DOI: 10.7763/IPEDR. 2012. V50. 24

Earnings Quality, Risk-taking and Firm Value: Evidence from Taiwan

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Abstract. This research examines the relationship of earnings quality, risk-taking and firm value. There has two hypotheses been constructed, first, a firm with lower earnings quality, which represents lower financial reporting quality, will has higher degree of risk-taking; and second, that lower accrual quality firm has significant influence on reducing firm value, even after controlling the size, B/M ratio, Amihud ILLQ and expected default probability proxies. This project uses Taiwan sample data during 2001 to 2010 and employing multivariate regression analysis, the results shows that the two hypotheses are verified and the phenomenon is especially significant after the 2008 financial crisis.

Keywords: Earnings quality, Risk-taking, Expected default probability

1. Introduction and Literature Review

The accounting quality, which can influence a firm's information risk, has being an important role in recent financial studies. Since Dechow and Dichev(2002) develop the econometric model to measure earnings quality, there are a lot of articles to explore the influence of accounting quality on different corporate finance issues. In this paper I focus on how the accounting quality affect risk choices in corporate investment and firm value. By literatures, there are several studies have discussed the influence of earnings quality on corporate finance issues. Wang(2006) investigates the relation between founding family ownership and earnings quality, finding consistent evidence that founding family ownership is associated with lower abnormal accruals, greater earnings informativeness. Biddle et al.(2009) provide evidence that firms with higher financial reporting quality also are found to deviate less from predicted investment levels and show less sensitivity to macro-economic conditions. With IPO data in UK, Ball and Shivakumar (2008) shows firms on average improving their financial reporting quality prior to an IPO, in order to meet the market demand for higher quality financials from public firms, and in response to public-firm regulation. Rajgopal and Venkatachalam(2011) find that deteriorating earnings quality is associated with higher idiosyncratic return volatility over 1962–2001 of US data. However, there are still rare papers to explore how the accounting quality affects the degree of risk-taking and firm value.

2. Hypotheses

The primary goal of the analysis is to determine the effect of earnings quality on risk-taking and firm value. In literatures, there are some close linkages of the similar issue. Gray et al.(2009) suggest while accruals quality impacts on the cost of capital for Australian firms. Rajgopal and Venkatachalam(2011) find that deteriorating earnings quality is associated with higher idiosyncratic return volatility over 1962–2001 of US data. Callen et al.(2012) empirically suggest that poor accounting quality increase the cost of equity. Therefore, it can be inferred that a firm with lower accrual quality (higher AQ value as mentioned in section III) will take more risk:

Hypothesis 1: A firm with lower earnings quality (higher AQ value) will has higher degree of risk-taking.

Secondly, this research would also like to discuss lower earnings quality affect firm's value. The sample period is divided into two periods by worldwide financial crisis 2008, checking the different degree of earnings quality effect on firm's value. Therefore, the hypothesis 2 can be developed as:

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Hypothesis 2: A firm with lower earnings quality (higher AQ value) will has lower firm value, even controlling relative variables. In addition, the influence of earnings quality on firm value is more significant after financial crisis 2008 than before.

3. The Model

This section introduces the proxies of accrual quality and risk-taking respectively, the regression models of this study, and the data used.

3.1. The Measure of Earnings Quality

This research employs the accrual estimation error measure developed by Dechow and Dichev (2002) and modified by Francis et al. (2005) as the measure of accruals quality. Accruals quality is defined as the degree of mapping for a firm's working capital accruals for the past, current and future operating cash flows, controlling for changes in revenue and the level of gross property, plant and equipment.

$$TCA_{it} = \beta_{0i} + \beta_{1i}CFO_{i,t\text{-}1} + \beta_{2i}CFO_{i,t\text{-}1} + \beta_{3i}CFO_{i,t+1} + \beta_{4i}\Delta REV_{i,t} + \beta_{5i}PPE_{i,t} + v_{it} \quad (1).$$

Where

$$TCA_{it} = \Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STDEBT_{i,t}$$

$$CFO_{it} = NIBE_{i,t} - (\Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{it} + \Delta STDEBT_{i,t} - DEPN_{it})$$

That *TCA* = total current accruals, *CFO* =cash flow from operations. CA= current assets, CL= current liability, STDEBT= debt in current liability, DEPN= depreciation and amortization, NIBE= net income before extraordinary items, ΔREV=changes in sales revenue, and PPE= gross value of property, plant and equipment. All variables in equation (1) are scaled by average total assets over year t-1 and year t.

Refer to Francis et al. (2005), the coefficients in Eq. (1) will likely differ across industries, since this research estimate equation (1) cross-sectionally by year and within each of the Taiwan Securities Exchange industry classifications, which must contain at least 10 firms in year t. Annual cross-sectional estimations of equation (1) yield the residuals v_{it}, and the accruals quality measure AQ= $\sigma(\hat{v}_{it})$,where $\sigma(\hat{v}_{it})$ is the standard deviation of firm i's residuals, $\hat{v}_{it}$, calculated over year t-5 through year t-1. Higher value of AQ means lower degree of earnings quality.

3.2. The Measure of Risk-taking

This research use two proxies to measure the degree of risk-taking: Expected default probability (EDP) and stock return volatility, which are similar to Erkens et al.(2012). EDP is implemented by Merton's (1974) structural form model, which has been usually used as a credit risk measure in practices (Moody's KMV, Crosbie and Bohn, 2003) or academic studies (Vassalou and Xing 2004, Covitz and Downing 2007). Taking a firm's equity as a call option with firm asset value as the underlying asset and its default threshold as the exercise price, estimating the asset market value and volatility of a firm by employing an option theory-based method developed by Black and Scholes (1973) and Merton (1974). A firm's asset value is denoted as V_t, which follows log-normal stochastic process, σ_V indicate the standard deviation of asset value, t is the remaining time to maturity of a firm's liabilities D_t, μ denotes the rate of growth of asset value.

$$EDF = N\left[-\frac{\ln\left(\frac{V_t}{D_t}\right)+\left(\mu-\frac{\sigma_V^2}{2}\right)t}{\sigma_V\sqrt{t}}\right] \quad (2)$$

$$N[\ ]: \text{Cumulative Normal Distribution}$$

Second, also referring to Erkens et al.(2012), this study measures stock return volatility as the standard deviation of weekly stock returns. The stock return volatility is calculated by 52 weekly stock returns during every year in the sample period.

3.3. Empirical Regressions

To observe the influence of accrual quality on risk-taking, the univariate regression is employed:

$$Risk\_taking = \alpha + \beta\,\mathrm{AQ} + \varepsilon \quad (3)$$

Where risk-taking can be proxied by two measures, EDP and stock return volatility, as mentioned above. If the coefficient β shows significant results, the Hypothesis 1 could be confirmed empirically.

Then, the Hypothesis 2 discusses the influence of accrual quality to firms value, can be test by the following regression:

$$Tobin\_Q_{it} = \beta_0 + \beta_1 \mathrm{AQ}_{it} + \beta_2 \log size_{it} + \beta_3 (B/M)_{it} + \beta_4 Amihud + \beta_5 \mathrm{EDP} + \varepsilon_{it} \quad (4)$$

Where Tobin's Q is proxied for firm value, which are used in prior literatures(Gompers et al., 2003; Morey et al., 2009, Chi and Lee, 2012) Tobin's Q is calculated as the book value of assets plus the market value of equity minus the book value of equity and deferred taxes, all divided by the book value of assets. Furthermore, the control variables including log value of firm size (book value of asset), book to market value of firm equity (B/M ratio), Amihud (2002) illiquidity proxy and Expected default probability (EDP). They are usually being controlled in relative studies.

3.4. Sample Data

The study uses listed firms data in Taiwan Stock Exchange. All data are taken from the *Taiwan Economic Journal* (TEJ), including transaction data and financial statement materials. The sample period composes during 2001 to 2010.

4. Empirical Results and Conclusion

Table 1 shows the results of testing Hypothesis 1. Both proxies of risk-taking (EDP and Stock Return Volatility) are significant influence by AQ. Because higher AQ represents lower earnings quality, higher AQ will induce higher degree of risk-taking. The results of Table 1 denote higher AQ (lower earnings quality) has positive significant impacts on firm's risk-taking, which is consistent with Hypothesis 1. In addition, the adjusted R-square of AQ regress on EDP is only 0.78%, which is much smaller than that of Stock Return Volatility 5.98%.

Table 1: Univariate Regression of Risk-taking on Accrual Quality

Explanatory Variables	EDP	Stock Return Volatility
Intercept	0.0626 (28.89)***	0.0551 (96.25)***
AQ	0.3077 (8.47)***	0.2318 (24.14)***
Adj R^2 (%)	0.78	5.98
No. of Observations	9031	9146

This table shows the results of univariate regression of risk-taking on accrual quality. The dependent variable of risk-taking proxies includes EDP and Stock Return Volatility. EDP is the expected default probability which is calculated by Merton's (1974) structural form model, which has been mentioned as Eq.(2). Stock Return Volatility is the standard deviation of weekly stock returns, calculated by 52 weekly stock returns during every year in the sample period, referring to Erkens et al.(2012). AQ denotes Accrual Quality developed by Dechow and Dichev (2002) and modified by Francis et al. (2005) as mentioned in section IV. Values in parentheses are t-value, and *,**,*** represent 10%, 5% and 1% significance level respectively.

Table 2 shows the multivariate regression results of testing Hypothesis 2. It can be seen that higher AQ (lower earnings quality) has negatively significant influence the firm value proxies (Tobin's Q) even controlling the size, B/M ratio, Amihud ILLQ and EDP variables. During the total sample period, the coefficients of AQ -0.0298 is significance at 1% level; however, the degree of significant reduces as -0.0189 before 2008 financial crisis, only slightly significant at 10% level, contrast to the period after 2008, that coefficient rise to -0.0555 and significant at 1%. Hence, the adjusted R-square of the regression also rises

from 7.52% to 10.23% after financial crisis. Therefore, the hypothesis 2 statement, that a firm with lower earnings quality (higher AQ value) will has lower firm value, and the influence of earnings quality on firm value is more significant after financial crisis 2008 than before, can be supported by empirical evidences.

Furthermore, it can also be taken attention how that four controlling variables affect Tobin's Q. Since all the controlling variables has significant impacts (1% level) on firm value, the coefficients of control variables: size (+), B/M (+), Amihud ILLQ (-) and EDP(-), denotes larger size, value-type, higher liquid stock and lower expected default probability firms have higher firm values.

In summary, the contribution of this study is to explore the issue how the accrual quality and risk-taking are connected. From the empirical results, this study demonstrates that higher earnings quality is accompanied with lower risk-taking and higher firm value. It also showed that accrual quality influence on firm value especially significantly after the 2008 financial crisis.

Table 2. Regression of Firm Value Proxy (Tobin's Q) on Accrual Quality and Control Variables

Explanatory Variables : Tobin's Q			
Sample Period	All (2001-2010)	Before Financial Crisis (2001-2007)	After Financial Crisis (2008-2010)
Intercept	1.5540 (11.86)***	1.3055 (7.82)***	2.1143 (10.11)***
AQ	-0.0298 (-3.61)***	-0.0189 (-1.79)*	-0.0555 (-4.24)***
Log value of Firm Size	5.2179 (16.56)***	5.6975 (15.04)***	4.2909 (7.62)***
B/M	0.0055 (8.72)***	0.0068 (7.95)***	0.0039 (4.36)***
Amihud	-0.0002 (-3.96)***	-0.0001 (-2.67)***	-0.0002 (-3.34)***
EDP	-0.8036 (-9.88)***	-0.3733 (-3.28)***	-1.3964 (-11.81)***
Adj R^2 (%)	7.28	7.52	10.23
No. of Observations	5655	3719	1936

This table shows the results of regression of firm value proxy (Tobin's Q) on accrual quality and control variables. The dependent variable is Tobin's Q. AQ denotes Accrual Quality developed by Dechow and Dichev (2002) and modified by Francis et al. (2005) as mentioned in section IV. Firm size is log value of asset, B/M is the ratio of book to market value of firm equity, Amihud ILLQ proxy is calculated by the method of Amihud (2002), EDP is the expected default probability which is calculated by Merton's (1974) structural form model, which has been mentioned as Eq.(2). Values in parentheses are t-value, and *,**,*** represent 10%, 5% and 1% significance level respectively.

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