation times), Augmented Dicky Fuller (ADF) is used. Like examining the stationary of the variables, we need to apply a suitable method for panel data. We use modified Wald statistics to examine group heteroscedasticity among remaining of fixed effects regression model. As well, F and Hausman test are used to determine of fixed effects or random effects model. To illustrate the explanatory power of the explanatory variables, coefficient of adjusted determination (adjusted R\(^2\)) will be used to evaluate significant variables, t-statistics and to assess the overall adequacy of the model, Fisher statistical.

Results:

Examination of heteroskedasticity:

To examine heteroskedasticity, Arch error terms test (LM) is performed. The obtained results are as follow:

<table>
<thead>
<tr>
<th>Description</th>
<th>Statistics amount</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>1.602336</td>
<td>0.095</td>
</tr>
<tr>
<td>Obs*R-squared</td>
<td>2.714152</td>
<td>0.095</td>
</tr>
</tbody>
</table>

* 5% error level

Regarding table 1, due to the significance level of f-statistics is not significant in 5% error level, homogeneity of variance is confirmed and heteroskedasticity of error terms are rejected.

Significance test of fixed effects method:

Table 2: F-Limer and Hausman test

<table>
<thead>
<tr>
<th>Description</th>
<th>Statistics amount</th>
<th>Freedom degree</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-Limer test</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cross-section F: 1.332014, 75, *0.000
Cross-section Chi-square: 126.714269, 75, *0.000

Hausman test

<table>
<thead>
<tr>
<th>Description</th>
<th>Statistics amount</th>
<th>Freedom degree</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-section F</td>
<td>8.162336</td>
<td>19</td>
<td>*0.018</td>
</tr>
</tbody>
</table>

* 5% error level

Regarding the results of both table (F and Hausman), the obtained probability were less than 5% in each tests, so fixed effects method should be used in the related regression model.

**Data normality test:**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Statistics</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cost of shareholders' equity</td>
<td>0.748</td>
<td>0.265</td>
</tr>
<tr>
<td>Bid ask spread</td>
<td>2.336</td>
<td>0.99</td>
</tr>
<tr>
<td>The component of false selection</td>
<td>1.162</td>
<td>0.175</td>
</tr>
<tr>
<td>Beta</td>
<td>1.806</td>
<td>0.126</td>
</tr>
<tr>
<td>Firm size</td>
<td>0.945</td>
<td>0.234</td>
</tr>
<tr>
<td>Book to market value ratio</td>
<td>2.226</td>
<td>0.101</td>
</tr>
</tbody>
</table>

Regarding to the table 3, due to significance level is not significant in 5% error level, it can be concluded that the research's data are normal.

**Research hypothesis test:**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimated coefficients</th>
<th>Estimation of deviation</th>
<th>t-statistics</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td>0.748</td>
<td>0.162</td>
<td>4.617</td>
<td>*0.039</td>
</tr>
<tr>
<td>Bid ask spread</td>
<td>2.623</td>
<td>0.384</td>
<td>6.831</td>
<td>*0.015</td>
</tr>
<tr>
<td>Beta</td>
<td>0.629</td>
<td>0.114</td>
<td>5.517</td>
<td>*0.023</td>
</tr>
<tr>
<td>Firm size</td>
<td>5.189</td>
<td>0.567</td>
<td>9.151</td>
<td>*0.000</td>
</tr>
<tr>
<td>Book to market value ratio</td>
<td>0.559</td>
<td>0.106</td>
<td>5.273</td>
<td>*0.027</td>
</tr>
</tbody>
</table>

* 5% error level

Regarding the table 4, since Durbin-Watson statistic test value is determined among 1.5 to 2.5, there is no correlation between errors and regression can be used. Due to significance level of F-test (75.663) in error level less than 0.01, it can be concluded that the regression model is a suitable model and the independent and control variables are able to describe the cost of shareholders' equity changes. The adjusted coefficient of determination is 0.695; indicating 69.5% of all changes depend on the independent and control variables. Also, the impact coefficient of bid ask spread on the cost of shareholders' equity is 2.623, indicating bid ask spread has positive direct impact on the cost of shareholders' equity. As well, regarding to significant level of T statistics of bid ask spread on the cost of shareholders' equity (0.015) and due to it is less than 5% error level with 95% confidence level, H0 can be rejected and it can be stated that there is a significant relation between bid ask spread and the cost of shareholders' equity. The regression model can be written as below:

\[ \text{COEC}_{it} = 0.748 + 2.623 \text{Spt}_{it} + 0.629 \text{Beta}_{it} + 5.189 \text{Size}_{it} + 0.559 \text{BM}_{it} + \epsilon_{it} \]

**Conclusion and recommendations:**

The test's results suggested that there is a significant relation between bid ask spread and the cost of shareholders' equity. Hence, Levi & Zhang (2013) examined the impact of temporary increase of information asymmetry on the cost of shareholders' equity. They found that changes in policies of firms' disclosure and information environment impact on the cost of shareholders' equity. The results of Peng et al., (2013) indicated that there is a significant positive correlation between information asymmetry and the cost of shareholders' equity. Armstrong et al., (2011) dealt with the influence of information asymmetry between investors on the cost of shareholders' equity with regarding to standard risk factors. Their results showed that information asymmetry and the cost of shareholders' equity have positive relation with together. On the contrary, the results of Setayesh et al., (2013) showed that there is no significant relation between information asymmetry and two other factors of capital cost, i.e. retained earnings and weighted mean of capital cost. Based on the research's results, it can be
suggested to shareholders, investors and other stakeholders to pay more attention to the level of information asymmetry during their decision-making, because it is one of the effective factors on increased cost of shareholders' equity that can decrease the investment risk itself.

REFERENCES


