The Association Between Information Asymmetry and the Cost of Equity Capital: An Examination of Earnings Quality

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Abstract

Theory suggests that a company’s information environment will influence its cost of capital. This notion is supported in empirical work. Using earnings quality as a proxy for the degree of information asymmetry, several studies using US data have documented an inverse relationship between earnings quality and the cost of capital. However, the existing literature is lacking with respect to Australian evidence on this issue. This paper seeks to contribute to the existing literature through the use of Australian data and a new and expanded definition of total accruals that will provide a better signal of earnings quality.
Introduction

This paper examines whether information asymmetry, as proxied by earnings quality, is a source of systematic risk priced by market participants. Information asymmetry occurs when one side of the market is relatively better informed than the other. For example, managers are likely to be better informed about their firm’s prospects than outside investors thus allowing them to make better informed investment decisions. This creates an asymmetric information risk for outside investors. Understanding whether this asymmetric information risk is reflected in a higher risk premium is an important issue because to the extent that managers are able to improve the quality of their reporting, and hence reduce the degree of information asymmetry, they may be able to reduce their cost of equity and hence increase the value of their company.

A common simplifying assumption underlying popular models in finance such as the CAPM is that information costs are zero. In such a world all investors use the same covariance matrix to derive their efficient frontiers. However, in reality information costs are non-zero. Consequently, theorists have developed models of market equilibrium that incorporate positive transaction costs. As one example, Grossman and Stiglitz (1980) develop a model under positive transaction costs in which market equilibrium requires that a fraction of investors are uninformed. When a market is composed of informed and uninformed investors information asymmetries exist. Theory also suggests that a firm’s information environment can affect its cost of capital (Wang, 1993 and Easley and O’Hara, 2001). Easley and O’Hara (2001) argue that the cost of capital is a positive function of the degree of information asymmetry characteristic of a company. Asymmetric information is a source of risk to uniformed investors because informed investors are better able to shift portfolio weights to incorporate new information, hence uniformed investors are always on the wrong side of the market. It is important to distinguish the theories of asymmetric information from those of incomplete information such as Merton (1987). In a market of incomplete information the quality of information is the same across all securities, such that all informed investors in a stock have the same information about the stock, however each investor is only informed about a sub-set of the universe of securities. In contrast, asymmetric information occurs when all investors are aware of the entire universe of securities however some investors are relatively more informed than others.

Information asymmetry is not observable hence a proxy must be employed in empirical work. Easley and O’Hara (2001) identify an explicit role for accounting information as a means of disseminating private information. Accounting disclosures are a means of turning private information into public information and hence reducing information asymmetries, and theoretically the cost of capital. Earnings are arguably the most important signal of firm performance. Markets react strongly to earnings announcements which suggests that earnings contain information not already impounded in prices (Ball and Brown, 1968). Earnings are therefore an important source of information that reduce information asymmetries between insiders and outside investors.

Stock prices respond negatively to negative earnings surprises. Additionally, managers’ compensations are often tied to the final earnings figures. Given these facts it is no wonder that until recently the focus was largely on quantity rather than the quality of earnings. However, recent corporate failures such as the case of Enron have highlighted the need to look past the

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1 Examples of proxies for information asymmetry that have been employed in previous studies include; the concentration of insider holdings (Chiang and Venkatesh, 1988); firm performance, share price volatility and firm size (Lang and Lundholm, 1993); the bid-ask spread and trading volume in the firm’s shares (Leuz and Verrechia, 2000); and R&D expenditures (Aboody and Lev, 2000).
earnings number and apply greater scrutiny to the quality of the figures. Earnings are composed of a cash flow component and an accrual component. The role of accruals is to adjust the recognition of cash flows over time such that the resulting earnings number better reflects firm performance (Dechow and Dichev 2002). However, Richardson, Sloan, Soliman, and Tuna (2001) stress that the relevant information contained in the accrual component comes at the expense of reliability. That is, accruals are less reliable than the underlying cash flows. Reduced reliability may result from transitory estimation errors in accruals (Dechow and Dichev 2002) or from earnings manipulation (Jones 1991). The implication of this tradeoff between relevance and reliability is that accruals may signal earnings quality. A poorly performing firm may still be able to report high earnings through the discretionary use of accruals. The result is that investors do not receive a clear signal of firm performance and information asymmetries are increased. Richardson et al. (2001) find that accruals are positively correlated with SEC enforcement actions and therefore that they contain information regarding earnings quality. However an SEC enforcement action is an extreme example of low earnings quality and it is important to recognize that earnings management often occurs within accounting standards, as was the case with Enron.

In conclusion, when earnings are of a low quality they only provide a noisy signal regarding firm performance, and hence the information of insiders may not be accurately reflected in earnings announcements. It is therefore reasonable to assume that earnings quality is a good proxy for the degree of information asymmetry characteristic of a company. In this vein a number of empirical studies have documented an inverse relationship between earnings quality and the cost of equity capital (Aboody et al. 2004 and Francis et al. 2002). This is consistent with the theory presented above, that earnings quality signals the degree of information asymmetry and that information asymmetry is positively related to the cost of equity capital.

The aim of this paper is to provide out of sample evidence, using Australian data, on US findings that asymmetric information risk, as proxied by earnings quality, is systematic and hence reflected in the cost of equity capital. An examination of the literature to date reveals a gap with respect to Australian evidence on this issue. Out of sample evidence is always crucial in validating prior results and establishing that a previously observed effect is real and not spurious. Therefore, although prior studies have established an inverse relationship between earnings quality and the cost of capital, if these results can be replicated in different time periods and in different geographical locations, it becomes less likely that the prior results were chance specific or the result of data-mining.

This paper will also extend prior research through the use of a more recent and expanded definition of total accruals than that used by Aboody et al. (2004) and Francis et al. (2002). The measures of total accruals employed in these studies are based on current accruals and viewed as inadequate by more recent work such as Richardson et al. (2001 and 2004) who provide expanded definitions of accruals that incorporate non-current operating assets and liabilities. Richardson et al. (2001) argue that accruals related to cash flows from investing activities are no more reliable than those relating to operating cash flows and hence should be included in the definition of accruals. The additional set of accruals considered by Richardson et al. (2001) contain relatively more information about future stock returns and SEC enforcement actions than the old definition based on changes in working capital, and hence should be a better signal of earnings quality.

The proposed dissertation will also contribute to a number of related streams of research. Firstly, it will provide further empirical evidence on theoretical models of information asymmetry such as Easley and O’Hara (2001). Their model specifically identifies a role for accounting information as a means of reducing information asymmetries and thus lowering a firm’s cost of capital. The proposed dissertation will provide evidence as to whether companies characterised as having high
quality earnings are more effective at reducing information asymmetries and hence lowering their cost of capital than companies characterised as having low quality earnings.

A related stream of research has examined the impacts of different types of disclosure on the cost of capital. The degree of public disclosure is also a proxy for the degree of information asymmetry (Lang and Lundholm, 1996), given that public disclosure is a means of disseminating private information to uniformed investors. Theory suggests that greater public disclosure may lower a firm’s cost of capital (Diamond, 1985 and Diamond and Verrecchia, 1991) while Botosan and Plumlee (2000) document a negative relationship between the level of disclosure in a company’s annual report and the cost of capital. While I am interested in one particular type of disclosure, namely earnings, the focus of my paper differs from that of the literature on disclosure. While these studies are largely concerned with the cost of capital effects of the quantity of public disclosure I am interested in the relationship between the quality of disclosure and the cost of equity capital.

Finally, the paper seeks to contribute to a growing body of literature that has established the importance of observable firm characteristics in explaining the cross-section of returns. Fama and French (1992, 1993 and 1996) argue that size and B/M ratios proxy for underlying state variables of special hedging concern to investors, and that a three factor model provides a parsimonious description of returns. More recent literature has uncovered additional risk factors that may be priced by the market. Fama and French (1996) find that momentum is not captured by the three factor model, and there is evidence that liquidity (Chordia, Subrahmanyam and Anshuman, 2001) and skewness (Harvey and Siddique, 2000) may also be priced by the market. It is therefore quite plausible that earnings quality is also a priced risk factor in an equilibrium asset pricing model. Furthermore, the theoretical models I have discussed above provide a justification as to why earnings quality may be priced, as opposed to some of the other factors which were found to work empirically and for which theories of why they work were constructed ex-post.

**Prior Research**

A market equilibrium under positive transaction costs is suggested by Grossman and Stiglitz (1980). In their model, prices convey information from the informed to the uninformed, but are a noisy signal. Grossman and Stiglitz (1980) argue that when information costs are non-zero the marginal investor that chooses to become informed will be indifferent between being informed and uninformed. When a large proportion of investors are informed the price system will be highly efficient and informative. Consequently, the value of becoming informed will be relatively low relative to the costs of obtaining information. However, if no-one is informed, prices will be uninformative and the value of becoming informed will be relatively high. The conclusion is that, when information costs are positive, market equilibrium requires that a fraction of investors are uninformed, and hence information asymmetries exist.

The theoretical contribution of Easley and O’Hara (2001) forms the foundation of empirical research into the relationship between asymmetric information and the cost of equity capital. Easley and O’Hara (2001) develop a multi-asset rational expectations equilibrium model in which investors demand a higher return to hold stocks with a greater degree of private information. Private information is a source of risk to uninformed investors because informed investors are better able to shift their portfolio weights to incorporate new information. Consequently, uninformed investors are always on the wrong side of the market and information risk cannot be diversified away by holding more stocks. If information asymmetry is a form of systematic risk, then we would expect that in equilibrium, ceteris paribus, stocks with more private and less
public information will face higher costs of equity capital\(^2\). That is, investors will require a higher risk premium to hold stocks with greater information asymmetry.

Easley and O’Hara (2001) argue that accounting information is one means through which managers may reduce information asymmetries and hence lower their cost of capital. Low earnings quality suggests that earnings do not accurately reflect the private information of insiders regarding firm performance and hence a high degree of information asymmetry between managers and the users of financial reports. Consequently, earnings quality may be a reasonable proxy for the degree of information asymmetry.

The model proposed by Easley and O’Hara (2001) implicitly assumes that insiders will exploit their informational advantages at the expense of outsiders and in doing so create an asymmetric information risk. Empirical work supports the notion that investors demand a risk premium to hold stocks with greater information asymmetry. Aboody et al. (2004) find that a hedge portfolio that is long in low earnings quality stocks and short in high earnings quality stocks earns positive abnormal returns after accounting for the risks associated with the Fama and French (1993) factors. Furthermore, they find that abnormal returns to insiders are relatively higher in low earnings quality stocks than high earnings quality stocks. The results are consistent with insiders exploiting their private information in companies where information asymmetries are greater.

Additional US evidence of an inverse relationship between earnings quality and the cost of capital is provided by Francis, LaFond, Olsson and Schipper (2002) who show that in the context of the one-factor model, lower earnings quality portfolios have higher market betas than higher earnings quality portfolios. Firms with the highest quality earnings experience a cost of equity capital 150-400 basis points lower than the firms with the lowest earnings quality. The relationship between the cost of equity capital and earnings quality is also tested using a three-factor model plus a factor mimicking portfolio for earnings quality. Regressions yield a positive and significant coefficient on the earnings quality factor which is consistent with earnings quality having incremental explanatory power over the Fama and French (1993) factors. Francis, LaFond and Olsson (2003) examine the relationship between cost of capital and seven attributes of earnings\(^3\). Of the seven attributes considered, earnings quality produced the largest cost of capital effects, with high earnings quality firms enjoying lower costs of capital relative to low earnings quality firms.

**Hypotheses**

Based on prior US findings, the main hypothesis of this paper, stated in its alternative form, is that there is an inverse relationship between the cost of equity capital and earnings quality. A hedge portfolio that is long in low earnings quality stocks and short in high earnings quality stocks, will earn positive abnormal returns after adjusting for the risks associated with the market, size and book-to-market ratio.

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\(^2\) In an empirical investigation of the theoretical relationship between information asymmetry and the cost of equity capital, Easley, Hvidkjaer and O’Hara (2000) generate a measure of the probability of information-based trading (PIN) for a large cross-section of stocks. They find that a difference of 10% in PIN between stocks leads to a significant difference of 25% in their expected returns which is consistent with the theory that investors require higher returns to hold stocks with greater private information.

\(^3\) The seven attributes considered were; quality; persistence; predictability; smoothness; value relevance; timeliness; and conservatism.
The earnings quality metrics employed in this paper were established in prior work\(^4\). The first of these is based on the Jones (1991) model that separates accruals into a normal and an abnormal component, where normal accruals are related to accounting fundamentals, namely revenues adjusted for receivables, and property, plant and equipment. On the other hand, abnormal accruals are subject to managerial discretion and may consequently reduce the quality of reported earnings. The first earnings quality metric is therefore, the absolute value of abnormal accruals, where higher absolute values of abnormal accruals signal lower earnings quality. We expect that firms with higher levels of abnormal accruals will have lower earnings quality and consequently face a higher cost of equity capital.

The second earnings quality metric employed is that of Dechow and Dichev (2002) who measure earnings quality by the extent to which current accruals map into cash flow realisations. The Dechow-Dichev measure of earnings quality does not distinguish between intentional and unintentional estimation errors in accruals. Estimation errors in accruals lower the level of earnings quality whether they are the result of earnings management, or the result of transitory estimation errors. The measure of earnings quality assigned to each firm is equal to the absolute value of the firm-specific residual from industry-specific regressions of total current accruals on prior year, current year and one year ahead cash flows. Higher levels of residuals signify lower earnings quality because the residuals are not related to cash flow realizations and therefore reflect estimation errors in accruals. This measure of earnings quality implicitly assumes that the information about earnings quality is contained in the current portion of accruals. While admittedly this is one limitation of this particular earnings quality metric it is a necessary assumption given the long lags between non-current accruals and cash flow realizations.\(^5\)

**Research Design**

**Data**

All accounting data is sourced from *Aspect Fin Analysis*. The database provides financial information from 1989 onwards for all companies listed on the ASX, with the quantity of information available growing each year. Accruals are calculated using the indirect approach hence the required data is sourced from the annual Balance Sheet and Profit and Loss components of the database.

Sample firms were selected separately for each earnings quality metric, however neither sample contains firms from the GICS financials sector. The selection criteria for the first measure of earnings quality (EQ1) based on the Jones (1991) model eliminated all firm-year observations with insufficient data in the current and the previous year necessary to calculate total accruals. Observations where current investments, short-term debt, non-current investments or long-term debt were missing were set to zero rather than eliminated because these constitute balance sheet items that are not relevant for all firms.\(^6\) In addition to the data items required to compute accruals, each firm-year observation also required availability of the current year value of PP&E and the current and previous year operating revenues and receivables. With respect to the second measure of earnings quality (EQ2) based on Dechow and Dichev (2002), all firm-year observations required sufficient data from the previous, current and subsequent year to calculate current accruals and net profits after taxes but before abnormals.

\(^4\) Aboody, Hughes and Liu (2004), and Francis, LaFond, Olsson and Schipper (2002).

\(^5\) See Dechow and Dichev (2002) for a further discussion.

\(^6\) This is consistent with Richardson et al. 2004.
Given the selection criteria described above the sample period for EQ1 is 1993-2003 while EQ 2 covers 1993-2002. Cross-sectional industry-specific regressions require a minimum of 20 firms per industry per year. This further reduces the sample by eliminating those industry-years with fewer than 20 firms. The final sample consists of 7079 firm-year observations for the first earnings quality metric and 4503 firm-year observations comprise the second earnings quality metric.

While *Aspect Fin Analysis* also provides historic share price data, the data that is available is not sufficient for calculating monthly stock returns over the entire period. Consequently, monthly return data will be sourced from the *Share Price & Price Relative* Database (S.P.P.R.) from the Centre for Research in Finance at the Australian Graduate School of Management. The database provides the monthly returns on all Australian listed stocks. GICS industry group classifications are obtained from the ASX website which is supplemented with *Aspect Fin Analysis* for classifying delisted firms.

Abnormal returns to the earnings quality portfolios will be calculated relative to the Fama and French (1993) three factor model. As a result, time-series returns for the factors will be required. The construction of the SMB and HML factors employed in this paper is described in Durack, Durand and Maller (2004). Monthly returns are available for the factors from March 1990 until December 2003. One point to note is the difference in the construction of the SMB factor used here relative to Fama and French (1993). In constructing SMB, Fama and French (1993) divide the sample stocks into two size groups, and SMB is equal to the difference in the return on the small size portfolio and the big size portfolio. The SMB factor used in this paper was constructed by ranking firms on the basis of size, and using the top and bottom 30% of firms in terms of market equity to yield the return on SMB. Monthly returns on the All Ordinaries Accumulation Index will also be used in calculating the excess returns on the market.

**Methodology**

The methodology adopted in this paper closely corresponds to that of Aboody et al. (2004) and Francis et al. (2002). The first measure of earnings quality employed is a measure of abnormal accruals derived from Jones (1991). The main distinction between this paper and prior work is the definition of accruals employed. We adopt a broader definition of total accruals derived from Richardson et al. (2004), where total accruals (TACC) are defined as the growth in net operating assets:

\[
(1) \text{TACC} = \frac{(\text{NOA}_t - \text{NOA}_{t-1})}{\text{NOA}_{t-1}}
\]

Where, NOA is the difference between operating assets (OA) and operating liabilities (OL).

\[
(2) \text{OA} = \text{COA} + \text{NCOA} = (\text{current assets – cash}) + (\text{total assets – current assets – non-current investments})
\]

\[
(3) \text{OL} = \text{COL} + \text{NCOL} = (\text{current liabilities – short term debt}) + (\text{total liabilities – current liabilities – long-term debt})
\]

The Jones (1991) approach involves separating accruals into a normal and an abnormal component, where normal accruals are related to accounting fundamentals, namely revenues adjusted for receivables, and property, plant and equipment. Each year the following cross-sectional regression is run for each of the 25 GICS industry groups with at least 20 firms per year:
(4) \[ TA_{j,t} = k_1 (1/NOA_{j,t-1}) + k_2 (\Delta \text{REV}_{j,t}/\text{NOA}_{j,t-1}) + k_3 (\text{PPE}_{j,t}/\text{NOA}_{j,t-1}) + e_{j,t} \]

Where, REV = Operating Revenues
PPE = Property, plant and equipment

The parameter estimates from equation (4) are then used to calculate normal accruals.

(5) \[ NA_{j,t} = k_1 (1/NOA_{j,t-1}) + k_2 (\Delta \text{REV}_{j,t} - \Delta \text{AR}_{j,t})/\text{NOA}_{j,t-1} + k_3 (\text{PPE}_{j,t}/\text{NOA}_{j,t-1}) \]

Abnormal accruals are then defined as:

(6) \[ AA_{j,t} = (TA_{j,t}/\text{NOA}_{j,t-1}) - NA_{j,t}\]

A higher absolute value of abnormal accruals signifies lower earnings quality.

The second earnings quality metric employed in this paper is derived from Dechow and Dichev (2002), and is based on the extent to which current accruals correspond to cash flows from the prior period, the current period and one period ahead cash flows. The following definitions apply:

(7) \[ \text{CFO}_{j,t} = \text{NPAT}_{j,t} - TA_{j,t} \]

Where, NPAT = net profit after tax before abnormals.

(8) \[ TA_{j,t} = (\text{change CA}_{j,t} - \text{change CL}_{j,t} - \text{change CASH}_{j,t} + \text{change STDEBT}_{j,t} - \text{DEPN}_{j,t}) \]

(9) \[ \text{TCA}_{j,t} = (\text{change CA}_{j,t} - \text{change CL}_{j,t} - \text{change CASH}_{j,t} + \text{change STDEBT}_{j,t}) \]

Where,
CA = total current assets
CL = total current liabilities
CASH = cash and current investments
STDEBT = short-term debt
DEPN = depreciation and amortization expense

The following cross-sectional regression is estimated each year for each of the 25 GICS industry groups with at least 20 firms per year:

(10) \[ \text{TCA}_{j,t}/\text{Aveasset}_{j,t} = b_0 + b_1 (\text{CFO}_{j,t}/\text{Aveasset}_{j,t}) + b_2 (\text{CFO}_{j,t+1}/\text{Aveasset}_{j,t}) + b_3 (\text{CFO}_{j,t+2}/\text{Aveasset}_{j,t}) + e_{j,t} \]

The second earnings quality metric is equal to the absolute value of the firm-specific residual. The limitation with the second approach which is recognized by Dechow and Dichev (2002) is that ideally we would like to regress current accruals on to the portion of past, present and future cash flows that are related to current accruals, however these are unobservable and hence we must use CFO. Thus, the independent variables are measured with error resulting in coefficients and an R² that are biased towards zero.

The two earnings quality metrics will be estimated monthly over the sample period and each year firms will be ranked on the basis of their earnings quality metrics. Each year the firms will be divided into quintile portfolios on the basis their earnings quality rank, where quintile 1 will contain the highest earnings quality firms and quintile 5 will be comprised of the lowest earnings
quality stocks. The portfolio formation procedure will be carried out separately for each of the earnings quality metrics. A hedge portfolio is also formed which is long in the lowest earnings quality portfolio and short in the highest earnings quality portfolio. Returns to each quintile portfolio will be calculated monthly and risk-adjusted using the Fama and French (1993) three-factor model.

Employing monthly data, the following time-series regression is estimated for each portfolio, for each of the earnings quality metrics.

\[
(11) \quad R_{p,t} - R_{f,t} = \alpha_{p,t} + \beta_{p,t}(R_{m,t} - R_{f,t}) + \gamma_{p,t} \text{SMB}_t + \delta_{p,t} \text{HML}_t + \varepsilon_{p,t}
\]

In testing the hypotheses I am interested in the \(\alpha\)'s of equation (11), which estimate the return to a portfolio of stocks after accounting for known risk factors associated with the market, size and B/M, and hence are a measure of abnormal returns. If there is in fact an association between earnings quality and the cost of equity capital then we would expect to see a monotonic increase in the size of \(\alpha\) as we move from high earnings quality portfolios to low earnings quality portfolios. A hedge portfolio that is long in low earnings quality stocks and short in high earnings quality stocks should yield a positive and statistically significant \(\alpha\).

**Expected Findings and Conclusion**

The aim of this paper is to provide Australian evidence on the issue of whether a firm’s information environment affects its cost of capital. The proxies for information asymmetry employed in this paper are two measures of earnings quality based on two different measures of accruals. The common factor in both of these earnings quality metrics is that each seeks to separate total accruals into those related to accounting fundamentals and those that reflect managerial discretion or estimation errors.

If information asymmetry is a source of systematic risk priced by market participants then we would expect to find an inverse relationship between earnings quality and the cost of equity capital. This finding would be consistent with prior US results. We expect to see a monotonic increase in abnormal returns as we move from high earnings quality quintiles to low earnings quality quintiles. Additionally, a hedge portfolio that is long in low earnings quality stocks and short in high earnings quality stocks is expected to earn positive and significant abnormal returns relative to the Fama and French (1993) three-factor model. These results would be consistent with investors requiring higher returns to hold stocks with a greater degree of information asymmetry.

The assumption underlying our expected findings is that earnings quality is a good proxy for the degree of information asymmetry. Given the capital market consequences of earnings announcements one cannot dispute the importance of earnings as a signal of firm performance. Earnings quality reflects the quality of that signal. When earnings are of low quality such that they only relay a noisy signal about firm performance then information asymmetries will be high. The information that investors receive regarding firm performance will be of a lower quality than the information available to insiders hence insiders will be able to make better informed investment decisions. This is the source of risk identified by Easley and O’Hara (2001) that faces uninformed investors and which commands a risk premium in market equilibrium. Overall, the results from this study based on earnings quality will pertain to the much broader issue of information asymmetry.
References


