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Firm size, disclosure and cost of equity capital

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Abstract

Purpose – Prior studies argue that larger firms could get more net benefit from higher disclosure compared to smaller firms due to economies of scale (lower relative costs to produce) and lower proprietary cost (risk of information disclosed being used by competitor). However, this has not been empirically tested. Thus, the purpose of this study is to provide a formal test on whether larger firms benefit more from higher disclosure compared to the smaller firms.

Design/methodology/approach – In prior studies, size is included as a control variable because it has been found to influence cost of equity capital. However, this study treats firm size as a moderating variable to the relationship between disclosure and cost of equity capital. The sample comprises 460 firms listed under the Main Board of Bursa Malaysia.

Findings – The result shows that there is a significant negative relationship between disclosure and cost of equity capital for large firms and not significant for small firms. The managers of firms could strategize the firm's disclosure policy by taking into consideration that the benefit of disclosure in reducing the cost of equity may depend on the size of the firms.

Originality/value – This is the first study that investigates the effect of size on the disclosure and cost of equity relationship. Thus, the evidence can support Diamond and Verrecchia's argument that larger firms benefit more from their disclosure policy compared to smaller firms. The nature of the information environment in the Malaysian capital market as well as legal background in Malaysia provides the authors with enough variations in disclosure and cost of equity to investigate this issue.

Keywords Disclosure, Information asymmetry, Financial accounting, Cost of equity, Size, Malaysia, Equity capital

Paper type Research paper

Introduction

The purpose of this study is to investigate the role of size in the relationship between disclosure and cost of equity. Cost of equity is important to firms as it forms part of the total cost of capital and often considered in decision-making process (Cotner and Fletcher, 2000) especially decisions regarding investment. According to Beneda (2003), cost of equity is important because it forms a basis of comparison in evaluating investment opportunities. Therefore, it is imperative that firms maintain their cost of equity at a reasonable level because if it is too high, the firm will have to let go of many potential investments.

Cost of equity to a firm is equivalent to return required by investors. Risk, growth and size are the most commonly cited factors that influence the required rate of returns by investors (Fama and French, 1993). Besides the three risk factors identified by Fama and French (1993), recent research in the area of accounting also identify the level of corporate disclosure to be negatively related to cost of equity (Botosan, 1997; Botosan and Plumlee, 2002; Botosan *et al.*, 2004).

Corporate disclosure can be defined as the process of providing information about items that is included in the financial statement through notes to the accounts, additional schedules, charts or tables (Shaw, 2003). Traditionally, corporate disclosure focuses more on financial data within the framework of generally accepted accounting principles. This, however, has been recognized as being insufficient as financial data

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are found to be susceptible to manipulation as well as not being able to fulfil the needs of multiple stakeholders, for example for investment purposes (Schuster and O'Connell, 2006). Firms have also recognized this shortcoming, and as part of their efforts to attract more investors, they voluntarily increase their corporate disclosure.

Studies (e.g. Botosan, 1997; Botosan and Plumlee, 2002) regarding disclosure and cost of equity had found that there was a significant negative relationship between disclosure and cost of equity. The explanation for this negative relationship is that higher disclosure reduces information asymmetry that leads to a reduction in transaction costs and/or reduces estimation risks. These studies included size of firms as control variable on the basis that size had been found to influence cost of equity capital. Diamond and Verrecchia (1991), however, contended that larger firms benefit more from their disclosure policy compared to smaller firms. One explanation given was that of economies of scale, meaning larger firms incur less incremental costs in disclosing their private information. More disclosure in smaller firms also expose themselves more to proprietorship cost and risk from the disclosure, making the total cost of disclosing higher compared to larger firms. As more disclosure of proprietary information introduces more risk in small firms, the investors' required return may not reduce much. This implies increasing disclosure may result in more reduction in cost of capital in large firms compared to small firms due to the existence of these costs and risk. This explanation suggests that size of firms can moderate the relationship between disclosure and cost of capital. That is, the relationship between the levels of disclosure and cost of equity depends on the size of firms. The role of size is more than just a control variable and this has not been studied before because most capital markets in developed countries are information rich. According to Verrecchia (2001), in such an environment, any effect from disclosure would be difficult to see.

Our study also contributes to the literature in several respects. First, this is the first study that investigates the effect of size on disclosure and cost of equity relationship. Thus, this study provides empirical evidence to support Diamond and Verrecchia's (1991) argument that larger firms benefit more from their disclosure policy compared to smaller firms. Second, this study is conducted in information environment that is different from previous studies. In an environment where information is already rich, any additional information revealed by firms may not give much impact to investors' decision-making process and may not significantly affect the cost of equity. However, Malaysia provides a good setting to investigate disclosure issue where the legal system and capital market are well developed (Mohamad *et al.*, 2007) but the information environment is not rich (Ball *et al.*, 2003). Similar to Lopes and de Alencar (2010) in Brazil, we expect the relationship between corporate disclosure and cost of equity to be strong and the size effect could be clearly identified.

Results from the analysis show that there is significant negative relationship between disclosure and cost of equity, consistent with previous findings. Using Baron and Kenny's (1986) procedure of testing moderation, we found that size moderates the relationship between disclosure and cost of equity capital. The result corroborates Diamond and Verrecchia's (1991) argument that large firms benefit more from their disclosure policy. This suggests that disclosure may not necessarily reduce cost of equity, despite the common perception. Botosan (1997) also cautioned that net benefits from disclosure were still not clear. As disclosure level increases, preparation cost and potential risk may also increase, therefore the effect on cost of equity is uncertain. These results should therefore initiate more research into this issue especially within the Asian region, where the information environment as well as ownership structure

are different from majority of previous studies that have been conducted in the USA or Europe.

The organization of the paper is as follows. Next we describe prior research related to the issue followed by research method in section three. Result is described in section four and finally we conclude the paper in section five.

Literature review and hypothesis development

Botosan (1997) has empirically shown that firms with higher disclosure level have lower cost of equity capital. Cost of equity is important to firms (Zorn, 2007) as it is often used in evaluating financing alternatives (Beneda, 2003), as well as in budget preparation and performance evaluation (Pagano and Stout, 2004). High cost of equity will lead to a potential investment being rejected which may affect its future growth. Therefore, if there were ways firms can influence the cost of equity, it would be illogical that they do not take advantage of it.

Disclosure of information is linked closely to information asymmetry. According to economic theory (Verrecchia, 2001), disclosure may reduce information asymmetry. Making private information public reduces private information and this diminishes the need to search for information. In other words, when private information is disclosed publicly, information asymmetry among users is reduced.

Information asymmetry exists when certain parties in a transaction have more information than the others. Therefore, there is possibility that those with more information taking advantage of those with less information. There are two problems relating to information asymmetry: adverse selection and moral hazard. Due to lack of information, sub-optimal decision may results, also known as adverse selection problem. Information asymmetry may also lead those with more information to take advantage of those without the information, or moral hazard problem. These problems cause investors to stay away from the market. This could lead to less liquid and less efficient capital market (Akerlof, 1970). Therefore, one way to promote a more efficient capital market is by ensuring that information asymmetry is low.

One way to reduce information asymmetry is to disclose more information. Kumar (2004) in his discussion highlighted that firms disclose more in order to increase the liquidity of their shares. The rationale is that by disclosing more information, information asymmetry is reduced, making their shares more attractive to investors, hence increasing its liquidity. Greenstein and Sami (1994) showed that disclosure level and information asymmetry were negatively related. Looking at segmental disclosure, they found that bid and ask spread (a measure of information asymmetry) was significantly reduced with higher segmental disclosure. Lim *et al.* (2003) came to the same conclusion by studying the disclosure on joint venture. Besides segmental reporting and joint-venture disclosures, which were mandatory voluntary disclosure was also reported to significantly reduced information asymmetry.

Brown *et al.* (2004) showed that conference calls undertaken by firms were negatively related to information asymmetry. Conference calls are activities taken by firms to disclose their private information to the public. These are done voluntarily and information disclosed are normally not those mandated by authorities. According to these researchers, conference calls manage to attract more investors into the market. This is because investors are equipped with more information without having to incur additional cost. Having more information reduces risks as well as adverse selection and moral hazard problems. This further encourages investors to trade, leading to a more liquid market, hence lower transaction cost. In short, higher disclosure level benefits

the market by making it more efficient (Akerlof, 1970) due to increasing shares liquidity (Bushee and Leuz, 2005). Hence, lower cost of equity for firms.

Besides the study by Botosan (1997) that showed negative relationship between disclosure and cost of equity, Richardson and Welker (2001), Botosan and Plumlee (2002), Botosan *et al.* (2004) and Petersen and Plenborg (2006) were among the studies that showed similar results. The negative relationship between disclosure and cost of equity had, however, been found to be conditional. Botosan (1997), for example, found the negative relationship only significant for firms with low analyst following. Richardson and Welker (2001) on the other hand found only financial disclosure to be negatively related to cost of equity, not non-financial disclosure. Botosan *et al.* (2004) on the other hand focused more on the precision of information disclosed rather that the level of disclosure. In all these studies, cost of equity is the dependent variable. In testing the relationship, size of firms is included as control variable on the basis that size influences cost of equity. Basically, the inclusion of size is based on finance literature that found size to be negatively related to returns. Return required by investors is cost of equity to the firm.

Investors demand returns from their investments and the returns are associated with risk. The higher the risk, the higher the return should be to compensate investors for bearing the risk. Banz (1981) first noted the "size effect" in stock returns. He noticed that small firms showed higher average return compared to large firms. He further suggested that size of firms played a role in determining stock returns. His "size effect" is noted in subsequent studies, for example Fama and French model modified CAPM by including size and found that size and return were negatively related (Annin, 1997). Berk (1995) argued that small firms were expected to have higher returns than larger firms because their risks were higher. Nevertheless, the relationship between size and returns or the size effect is difficult to explain (Davis and Desai, 1998). Furthermore, the size effect had also been found to be inconsistent. For example, Davis and Desai (1998) found that the relationship between size and returns also depends on the market condition. Lau *et al.* (2002) and Lam (2002) found a significant negative relationship between size and returns but Morelli (2007) did not find the relationship to be significant.

Size of firms is also found to be positively related disclosure level (Ahmed and Courtis, 1999; Eng and Mak, 2003). In other words, larger firms have higher disclosure level compared to smaller firms. One explanation is that cost of disclosure for these firms is lower due to economies of scale (Lang and Lundholm, 1993). Diamond and Verrecchia (1991) suggested that disclosure benefited larger firms' more than smaller firms. This could be a possible explanation as to why larger firms are found to have higher disclosure levels. Diamond and Verrecchia (1991) further suggested that disclosure and cost of equity could be positively related, that is, if disclosure caused the firms' stock to be more volatile. Small firms' stocks are more prone to changes in the market making it more volatile. As more information is disclosed by smaller firms, they expose themselves more to proprietorship cost, making the total cost of disclosing higher compared to larger firms. As more disclosure of proprietary information introduces more risk in smaller firms, the investors' required return may not reduce much. In other words, the hypothesized negative relationship between disclosure and cost of equity capital may not hold for smaller firms.

Succeeding the above discussions, the following hypothesis is put to the fore:

H1. Firm size moderates the relationship between disclosure and cost of equity.

More specifically, the relationship between disclosure and cost of equity is different for large and small firms. The relationship is expected to be negative and significant only for large firms.

Methodology

Sample

Sample consists of firms listed under Main Board of Bursa Malaysia (previously known as Kuala Lumpur Stock Exchange, KLSE). There are several justifications as to why only firms listed under main board are chosen. Disclosure level in Malaysia is still at minimal level (Ball *et al.*, 2003; Mohd Ghazali and Weetman, 2006). Since previous studies found that larger firms disclose more compared to smaller firms, we expect that firms listed under the main board to have a lot more variation in their disclosure level. This is important because if disclosure made was only to fulfil mandatory requirement, there will be no variation in the disclosure score. This is pertinent because this study is looking at voluntary disclosure.

Firms listed under the main board are larger in size (based on market value) compared to those in the second board or Malaysian Exchange of Securities Dealing and Automated Quotation (MESDAQ). These firms are assumed to be having more opportunity and prospect of expanding. Expansion requires capital and one way of financing the activity is through capital market. Therefore, cost of equity is important to these firms as it will determine whether investment or project under consideration is profitable or not. Since cost of capital is important to these firms, it is logical to assume that firms will take advantage of whatever means that can lower their cost of equity which include higher disclosure. For these reasons, the selection basis is seen justified in order to study the relationship between disclosure and cost of equity as well as gauging the role of size.

All firms listed under the main board are potential sample. However, the calculation of cost of equity using Gode and Mohanram (2003) model requires earnings forecast for two years ahead. The earnings forecast data are taken from I/B/E/S. Unfortunately not all firms have this forecast. Therefore only firms with forecast available are taken as sample. There are also firms with only one of the two years of forecast available. These firms are dropped from the potential sample list. To increase the number of samples included in the study, three years of observation is used, covering years 2004, 2005 and 2006. Firms chosen for each year follow the criteria already mentioned.

Based on the availability of two-year-ahead earnings forecast, 208 firms have been identified as potential sample for year 2004, 223 for year 2005 and 244 for year 2006. This makes a total of 675 observations (firm-years) for the three years of study. However, the calculation of cost of equity also requires other data such as dividend per share and share price. Firms without these data, 118 altogether, are excluded from the sample, giving a total of 557 firms. This constitutes firms from all industries including banking and insurance. Firms in banking and insurance industry are subjected to different regulation, hence excluded from the sample list leaving a final total of 460 firms. Firms from consumer and industrial products as well as consumer services industries constitute 75 per cent of the total sample. The rest are from basic material, healthcare, oil and gas, telecommunication, technology and utility industries. Analysis is then done cross-sectionally.

Variables and measurements

Variables of interest are disclosure, cost of equity and firm size. Variables that have been found to influence cost of equity from past studies are included as control

variables. This consists of Beta, book-to-market value (BTM) and leverage. Disclosure is the independent variable and cost of equity is the dependent variable. Size is tested as moderating variable. Each variable and its operationalization are discussed next.

Disclosure level is measured from what is being disclosed or included in the annual report. This is decided on the basis that annual report is one of the most important channels of communicating corporate information (Botosan, 1997). The focus of this study is voluntary disclosure and general in scope. It means that the focus is not on specific item or issue, but rather overall information that is being disclosed. This includes corporate social reporting, future prediction, firm's vision and mission and so on. The scoring of disclosure level is done based on checklist employed by Mohd Ghazali and Weetman (2006). This checklist is chosen because the study is done on Malaysian firms and has been adapted to suit the requirement of Malaysian authority.

The disclosure checklist contains 51 items and classified under 11 categories. The categories are general corporate information, specific corporate information, chairman's report, review of operations, product/service information, segmental information, research and development, employee information, social and environmental reporting, financial ratios and market-related information. These 51 items can further be sub-grouped into information of strategic, financial and corporate social responsibility in nature. The disclosure checklist is included as Appendix 1.

Firms are given a point for each item disclosed and 0 if there was no disclosure on the item listed in the checklist. Scores are then totalled and divided by total possible score. Disclosure score is therefore in percentage or index form. The score is not weighted because this is perceived as more appropriate for study that do not focus on needs of specific group (Cooke, 1989). The use of unweighted index can avoid the issue of subjectivity in determining the weight to be given to items in the checklist (Courtis, 1996). Furthermore, prior studies also indicated that there was no difference between weighted and unweighted index (Beattie *et al.*, 2004).

The dependent variable, cost of equity can be measured in several ways. Botosan (1997) discussed methods or measurements that could be used to measure cost of equity. Methods such as average realized returns and CAPM are *ex post* in nature. This is seen as inappropriate because this study tries to relate disclosure with decision making, specifically those of investors. Therefore, the cost of equity calculated must be forward looking or *ex ante*. Another alternative is the calculation of cost of equity that is based on accounting numbers and taking into consideration the economic profit. This is generally known as implied cost of equity. The basis of this calculation is the dividend discount formula/model. This model assumes that current share price is equal to the total dividend receivable for some time into the future (infinity) discounted at cost of equity. Several methods or models have been generated from this basic formula. Among them is the residual income model or accounting-based valuation formula (Ohlson, 1995) and another one that is based on dividend discount growth model (Ohlson and Juettner-Nauroth (OJ), 2005). The Ohlson model has been employed in studies by Botosan (1997) as well as Gebhardt *et al.* (2001). The OJ model has been applied by Gode and Mohanram (2003). The two models are slightly different but the underlying concept is the same and both give implied cost of equity that is *ex ante* in nature.

There are two mostly used models, namely those applied by Gebhardt *et al.* (2001) and another one by Gode and Mohanram (2003). Both methods lead to the same conclusion (Hribar and Jenkins, 2004). Cost of equity generated using Gode and Mohanram's (2003), however, produces higher cost of equity compared to the one using

Gebhardt *et al.* (2001) model. The two models are different in the sense that Gebhardt *et al.* (2001) uses return on equity forecast whereas Gode and Mohanram (2003) uses earnings per share forecast. Another difference is the number of forecast involved, Gode and Mohanram (2003) only needs two-year-ahead forecasts whereas Gebhardt *et al.* (2001) requires 12 years into the future forecast as well as terminal value. Due to this, Gebhardt *et al.* (2001) model could be argued to be subjected to more uncertainty as compared to Gode and Mohanram (2003) model. This also makes Gode and Mohanram's (2003) model to be more parsimony. On this basis, this study employs or calculates cost of equity using model applied by Gode and Mohanram (2003). Details of the model are presented in Appendix 2. Data regarding earnings forecast is collected from I/B/E/S while other related data are collected from Datastream.

Size of firm, the moderating variable is measured using market value. This is one of commonly used proxies of size. It has been used in most studies concerning cost of equity, for example Botosan (1997), Botosan and Plumlee (2002), Botosan *et al.* (2004) and Petersen and Plenborg (2006), but normally included as control variable. The data are taken from Datastream. Following previous studies, log market value is used.

Control variables that are found by previous studies to be related to cost of equity are included in the analysis. These variables are Beta (Easton, 2004), BTM (Hail and Leuz, 2006) and leverage (Maroney *et al.*, 2004). Beta is a measure of risk and expected to be positively related to cost equity. Book-to-market represents growth. High growth firms are deemed to be more risky, therefore book-to-market and cost equity are expected to be positively related. Leverage entails committed costs and thus contributes to business risk. Leverage and cost of equity are thus expected to be positively related.

Normal procedure of analysing data is followed. Descriptive analysis is performed to get an indication of data distribution. Skewness and kurtosis values are analysed as indication whether or not data are normally distributed. This is important as linear regression requires the residuals to be normally distributed.

Results and discussion

Analysis is performed on 460 firms cross-sectionally. Before testing the hypothesis using multiple regression, inspection of data by means of descriptive statistic and correlation analysis is performed. Table I reports descriptive statistics of variables in this study.

Disclosure level shows an average value of 31.20 per cent with minimum of 9.80 per cent and maximum of 67.65 per cent. Comparison is made with similar study

	Mean	Median	SD	Minimum	Maximum
Disclosure	0.312	0.280	0.134	0.098	0.677
Cost of equity	0.177	0.162	0.074	0.027	0.347
Size	2.677	2.616	0.624	1.020	4.230
Beta	1.035	1.040	0.325	0.259	1.035
BTM	0.898	0.789	0.590	−0.569	2.225
Leverage	0.105		0.391	0.000	8.099

Notes: Disclosure, disclosure index; cost of equity, rate calculated using Gode and Mohanram (2003) study; size, log market value; Beta, accounting beta; BTM, book-to-market value ratio; and leverage, long-term debts/total asset

Table I.
Descriptive statistics

by Mohd Ghazali and Weetman (2006) using Malaysian firms as sample. Their sample consists of firms listed under Bursa Malaysia (was known as KLSE) Composite Index in year 2001. The results of their study show an average disclosure level of 31.4 per cent, minimum and maximum values of 6.3 and 74 per cent, respectively. The result somehow substantiates Botosan's (1997) claim that disclosure policy is consistent from year to year.

Average cost of equity is 17.74 per cent with minimum value of 2.70 per cent and maximum 34.71 per cent. Comparison is difficult to make due to limited study on Malaysian firms using the same model of calculating cost of equity. The closest comparison is with Hail and Leuz (2006). Taking an average from four methods (including Gode and Mohanram (2003) model) of calculating cost of equity, Hail and Leuz (2006) found an average cost of capital of 9.75 per cent for Malaysia. Their study covers period from 1992 to 2001. The average is much lower than the average generated in this study. Hail and Leuz (2006) also included the USA in their study and reported an average of 9.75 per cent. Botosan (1997) using firms in the USA as her sample shows an average of 20.1 per cent for cost of equity calculated using model based on Ohlson (1995). Therefore, an average of 17.8 per cent for this study is acceptable.

Table I indicates that there is a large dispersion on size of firm as depicted by minimum and maximum value. The minimum value of size is 1.02 whereas maximum value is 4.23. This shows that even though firms in the sample are all listed under the main board, the size still varies considerably.

Correlation test is also performed to have an insight into the relationship between variables. The result can also give a preliminary indication as to whether or not there is multi-collinearity problem. If there is, then the problem should be handled before regression analysis is performed. Table II shows the result from correlation analysis.

Similar to Lopes and de Alencar (2010) in Brazil, the result shows that there is significant negative relationship between disclosure and *ex ante* cost of equity in Malaysia. There is therefore no dispute that higher disclosure may lead to a lower cost of equity capital. There is also significant relationship between size and disclosure as well as cost of equity. This is also in line with previous findings that suggest larger firms to disclose more compared to smaller firms. Size and cost of equity are negatively related confirming previous findings ($r = -0.281$, $p < 0.01$). Beta and BTM, the control variables, are also significantly related to cost of equity and in the expected direction.

	Disclosure	Cost of equity	Size	Beta	BTM	Log TA	Leverage
Disclosure	1.000						
Cost of equity	−0.143*	1.000					
Size (log MV)	0.421*	−0.281*	1.000				
Beta	0.089	0.283*	0.056	1.000			
BTM	−0.051	0.251*	−0.404*	0.179*	1.000		
Log TA	0.558*	−0.193*	0.560*	0.249*	0.036	1.000	
Leverage	0.009	−0.008	−0.026	0.000	0.0380	0.040	1.000

Notes: Disclosure, disclosure index; cost of equity, rate calculated using Gode and Mohanram (2003) study; size, log market value (MV); Beta, accounting beta; BTM, book-to-market value ratio; leverage, long-term debts/total asset; and log TA, log total asset (alternate proxy for size); *significant at 0.01

Table II.
Correlation test result

This confirms finance literature that risk represented by Beta is positively associated to required return by the investors, i.e. cost of equity ($r = 0.283$, $p < 0.01$). Higher disclosure may also be perceived as imposing higher risk to the firm as some information disclosed may be used by competitors. Therefore there may be correlation between disclosure and Beta. Beta, however, is not a perfect proxy for "perceived risks" by investors (Farrelly *et al.*, 1985). It is merely from the perspective of market prices. Investigation into the role of "perceived risks" arising from disclosure warrants a separate study. Consistent with this, the result reveals that correlation between disclosure and Beta is not significant ($r = 0.089$).

The existence of significant univariate relationship between interested variables justifies further analysis. There is a positive and significant association between risk (Beta) and a measure of growth (BTM), suggesting that high growth companies tend to be more risky than low growth companies ($r = 0.179$, $p < 0.01$). Leverage is another variable that is normally associated with risk and hence cost of equity capital. In this case, however, leverage is not correlated to Beta ($r = 0.000$) and although positively correlated to BTM, is not significant. Surprisingly, leverage is negatively correlated to cost of equity, albeit insignificantly. Further research can be done in this area. Malaysian debt market is quite unique in the sense that most debts are given by private organization namely banks and financial institution. This may challenge previous findings regarding leverage. Next, result from regression analysis is presented and discussed.

Multiple regression analysis is used to test our hypothesis. The main objective of this study is to test the role of size in the relationship between disclosure and cost of equity. We first establish that there is significant relationship between disclosure and cost of equity. Therefore, first, we run regression for main effect, that is, to establish whether there is relationship between disclosure and cost of equity as expected. The regression is run several times, first without any control variables, then control variables are included one at a time. We also include size in the full model to see if size changes the relationship between disclosure and cost of equity. The result of multiple regression analysis is presented in Table III.

Result of the regression shows that the relationship between disclosure and cost of equity is significant when control variables are not included in the regression (Model 1). The relationship remains significant and in the expected direction when control variable Beta is included in the regression (Model 2) and still significant with the inclusion of BTM and leverage (Model 4). The negative relationship is, however, no longer significant when size is included in the relationship. This brings us to further investigate the role of size.

The 460 firms in our sample are divided into two groups (based on their median market values) in order to test for the role of size in the relationship between disclosure and cost of equity. Those above median are large firms and those below median are classified as small firms. To prove that the two groups are distinct, *t*-test is performed. Two other commonly used proxies of size namely log sales and log total assets are also included in the *t*-test. The test is to determine whether the means of log sales and log total assets of the two groups are significantly different. In addition to that, the test also includes disclosure and cost of capital as well as the control variables. The result is shown in Table IV.

The result shows that the two groups are significantly different in terms of sales and total assets. The difference in disclosure level, cost of equity, Beta and BTM are also significant. This therefore confirms that our sub-sample of large and small firms is

	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	0.202	0.137	0.121	0.121	0.183
	(*23.388*)**	(*10.676*)**	(*9.136*)**	(*9.132*)**	(*9.402*)**
Size					−0.027
					(*−4.271*)**
Leverage				−0.003	−0.003
				(*−0.328*)	(*−0.408*)
BTM			0.024	0.025	0.013
			(*4.361*)**	(*4.366*)**	(*2.163*)*
Beta		0.068	0.060	0.060	0.064
		(*6.714*)**	(*5.8290***	(*5.820*)**	(*6.367*)**
Disclosure	−0.079	−0.094	−0.086	−0.086	−0.037
	(*−3.102*)**	(*−3.829*)**	(*−3.545*)**	(*−3.537*)**	(*−1.1412*)
Adjusted R^2	0.018	0.105	0.140	0.138	0.171
F statistic	9.625	27.794	25.073	18.794	19.272
p value	0.002	0.000	0.000	0.000	0.000

$$\text{CoE} = \beta_0 + \alpha_1\text{Size} + \alpha_2\text{Leverage} + \alpha_3\text{BTM} + \alpha_4\text{Beta} + \alpha_5\text{Disclosure} + \varepsilon$$

Table III.
Regression analysis result

Notes: Disclosure, disclosure index; cost of equity, rate calculated using Gode and Mohanram (2003) study; size, log market value; Beta, accounting beta; BTM, book-to-market value ratio; and leverage, long-term debts/total asset; **, * significant at 0.01, 0.05, and respectively

	Average			
	Large firm	Small firm	t	Significance (two tailed)
Log sales	5.986	5.489	10.795	0.000
Log total asset	6.209	5.671	11.583	0.000
Disclosure	0.363	0.263	8.608	0.000
Cost of equity	0.162	0.193	−4.597	0.000
Beta	1.069	1.000	2.278	0.023
BTM	0.726	1.080	−6.643	0.000
Leverage	0.095	0.115	−0.548	0.584

Table IV.
Comparison of means

Notes: Disclosure, disclosure index; cost of equity, rate calculated using Gode and Mohanram (2003) study; size, log market value; Beta, accounting beta; and BTM, book-to-market value ratio

distinct. Analysis is then performed on these sub-samples to test the relationship between disclosure and cost of equity. Control variables Beta and BTM are included in the regression. Result on the regression analysis is shown in Table V.

The result shows that for large firms, there is a significant negative relationship between disclosure and cost of equity as has been found by previous studies. There is, however, a positive relationship between disclosure and cost of equity for small firms, although it is not significant. This finding corroborates Diamond and Verrecchia's (1991) contention that larger firms benefits more from their disclosure. This partly explains why smaller firms disclose less compared to larger firms. If higher disclosure results in their cost of equity to be higher, then it will be better off for the small firms to limit the disclosure of their private information.

	Large firm	Small firm
Constant	0.116	0.110
	(*6.765*)*	(*5.298*)*
Leverage	0.014	−0.003
	(*0.390*)	(*−0.307*)
BTM	0.029	0.011
	(*3.322*)*	(*1.412*)
Beta	0.056	0.068
	(*4.522*)*	(*3.928*)*
Disclosure	−0.102	0.009
	(*−3.388*)*	(*0.207*)
Adjusted R^2	0.179	0.073
F statistic	13.465	5.251
p value	0.000	0.000

$$\text{CoE} = \beta_0 + \alpha_1\text{Leverage} + \alpha_2\text{BTM} + \alpha_3\text{Beta} + \alpha_4\text{Disclosure} + \varepsilon$$

Notes: Disclosure, disclosure index; cost of equity, rate calculated using Gode and Mohanram (2003) study; size, log market value; Beta, accounting beta; BTM, book-to-market value ratio; and leverage, long-term debts/total asset; *significant at 0.01

Table V.
Regression result on sub-sample

Verrecchia (1999) also argued that although the negative relationship between disclosure and cost of equity is generally acknowledged, it is not impossible that higher disclosure leads to higher cost of equity. This can happen if shares of the firms become more volatile as a result of higher disclosure. Higher volatility then will lead to higher cost of equity. Therefore, the result shown here suggests that Verrecchia's (1999) argument is valid. Future study may continue on this.

To test the role of size, our sample is sub-divided into large and small firms. Some may argue that this procedure may result in loss of information because all data employed in this study are continuous in nature. Therefore, an additional analysis is performed whereby an interaction term of size and disclosure is included in the regression instead of running the regression separately for large and small firms. Result of this additional analysis is presented in Table VI.

The result of this additional regression analysis, however, shows that the interaction term is not significant. The reason could be because the relationship between disclosure and cost of equity is negative for large firms but positive for small firms. The opposing effect may cause the interaction term to be non-significant. To further understand the interaction effect, a graph is plotted. The graphical representation of the relationship and the interaction effect is presented in Figure 1.

The relationship between disclosure and cost of capital depicted in the diagram confirms earlier conclusion. There is negative relationship between disclosure and cost of equity for large firms as depicted by downward slope of the line representing large firms. The relationship between disclosure and cost of equity for small firms is, however, positive in direction, as represented by upward sloping of the relevant line. In short, this additional analysis confirms the result of separate regression on sub-samples.

Dependent variable = cost of equity (CoE)	
Constant	0.179
	(*51.262*)
Beta	0.021
	(*6.292*)**
BTM	0.008
	(*2.197*)*
Leverage	−0.001
	(*−0.367*)
Disclosure	−0.005
	(*−1.319*)
Size	−0.016
	(*−3.852*)**
Interaction (Size × Disclosure)	−0.003
	(*−1.012*)
Adjusted R^2	0.171
F statistic	16.231
p value	0.0000

$$\text{CoE} = \beta_0 + \alpha_1\text{Beta} + \alpha_2\text{BTM} + \alpha_3\text{Leverage} + \alpha_4\text{Disclosure} + \alpha_5\text{Size} + \alpha_6(\text{Size}\times\text{Disclosure}) + \varepsilon$$

Table VI.
Result on additional regression including interaction term

Notes: Disclosure, disclosure index; cost of equity, rate calculated using Gode and Mohanram (2003)study; size, log market value; Beta, accounting beta; BTM, book-to-market value ratio; leverage, long-term debts/total asset; all independent variables have been standardized; **, *significant at 0.01, and 0.05, respectively

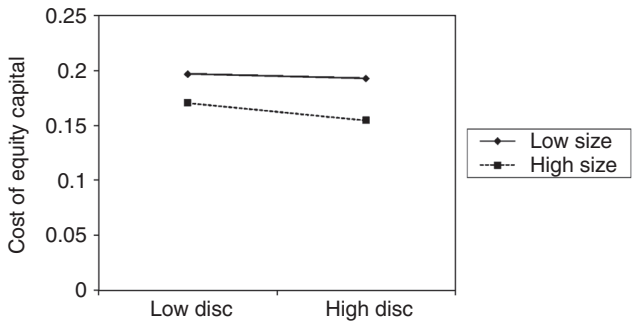

Figure 1.
Graphical representation of interaction effect

From the analysis performed, it is therefore clear that size of firms moderates the relationship between disclosure and cost of equity. This shows that large firms do indeed benefits more from their disclosure. According to Baron and Kenny (1986), once moderation has been established, the direct effect should be interpreted with caution.

Additional analysis

Size can be a proxy for several things (Ball and Foster, 1982), for example it can be a proxy for political cost (Watts and Zimmerman, 1986). Size may also be related to

analyst following, since Botosan (1997) found that the negative relationship between disclosure and cost of equity capital was only significant for firms with low analyst following, additional analysis is performed to see if analyst following has any role in our study. Bivariate correlation ($r = 0.521$, $p < 0.01$) shows that there is a high positive correlation between log market value (proxy of size) and analyst following. This means that larger firms are being followed more compared to smaller firms. Further analysis on the frequency and differences of means of the two groups (small and large) confirms this. The t-test for equality of means between the two groups gives t-value of 6.018 and this is significant at $p = 0.000$. We repeat the tests using the number of analyst following indicator (ANALYST). ANALYST ranges from 0 to 26. A total of 66 firms are with 0 analysts following. Generally the results are qualitatively similar. The coefficient on disclosure becomes insignificant when the number of analyst following (ANALYST) is included in the regression. When the sample is split into low and high analyst following companies (median split), the results (significance of all variables) are qualitatively consistent with the one reported in Table V. Disclosure is significantly related to cost of equity only in companies with high analyst following. Generally, the adjusted R^2 reduced to 9.7 per cent (4.2 per cent) for regression of high (low) analyst following companies.

We compare our results with Botosan (1997). Botosan (1997) found that negative relationship between disclosure and cost of equity is only significant for firms with low analyst following. This implies that disclosure made by the firms complement the role of analyst in getting the information through to investors. Botosan (1997) included size as one of control variables in the regression. The results from Botosan's (1997) study also showed a high positive correlation between log market values (proxy of size) and analyst following that is 0.819, significant at $p = 0.000$. This means that large firms are associated with higher number of followings. Hence, we presume that Botosan's (1997) study shows that the negative relationship between disclosure and cost of equity is significant only for small firms. This, however, is contrary to our findings. Our results show that the negative relationship between disclosure and cost of equity is only significant for large firms. As discussed above, we argued the result to be consistent with Diamond and Verrecchia's (1991) contention. The results may also be justified from economies of scale perspective.

Although our results have a solid justification, we cannot dismiss the contradiction between our result and Botosan's (1997) results. First, this could be due to the sample included in these studies. Our sample comprises all firms listed under the Main Board of Bursa Malaysia and this covers all industrial sectors except banking and financial institution. Botosan (1997), however, only covers firms within manufacturing sector. Another possible explanation that can be further studied is the difference in ownership structure of firms included in our study compared to those of Botosan's. Firms in Malaysia are rather unique in the sense that large firms are mostly government linked while small firms are family owned. The role of ownership structure in disclosure can further be studied.

Additional analysis is also performed to see whether industry affects our earlier findings. Regression with dummy variables for industry is performed. The result (not shown) leads to the same conclusion.

The more commonly used proxy for size is log total asset. As shown in the binary correlation table (Table II), log total market value and log total asset is positively correlated ($r = 0.560$, $p < 0.01$). Regression is performed using log total asset as a proxy for size. Result obtained (not shown) confirmed our earlier findings.

Conclusion

The relationship between disclosure and cost of equity has been empirically proven in previous studies. In testing the relationship, these studies included size of firms as one of control variables. This is so because size has been found to influence returns. Returns required by investors are cost of equity from firm's point of view. The effect of size on return is, however, not consistent.

Diamond and Verrecchia (1991) argued in their discussion that benefits gained from disclosure may not be the same for large and small firms. This implies that the relationship between disclosure and cost of equity for firms of different size may not be the same. This, however, has not been empirically tested. One reason could be because previous studies on this matter had been conducted in an environment where information was already rich. According to Verrecchia (2001), in such an environment, any effect from disclosure would be difficult to see. Therefore conducting similar research in a different information environment can contribute towards understanding the matter.

The results obtained from this study provide empirical evidence supporting Diamond and Verrecchia's (1991) argument. This explains why small firms are reluctant to disclose their private information. However, we have argued that higher disclosure is good for the market and the economy in general. Therefore firms in the market should be encouraged to increase their disclosure level. Since small firms cannot take advantage from higher disclosure in the form of lower cost of equity, they are not eager to increase their disclosure level. As Zorn (2007) had suggested, in order to increase disclosure level, promoting firm growth could be one of the solutions. As such, finance managers of firms could utilize these findings in strategizing the firm's disclosure policy. The benefit of disclosure in reducing the cost of equity is apparent for large firms.

This study highlights the importance of size in determining the disclosure level of firms, a finding not yet reported before. However, this study is not without limitation. The sample included in this study is on the basis of availability of data. Therefore, the problem of self-selection cannot be avoided. The sample comprises firms listed under Main Board of Bursa Malaysia, hence may not be generalized to firms having different characteristics. Test on market value, sales and total assets, however, shows variation in size. Future study can nonetheless pursue to generalize the findings to firms listed under second board as well as MESDAQ (now known as ACE). The size variation is greater if these firms are included in the sample and hence the role of size will be clearer. A more in depth study on the cost of disclosing information such as proprietary cost can also be pursued. This may further explain why small firms disclose less.

Comparison with Botosan's (1997) findings as discussed in the additional analysis section above shows that the impact of higher disclosure on cost of equity is not universal. More studies should be carried out covering different economic and capital market environment to better understand the issue. We cannot stress more the need for higher transparency. In corporate world, this can be achieved through higher disclosure. This can be pursued when issues relating to disclosure are well understood.

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Appendix 1

		Type	Score
(A)	General corporate information		
	1 Brief history of company/company profile	S	
	2 Corporate vision and mission	S	
	3 Corporate structure	S	
	4 Five-year financial highlights	F	
(B)	Specific corporate information		
	5 Statement of strategy/objectives	S	
	6 Significant events calendar	S	
	7 Acquisition and expansion	S	
	8 Disposals and cessation	S	
(C)	Chairman's report		
	9 Overview of economic performance	F	
	10 General discussion of future industry trend	S	
	11 Discussion of factors affecting company's prospects	S	
(D)	Review of operations		
	12 Review of operations by divisions – turnover	F	
	13 Review of operations by divisions – operating profit	F	
	14 Review of operations – productivity	F	
(E)	Product/service information		
	15 Discussion of major types of products/services/projects	S	
	16 Improvement in product quality	S	
	17 Improvement in customer service	S	
	18 Distribution of marketing network for finished products	S	
	19 Customer awards/ratings received	S	

(*continued*)

Table AI.
Disclosure checklist

		Type	Score
(F)	Segmental information		
	20 Geographical production	F	
	21 Line of business production	F	
(G)	Research and development		
	22 Discussion of company's R&D activities	S	
(H)	Employee information		
	23 Breakdown of employees by line of business	CSR	
	24 Breakdown of employees by level of qualification/ executives vs non-executives	CSR	
	25 Breakdown of employees by ethnic origin	CSR	
	26 Employees appreciation	CSR	
	27 Employees training	CSR	
	28 Amount spent on training	CSR	
	29 Number of employees trained	CSR	
	30 Discussion of employee welfare	CSR	
	31 Safety policy	CSR	
	32 Information on accidents	CSR	
(I)	Social and environmental reporting		
	33 Statement of internal control	CSR	
	34 Value-added statement	CSR	
	35 Product safety	CSR	
	36 Environmental policies	CSR	
	37 Charitable donations/sponsorships	CSR	
	38 Participation in government social campaigns	CSR	
	39 Community programmes (health education)	CSR	
(J)	Financial ratios		
	40 Profitability ratios	F	
	41 Gearing ratios	F	
	42 Liquidity ratios	F	
	43 NTA per share	F	
(K)	Market-related information		
	44 Stock exchanges where shares are traded	F	
	45 Volume of shares traded (trend)	F	
	46 Volume of shares traded (year-end)	F	
	47 Share price information (trend)	F	
	48 Share price information (year-end)	F	
	49 Market capitalization (year-end)	F	
	50 Domestic and foreign shareholdings	F	
	51 Distribution of shareholdings (type)	F	

Notes: S, strategic; F, financial; CSR, corporate social responsibility
Source: Mohd Ghazali and Weetman (2006)

Table AI.

Appendix 2. Cost of equity based on Gode and Mohanram (2003) model

The calculation of cost of equity that is applied by Gode and Mohanram (2003) in their study is based on Ohlson and Juettner-Nauroth (2005) (OJ) model (originally discussed in a working paper published in 2000). The model is used because of its appealing features, namely:

(1) the model works directly with earnings instead of dividends and does not require forecasts of book values or return on equity. Thus, one need not make assumptions about dividends beyond dividend per share in year one (dps_1); and

(2) the OJ model is parsimonious.

The details of the model, as being explained in Gode and Mohanram (2003) is reproduced below:

(1) The OJ model relate price to expected earnings and growth in expected earnings.

(2) Analysts typically provide three growth forecasts: eps_1, eps_2, and annualized five-year growth.

(3) Although analysts do not provide estimates of perpetual growth, all valuation model assumes a perpetual growth either explicitly or implicitly when they assume a terminal value.

(4) Based on generalization of Gordon growth model with the following assumptions:

- Price equals the present value of expected dividends.
- There is a fixed dividend payout in relation to earnings – assume full payout for simplicity.
- There is a constant perpetual earnings growth rate $g_p = \gamma - 1$.

These assumptions yield the following well-known formula:

$$P_0 = eps_1/(r_e - g_p)$$

where r_e is the cost of equity capital.

Adding and subtracting eps_1/r_e to the right-hand side of the above equations yields the following:

$$P_0 = \frac{eps_1}{r_e} - \frac{eps_1}{r_e} + \frac{eps_1}{r_e - g_p} = \frac{eps_1}{r_e} + \frac{g_e eps_1}{r_e(r_e - g_p)}$$

Because $g_p eps_1 = eps_2 - eps_1$ due to the uniform growth rate assumption of the Gordon growth model, we get:

$$P_0 = \frac{eps_1}{r_e} + \frac{eps_2 - eps_1}{r_e(r_e - g_p)}$$

The OJ generalizes this formula in the following ways:

(1) It makes the basic assumption that price equals present value of expected dividends.

(2) It imposes no restriction on the payout policy where the abnormal change in earnings is defined to be the change in earnings in excess of the return on net reinvestment during the period.

(3) Instead of a single constant perpetual growth rate $g_p = \gamma - 1$, the OJ model allows the short-term growth: $\hat{g}_2 = (eps_2 - eps_1 - r_e(eps - dps_1))/eps_1$ to differ from g_p. The short-term growth is assumed to decay asymptotically to g_p. The decay rate is also determined by g_p.

- Assumptions of the OJ model:
  - $P_0 = \sum_{t=1}^{\infty} dps_t/(1 + r_e)^t$ where $r_e > 0$ is a fixed constant.
  - Let $z_t = (eps_{t+1} - eps_t - r_e(eps_t - dps_t))/r_e$. The sequence $\{z_t\}_{t=1}^{\infty}$ satisfies $z_{t+1} = \gamma z_t$ $t = 1, 2, \ldots$, where $1 \leqslant \gamma \leqslant (1 + r_e)$ and $z_1 > 0$.

The OJ model yields the following pricing equation:

$$P_0 = \frac{eps_1}{r_e} + \frac{(eps_2 - eps_1 - r_e(eps_1 - dps_1))}{r_e(r_e - g_p)}$$

Rearranging and substituting $g_p = \gamma - 1$, one gets the following:

$$r_e = A + \sqrt{A^2 + \frac{eps_1}{P_0}(g_2 - (\gamma - 1))}$$

where:

$$A \equiv \frac{1}{2}\left((\gamma - 1) + \frac{dps_1}{P_0}\right)$$

and:

$$g_2 = \frac{eps_2 - eps_1}{eps_1}$$

The above expression would be the same as Gordon growth model if: $dps_t = k \times eps_t$ and $g_2 = \gamma - 1$.

To implement the OJ model, the following choices were made:

(1) Use the average of two-year growth and five-year growth as the estimate for short-term growth. OJ model does not explicitly use the five-year analyst earnings forecasts.

(2) The OJ model does not explicitly deal with inflation. Yet analyst forecasts are in terms of nominal dollars. So while estimating the risk premium across time, we use estimates of the nominal long-term growth rate by setting $\gamma - 1 = r_f - 3\%$ where r_f is the yield on ten-year notes.

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