Do stock fundamentals explain idiosyncratic volatility? Evidence for Australian stock market

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Abstract

This study examines the relationships between stock fundamental ratios and idiosyncratic volatility from 1993 to 2010 for Australian Securities Exchange listed companies. The portfolio analysis results show that high idiosyncratic volatility companies tend to be small (measured by size), highly leveraged (measured by interest cover ratio), low profitability (measured by return on equity and earnings per share), low valuation (measured by price to earnings ratio) companies. The regression analysis results show that dividend yield is positively related to the idiosyncratic volatility. Price to earnings ratio and return on equity are negatively related to the idiosyncratic volatility. The relationships between the idiosyncratic volatility and the stock fundamental ratios remain robustness in presence of size.

JEL classification: G10

Keywords: Idiosyncratic volatility; Dividend yields; Size; ROE; Price to earnings; Stock fundamentals; Australia

1. Introduction

The Capital Asset Pricing Model (hereafter CAPM) of William Sharpe (1964) and John Lintner (1965) provides a theoretical framework for pricing of risky assets. The theory suggests that idiosyncratic volatility does not matter in pricing risky assets given that idiosyncratic volatility is assumed to be diversified away since investors hold a proportion of the well-diversified market portfolio. However, idiosyncratic volatility should play a role in explaining returns of risky assets due to the fact that investors do not always hold well-diversified portfolios (see example Malkiel and Xu, 2006). A number of studies find that idiosyncratic volatility is a pricing factor for returns of risky assets (see example, Malkiel and Xu 1997 and 2006; Goyal and Santa-Clara 2003; Ang, Hoddrick, Xing and Zhang 2006 and 2009; Fu 2009), and these studies support that idiosyncratic volatility is a missing risk factor for the asset pricing models.

The studies on idiosyncratic volatility have been growing fast since year 2000. The majority of studies in the area have focused on the pricing of idiosyncratic volatility for stock returns than investigating what factors explain idiosyncratic volatility. The purpose of this paper is to explore the roles of the stock fundamental ratios in explaining aggregate idiosyncratic volatility in Australia stock market from 1993 to 2010. As idiosyncratic volatility is firm specific risk and stock fundamental ratios are proxies for firm specific information, this study explores the cross sectional relationships between idiosyncratic volatility and the stock fundamental ratios.

This study is motivated due to several reasons. First, the trend in aggregate idiosyncratic volatility has an important implication to the level of diversifications of investors' portfolios. Campbell, Lettau, Malkiel and Xu (2001) find that idiosyncratic volatility increased from 1962 to 1997 in the US. They suggest that investors should consider increasing the number of stocks in their portfolios over time in order to maintain the same level of diversification over the sample period. Liu and Di Iorio (2012) find that idiosyncratic volatility increases significantly during bad market time but decreases marginally during good market time from 2002 to 2010 in Australia. In this paper, we further confirmed that there is an upward trend in the aggregate idiosyncratic volatility from 1993 to 2010 in Australia. Therefore, further research is desirable to understand the causes of increasing idiosyncratic volatility over time. Second, previous studies in the area concentrate on US and Japanese stocks. There is lack of study for Australia stocks. However, the Australian stock market has grown rapidly over past decades. The Australian stock market is the eighth largest stock market in the world as at 31 August 2012 by market capitalisation[1]. Therefore, we are motivated to explore driving factors for idiosyncratic volatility in one of the most important stock market in the world. To our knowledge, this is the first paper to study the relationships between idiosyncratic volatility and stock fundamental ratios by using Australian data. Moreover, it is not clear that what factors drive idiosyncratic volatility over time. Some driving factors have been discovered by researchers, such as profitability ratios (e.g. return on equity and return on asset), institutional ownership, future earnings growth rates, firm age and newly listing of riskier companies. For example, Malkiel and Xu (2003) find that future earnings growth rates of US listed companies were positively related to idiosyncratic volatility from 1986 to 1995. Chang and Dong (2006) find that institutional ownership and profitability ratios explain market aggregate idiosyncratic volatility from 1975 to 2003 by using Japanese stock market data. Brown and Kapadia (2007) find that idiosyncratic volatility is driven by new listings of riskier companies from 1963 to 2002 by using US data. Cao, Simin and Zhao (2008) find that corporate growth options explain idiosyncratic volatility in the US. These discovered factors are mainly firm specific information proxies. Stock fundamental ratios are proxies of firm

[1] According to MSCI global index, http://www.asxgroup.com.au/the-australian-market.htm

specific information. Hence, this study is motivated by the hypothesis that firm specific information should explain firm specific risk/idiosyncratic volatility. We use stock fundamental ratios, such as dividend yield, earnings per share (hereafter EPS), return on equity (hereafter ROE), interest cover ratio (hereafter Icover) and price to earnings ratio (hereafter PE), as proxies for firm specific information and we study the cross-sectional relationships between the idiosyncratic volatility and these stock fundamental ratios.

In this paper, we use portfolio analysis to reveal some interesting findings in regard to the stock fundamental ratios. We sort the stocks into portfolios according to size and idiosyncratic volatility. Using the size sorted portfolios, we find that big companies by size tend to have low idiosyncratic volatility, high Icover, high ROE, high EPS, high PE and vice-versa. As size and idiosyncratic volatility negatively correlated, we obtain similar results by using the idiosyncratic volatility sorted portfolios. In general, the portfolio analysis results can be summarized as high idiosyncratic volatility companies are small by size, have low ability to meet debt obligation (measured by Icover), have low management performances (measured by ROE) and low profitability (measured by EPS), and investors are willing to pay less for every dollar of earnings (measured by PE) and vice-versa.

The portfolio analysis suggests that some of the stock fundamental ratios are correlated with the idiosyncratic volatility. We then run regressions to examine whether there are significant cross-sectional relationships between the stock fundamental ratios and the idiosyncratic volatility. I use panel regression model[2] with fixed effect to control for unique characteristics of the companies in the sample by capturing the firm specific effects. We find significant positive cross-sectional relationship between dividend yield and the idiosyncratic volatility. We also find other stock fundamental ratios explain the idiosyncratic volatility. Size, ROE

[2] Result of Hausman test also indicates that a fixed effect model is preferred to a random effect model. The result will be available upon request.

and PE are negatively related to the idiosyncratic volatility. These negative relationships suggest that high idiosyncratic volatility stocks exhibit the following characteristics: small by size, less profitable by ROE and low valued by PE.

The empirical results show that dividend yield, ROE and PE explain the idiosyncratic volatility even in presence of firm size. The results suggest that firm specific information explains aggregate idiosyncratic volatility in Australia stock market from 1993 to 2002.

The reminder of this paper is organized as follows. Section 2 summarizes the relevant literatures. Section 3 describes the data. The methodology employed in this study is found in section 4. Section 5 presents the empirical test results. Finally, section 6 provides the conclusion.

2. Literature Review

2.1. Idiosyncratic volatility

According to theory of CAPM, idiosyncratic volatility can be fully diversified away by holding a proportion of the well diversified market portfolio. Idiosyncratic volatility has attracted researchers' attentions since 1990's when its importance in asset pricing was first reported. Under theory of CAPM, investors are assumed to hold a proportion of the well diversified market portfolio, but previous studies show that in reality investors do not hold well diversified portfolios. Merton (1987) suggests that idiosyncratic volatility should be priced in the case that investors hold under diversified portfolios due to transaction costs, information costs etc. Goetzmann and Kumar (2004) find that more than 25% of investors hold only one stock and less than 10% of investors hold more than 10 stocks. Campbell et al. (2001) suggest that investors should hold minimum 50 randomly selected stocks in order to diversify idiosyncratic volatility. These studies further support that idiosyncratic volatility should be priced because investors require a higher rate of return to compensate the undiversified level of idiosyncratic volatility they are bearing. Therefore, idiosyncratic volatility has attracted attentions from researchers as idiosyncratic volatility can be a missing asset pricing factor for asset pricing models. Malkiel and Xu (1997) find that idiosyncratic volatility is priced for US stock returns. Goyal and Santa-Clara (2003) find idiosyncratic volatility is positively related to the stock returns from 1963 to 1999 in the US. Ang et al. (2006, 2009) find that idiosyncratic volatility is negatively related to the stock returns in the US and other developed countries. Liu and Di Iorio (2012) find that the idiosyncratic volatility is positively related to the stock returns in Australia from Jan 2002 to Dec 2010. The previous studies in the area of idiosyncratic volatility focused more from asset pricing perspective and majority of studies in this area find that idiosyncratic volatility is priced for returns of risky assets. However, fewer studies has investigated that what factors/variables explain idiosyncratic volatility. It is not clear that what factors drive idiosyncratic volatility. Wei and Zhang (2004) find that ROE is negatively related to idiosyncratic volatility and variance of ROE is positively related to idiosyncratic volatility in the US from 1976 to 2000. They suggest that the increase in idiosyncratic volatility over time is led by high idiosyncratic volatilities of newly listed companies as newly listed companies tend to have bad profitability. Brown and Kapadia (2005) find that increase in idiosyncratic volatility in the US market is driven by new listings of riskier companies. They find newly listed companies are smaller in size, have lower profitability, are not likely to pay dividends, have more fractions of intangible assets and are highly likely be ‘growth’ stocks. Chang and Dong (2006) find the absolute firm earning (measured by return on asset and return on equity) are positively related to idiosyncratic volatility by using Japanese data from 1975 to 2003.

2.2. *size*

Size is negatively correlated to idiosyncratic volatility. Many previous studies provide evidences to support the negative correlation between the two variables. For example, Bali et al. (2005) find that small stocks have high idiosyncratic volatility in the US. Liu and Di Iorio (2012) find similar relationship between idiosyncratic volatility and size by using Australian stock market data. I use size as a control variable in the regression function to examine whether the relationships between the idiosyncratic volatility and the stock fundamental ratios remain robustness in presence of size.

Chang and Dong (2006) use lagged firm size as a control variable in the regression function. They find lagged size is negatively related to the idiosyncratic volatility for the Japanese stock market. This negative relationship between the idiosyncratic volatility and size is not surprising due to the fact that negative correlation between the two variables has been found in previous studies.

2.3. ROE

ROE is one of the most popular profitability ratios using by investors in determining stock prices. The role of ROE in determining stock prices can not be ignored. The previous studies find evidence in support of a relationship between idiosyncratic volatility and ROE. Wei and Zhang (2004) find negative relationship between ROE and the stock return volatility in the US from 1976 to 2000. They argue that this finding makes sense in term of Economics as stock prices should equal to sum of all future discounted profits and stock return volatility represents risk in regard to future profits. Chang and Dong (2006) find Return On Asset[3] is positively related to the idiosyncratic volatility using Japanese data. Even in presence of control variables (lagged idiosyncratic volatility, lagged size and lagged return), the coefficient of Return On Asset remains significant positive. They repeat the regressions by

[3] They define Return On Asset as the absolute value of the deviation of ROA from cross-sectional mean of ROA.

using ROE instead of Return On Asset and same results are obtained suggesting that Return of Asset and ROE play very similar roles in explaining idiosyncratic volatility.

3. Data

Australian stock return, company size, book-to-market equity ratio, dividend yield, Icover, PE, ROE and EPS are from Datastream. The 90-day Australian Bank Accepted Bill Rate is sourced from the Reserve Bank of Australia website. We use the 90-day Australian Bank Accepted Bill Rate as a proxy for the risk free rate in Australia. We use total return indices of the stocks to calculate the returns of the stocks and ASX All Ordinaries Total Return Index to represent the market portfolio. The initial sample included all the active and dead ASX listed companies available on Datastream from 1993 to 2010.

For stock returns, daily data is downloaded. For size and book to market equity ratios, monthly data is downloaded. For stock fundamental ratios, yearly data is downloaded. We removed thinly traded and delisted stocks from the initial sample because Guant (2004) suggest that thinly traded and delisted stocks may show constant returns in post portfolio formation periods which lead to lower statistical reliability. We follow Guant (2004), (1) stocks are required to had at least one trade in a month, and (2) stocks are required to had return, size measured by market capitalization and market to book equity value at the same point in time. We also removed top and bottom five precents observations for the stock fundamental ratios, as there were some significant outliers for these ratios. After cleaning up the initial sample, there are 2034 companies in the final sample cross-sectionally.

Figure 1 plots the yearly idiosyncratic volatility from 1993 to 2010. Overall, there is upward trend in the movement of the idiosyncratic volatility over the sample period. This suggests that the idiosyncratic volatility increased from 1993 to 2010 and increase in the idiosyncratic volatility may suggest that investors may need to increase number of stocks in their portfolios in order to maintain a desired level of diversification for their portfolios (see Campbell et al 2001).

4. Methodology

4.1. Idiosyncratic volatility estimation

Idiosyncratic volatility is not observable. Following Ang et al (2006, 2009), we define idiosyncratic volatility as the standard deviation of regression residuals of the Fama and French (1993) three-factor model. Therefore, the first stage for this step is to construct daily size and book to market equity ratio portfolios. We divided companies into total six portfolios. We first divided companies into two size portfolios then divided each size portfolios into three book to market equity ratio portfolios. The two size portfolios consist of (i) the top 50% of companies (big) by market capitalization, and (ii) the bottom 50% companies (small) by market capitalization. The three book-to-market equity ratio portfolios consist of (i) 1/3 high book-to-market equity ratio companies, (ii) 1/3 medium book-to-market equity ratio companies, and (iii) 1/3 low book-to-market equity ratio companies. Every year t, the companies are ranked and sorted into portfolios according to their size and book-to-market equity ratio at December of year t-1. The return of the daily size portfolio is calculated as the daily returns of the big size portfolio minus the daily returns of the small size portfolio. The return of daily book to market equity portfolios is calculated as the daily returns of the high book-to-market equity ratio portfolio minus the daily returns of the low book-to-market equity ratio portfolio. The portfolios are rebalanced on an annual basis. Then, we regress daily excess returns of stock on the daily market factor, daily size factor and daily book-to-market equity factor. The regression equation is the following:

$$r_t - r_{ft} = \alpha + \beta(r_{mt} - r_{ft}) + \lambda SMB_t + \delta HML_t + \varepsilon_t \quad (1)$$

Where r_t is the daily returns of stock i, r_{ft} is the daily 90-day bank acceptable bill rate, r_{mt} is the daily returns of S&P/ASX All Ordinary Index, SMB_t and HML_t are the daily returns of the size portfolio and book-to-market equity portfolio respectively. Yearly idiosyncratic volatility is estimated as the yearly standard deviation of regression residual ε_t from regressing equation (1).

4.2. Portfolio analysis

We first explore the relationships between the variables at portfolio level. We sort the stocks into five equally weighted portfolios according to size and idiosyncratic volatility to reveal the changes in the averages of other firm specific variables across the portfolios. I use yearly data for portfolio analysis.

In Table 1, the yearly variables are ranked by size and sorted into five portfolios with an equal number of stocks in each portfolio. Portfolio 1 comprises the biggest companies by size and portfolio 5 comprises the smallest companies by market capitalization. In table 2, the yearly variables are ranked by idiosyncratic volatility and sorted into five portfolios with an equal number of stocks in each portfolio. Portfolio 1 comprises the companies with highest idiosyncratic volatility and portfolio 5 comprises the companies with lowest idiosyncratic volatility. All portfolios are rebalanced on annual basis.

4.3. Regression analysis

To estimate the cross-sectional relationships between the idiosyncratic volatility and stock fundamentals, the following regression study is conducted:

$$Idiovol_{i,t} = \alpha_0 + a_1 DividendYield_{i,t} + a_2 Icover_{i,t} + a_3 Size_{i,t} + a_4 PE_{i,t} + a_5 ROE_{i,t} + a_6 EPS_{i,t} + \varepsilon_t$$

Where $Idiovol_{i,t}$, $DividendYield_{i,t}$, $I\text{cov}er_{i,t}$, $Size_{i,t}$, $PE_{i,t}$, $ROE_{i,t}$, $EPS_{i,t}$ are the idiosyncratic volatility, dividend yield, interest cover ratio, size, price to earnings ratio, return on equity and earnings per share of company i at year t. We take natural logarithm of size to scale it. All other variables are the levels. We use yearly data for regression analysis.

A panel data model with fixed effects is employed to control the effects of independent variables that vary over time. The rationale is that company's earning is not constant over time, and changes in company's earning have direct impacts on the independent variables and dependent variables. Hence, if company's earning is not a constant over time, then any changes in company's earnings should lead to changes in the variables such as Icover, PE, dividend yield etc. Therefore, we use fixed effect model as we am interested in analysing the effects the variables that vary overtime. we also use Hausman test to confirm my decision on the model selection, the result of Hausman test indicates that fixed effect model is preferred to random effect model[4].

5. Empirical Results

5.1. Portfolio analysis

Table 2 presents average idiosyncratic volatility, dividend yield, Icover, ROE, EPS and PE of five size sorted portfolios. Portfolio 1 comprises the biggest companies by market capitalization and portfolio 5 comprises the smallest companies by market capitalization.

In Table 2, there are patterns in idiosyncratic volatility, Icover, ROE, EPS and PE when moving from portfolio 1 to portfolio 5. The patterns are shown in Figure 2 to 7. Figure 2 shows that idiosyncratic volatility increases when moving from portfolio 1 to portfolio 5. This suggests that big companies tend to have low idiosyncratic volatilities and this finding is

[4] The result of Hausman test is available upon request.

consistent with the findings of previous studies, for example Bali et al (2005) find that small companies have high idiosyncratic volatility in the US and Liu and Di Iorio (2012) find that high idiosyncratic stocks are small stocks in Australia. In figure 3, there is not pattern in dividend yield when moving from portfolio 1 to port 5. Average dividend yield increases when moving from portfolio 1 to portfolio 3 then it decreases when moving from portfolio 3 to portfolio 5. In figure 4, Icover decreases when moving from portfolio 1 to portfolio 4 then increases slightly when moving from portfolio 4 to portfolio 5. This suggests that big companies have high interest cover ratio as big companies have better ability to meet debt obligations by using profits than small companies. The average Icover for portfolio 1 is 4.4089 which indicate that big companies have lower leverages of those small companies. Figure 5 shows a decreasing pattern in average ROE when moving from portfolio 1 to portfolio 5 which indicate that big companies has used the equity capitals in a more effective way to generate profit than small companies. ROE also measure management performance. Therefore, the results also suggest that big companies have better management performance than small companies. Figure 6 shows that EPS decreases when moving from portfolio 1 to portfolio 5. This pattern suggests that big companies are more profitable than small companies. Figure 7 shows a decreasing pattern for PE when moving from portfolio 1 to portfolio 5. This decreasing pattern suggests that big companies have high PE. Portfolio 1 and 2 have positive PE ratios and Portfolio 3 to 5 have negative PE ratios suggesting that big companies tend to had positive earnings but small companies may had negative earnings over the sample period.

Table 3 presents average size, dividend yield, Icover, ROE, EPS and PE of five idiosyncratic volatility sorted portfolios. Table 3 shows consistent results as those of Table 2 and the patterns are shown in Figure 8 to 13.

In Table 3, portfolio 1 comprises the companies with highest idiosyncratic volatility and portfolio 5 comprises the companies with lowest idiosyncratic volatility. As size is negatively correlated with idiosyncratic volatility, the opposite patterns are expected in Table 3 to Table 2.

As expected, high idiosyncratic volatility companies are small by size, low in Icover, ROE, PE and EPS. In other words, Table 3 further confirm that high idiosyncratic volatility companies are small by size, have low ability to meet debt obligation (measured by Icover), have low management performances (measured by ROE) and profitability (measured by EPS), and investor are willing to pay less for every dollar of earnings (measured by PE). There is not a clear pattern in dividend yield when moving from portfolio 1 to portfolio 5. Dividend yield increases when moving from portfolio 1 to portfolio 3, but it does not change much when moving further from portfolio 3 to portfolio 5.

Overall, the results of Table 2 and 3 make economic senses as according to both tables that high idiosyncratic volatility companies have low earnings. Low earnings lead to low EPS, and investors are not willing to pay high price for every dollar of earning for the companies with low EPS as low EPS indicates bad company's performance and low ability to generate profits. Hence, it is reasonable that these companies have lowest PE among all idiosyncratic volatility and size sorted portfolios. High leverage and low profitability also lead to increase in volatility in earnings over time. Volatility in earnings is part of firm specific risk. Hence, high leverage and low profitability companies tend to have high idiosyncratic volatility. Overall, the results of portfolio analysis suggest that high idiosyncratic volatility companies are small, highly leveraged, low profitability and investors are not willing to pay high prices for the earnings of the companies with high idiosyncratic volatility.

5.2. Regression analysis

Table 4 presents the regressions results. The dependent variable is the idiosyncratic volatility. The independent variables are dividend yield, Icover, size (natural logarithm of size), PE, ROE and EPS.

In model a, dividend yield and Icover are regressed with the idiosyncratic volatility. The coefficient on dividend yield is 0.0701 and it is statistically significant at 1% level with a t-statistics of 10.90. The coefficients on dividend yield are statistically significant at 1% level in model b, c, d, e, f and g and there are not big changes in the magnitude of the coefficient in different models. Strong evidence is presented in Table 4 supporting the hypothesis that dividend yield is positively related to the idiosyncratic volatility.

The coefficient on Icover is statistically significant at 5%, but the negative relationship between Icover and the idiosyncratic volatility is not stable as the coefficient on Icover becomes insignificant in model e, f and g. In model b, size is presented to the regression function. The coefficient on size is statistically significant at 1% level and negative. This suggests that when a company grows by size, it's idiosyncratic volatility decreases. This is consistent with the results of portfolio analysis from Table 2 as Table 2 shows big companies tend to have low idiosyncratic volatilities and small companies tend to have high idiosyncratic volatilities.

In model c, ROE is presented in the regression function. The coefficient of ROE is statistically significant at 1% level and it has negative sign suggesting that higher level of the management performance (measured by ROE) lower the idiosyncratic volatility for a company. The coefficients on ROE are stable and statistically significant in model d and g supporting the hypothesis that ROE is negatively related to idiosyncratic volatility. This finding is consistent with Wei and Zhang (2004) as they find a negative relationship between

ROE and the stock return volatility (largely idiosyncratic volatility) in the US from 1976 to 2000.

EPS is presented in the regression function for model e. The coefficient on EPS is not statistically significant suggesting that EPS does not explain the idiosyncratic volatility cross-sectionally. In model f, PE is presented in the regression function. The coefficient on PE is statistically significant at 5%. The coefficient has negative sign suggesting that PE is negatively related to the idiosyncratic volatility. As PE measures how much investors are willing to pay for every dollar of the company's earning, so it is not surprising that investors are willing to pay more for companies with low idiosyncratic volatilities companies but pay less for companies with high idiosyncratic volatilities.

In model g, all independent variables are presented in the regression function. The coefficients on dividend yield, size, PE and ROE are statistically significantly. These coefficients are stable by magnitude and t-statistics in all models presented in Table 4. Overall, the results of regression analysis show that dividend yield is positively related to the idiosyncratic volatility, PE, ROE are negatively related to the idiosyncratic volatility over the sample period. These relationships remain statistically significant in presence of Size.

These negative relationships are expected as they make economic sense. For example, ROE measures how well a company uses its equity to make profits. Companies with bigger ROE should have lower idiosyncratic volatility because the better a company uses its equities the lower expected firm specific risk. PE can be used to measure companies' value and interpret how much investors pay for every one dollar the company makes. PE is closely related to company's capital structure. Generally, highly leveraged companies tend to have lower PE because leverage affects earnings and share prices. Investors would pay less for every dollar of company's earnings in order to compensate the higher bankruptcy risk for holding the company's share. Hence, a highly leveraged company commonly have lower PE. It is not surprised that PE is negatively related to idiosyncratic volatility.

5.2.1. Dividend yield and the idiosyncratic volatility

We find an interesting positive relationship between dividend yield and the idiosyncratic volatility using regression analysis. The positive relationship is descripted as "interesting" because a negative relationship between dividend yield and the idiosyncratic volatility makes more economic sense. According to dividend signalling theory, dividend yield signals company's future prospects. Miller and Modigliani (1961) suggest that company's dividend policy signals the company's future prospects as investors interpret changes in dividend policy in management's expectations in regard to the company's future prospects. Dividend signalling theory suggests that increase in dividend yield may indicate management's optimism expectations on future earnings of the company. Bhattacharya (1979), John and Willianms (1985) and Miller and Rock (1985) further confirm the signalling property of dividend yield by developing dividend signalling models. These studies find evidence supporting that investors interpret increase in dividend yield as good news and decrease in dividend yields as bad news. In theory, increase in dividend yield single good news and vice versa, so a negative relationship between idiosyncratic volatility should be expected because companies have better future prospects should have lower firm specific risk or idiosyncratic volatility. However, I find positive relationship between the idiosyncratic volatility and dividend yield which seems to contradict the hypothesis which is derived from dividend signalling theory. One possible explanation is that increases in dividend payment over the sample period might be made out of liabilities and consequently lead to increases in the leverages of the listed companies. An increase is leverages should lead to an increase the idiosyncratic volatility. Hence, idiosyncratic volatilities of the listed companies increase as dividend yields increase. This nature of dividend payment is documented in Archarya, Gujral, Kulkarni and Shin (2011). They find that financial institutions worldwide raised new capital in debts and hybrid instruments from August 2007 to December 2012. Then, financial institutions continued to pay dividends out of liabilities rather than earnings which further led to increases in leverages. As leverage increases, idiosyncratic volatilities of these financial institutions are expected to increase. If this is the case for the companies listed on ASX, then it is not surprising to observe a positive relationship between the idiosyncratic volatility and dividend yield over the sample period. Table 1 shows partial evidence that may suggest that the listed companies raised new capitals in the form of debts as interest cover ratios decreased after 1995. The results indicate that there may an interesting linkage between corporate finance and idiosyncratic volatility.

6. Conclusion

Using Australian stock market data, this study examines the cross-sectional relationships between idiosyncratic volatility and stock fundamental ratios. I find that big companies tend to have low idiosyncratic volatility, high Icover, high ROE, high EPS, high PE and vice-versa. In addition, I find a significant positive cross-sectional relationship between dividend yield and the idiosyncratic volatility, a significant negative cross-sectional relationship between ROE and the idiosyncratic volatility and a significant negative cross-sectional relationship between PE and the idiosyncratic volatility. The results are robust when controlling for size in the regressions.

In summary, for ASX listed companies from 1993 to 2010, high idiosyncratic volatility companies are small by size, have low ability to meet debt obligation (measured by Icover), have low management performances (measured by ROE) and low profitability (measured by

EPS), and investor are willing to pay less for every dollar of earnings (measured by PE) and vice-versa.

One interesting finding is the positive relationship between dividend yield and the idiosyncratic volatility. According on signalling property of dividend yield, a negative relationship between dividend yield and the idiosyncratic volatility makes more economic sense as increase in dividend yield can be good news in the market and good news should lead decrease in idiosyncratic volatility. However, Archarya et al. (2011) document an undesirable nature of dividend payment as they find that financial institutions paid high dividend to shareholders out of newly raised liabilities from 2007 to 2012. If companies pay dividend out of liabilities which lead to increase in leverages, and consequently lead to increases in return volatilities. If this is case for ASX listed companies from 1993 to 2010, it is not surprise to see a positive relationship between dividend yield and idiosyncratic volatility. This study provide partial evidence to support that leverages of ASX listed companies increased over the sample period as average Icover increased. Further study is need to investigate the source of capital raised and sources of the fund for dividend payments for ASX listed companies. This study indicates that there may be an interesting linkage between idiosyncratic volatility and corporate finance. We leave this question for future study.

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Figure 1. This figure shows time series of monthly equally-weighted average of idiosyncratic volatility from Jan/1993 to Dec/ 2010.

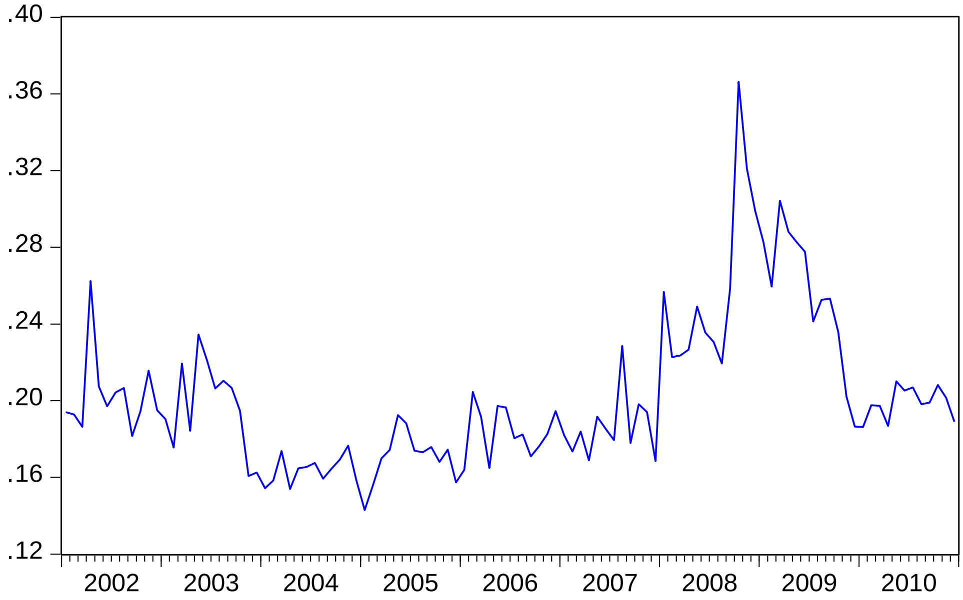

Table 1. This table presents time-series means the equally weighted yearly average of the variables from 1993 to 2010. Size is scaled by taking naturel logarithm, other variables are the levels. Idiovol is idiosyncratic volatility, Icover is interest cover ratio, PE is price-to-earnings ratio, ROE is return on equity, and EPS is earnings per share.

Year	Idiovol	dividend yield	Icover	size	PE	ROE	EPS
1993	0.0327	0.0378	4.51	1.55	6.93	0.0246	0.1406
1994	0.0306	0.0470	4.85	1.79	7.54	0.0644	0.1657
1995	0.0307	0.0513	6.38	1.70	6.61	0.0726	0.1553
1996	0.0346	0.0467	1.74	1.72	8.06	0.0773	0.1355
1997	0.0383	0.0472	-1.14	1.57	6.86	0.0412	0.1313
1998	0.0412	0.0514	-7.18	1.47	4.35	0.0090	0.1304
1999	0.0418	0.0494	-13.93	1.42	1.35	-0.0467	0.1324
2000	0.0452	0.0523	-29.84	1.60	-0.66	-0.0696	0.1480
2001	0.0458	0.0470	-36.43	1.49	-1.53	-0.1799	0.1079
2002	0.0429	0.0480	-36.15	1.42	-1.41	-0.1882	0.1233
2003	0.0407	0.0424	-29.35	1.39	-2.05	-0.1828	0.1188
2004	0.0358	0.0406	-30.48	1.56	-2.63	-0.1356	0.1479
2005	0.0369	0.0448	-27.89	1.61	-2.39	-0.1529	0.1482
2006	0.0393	0.0423	-30.26	1.63	-3.32	-0.1261	0.1636
2007	0.0414	0.0433	-32.92	1.75	-4.06	-0.1342	0.1693
2008	0.0550	0.0678	-36.43	1.78	-2.07	-0.1684	0.1612
2009	0.0518	0.0466	-30.64	1.33	-4.38	-0.2584	0.1238
2010	0.0419	0.0486	-20.88	1.61	-4.11	-0.1752	0.1583

Table 2. This table shows equally weighted average of the variables in five size sorted portfolios. Size is scaled by taking natural logarithm, other variables are the levels. Idiovol is idiosyncratic volatility, Icover is interest cover ratio, PE is price-to-earnings ratio, ROE is return on equity, and EPS is earnings per share. The portfolios are rebalanced on annual basis.

Portfolios sorted by company size					
	1 (Biggest)	2	3	4	5 (smallest)
Idiovol	0.0197	0.0295	0.0418	0.0501	0.0505
Dividend Yield	0.0402	0.0456	0.0482	0.0459	0.0357
Interest Cover Ratio	4.4089	-5.3013	-13.9958	-21.4573	-21.1850
Return of Equity	0.0719	-0.0022	-0.1241	-0.2472	-0.3547
EPS	0.1943	0.0894	0.0431	0.0223	0.0117
PE Ratio	7.9296	2.0905	-2.3890	-4.4693	-4.5311

Figure 2. This figure shows the average idiosyncratic volatilities for five size sorted portfolios. Portfolios 1 consists of biggest companies by size and portfolio 5 consists of smallest companies by size.

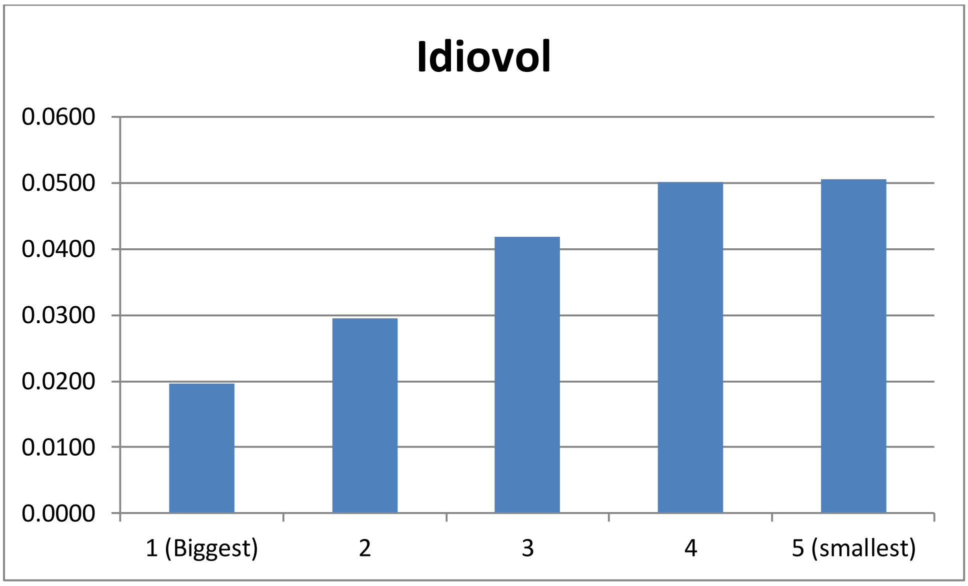

Figure 3. This figure shows the average Dividend Yields for five size sorted portfolios. Portfolios 1 consists of biggest companies by size and portfolio 5 consists of smallest companies by size.

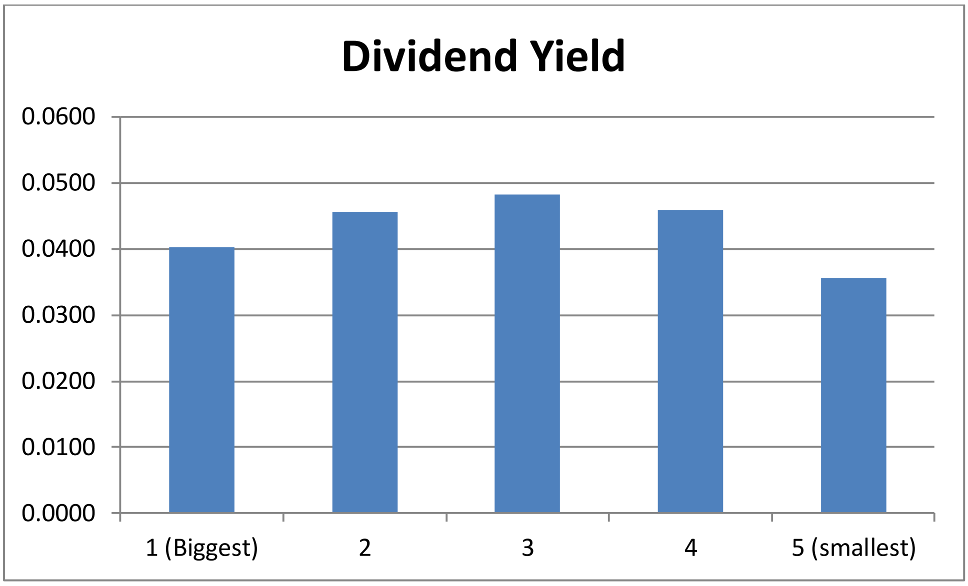

Figure 4. This figure shows the average Interest Cover Ratios for five size sorted portfolios. Portfolios 1 consists of biggest companies by size and portfolio 5 consists of smallest companies by size.

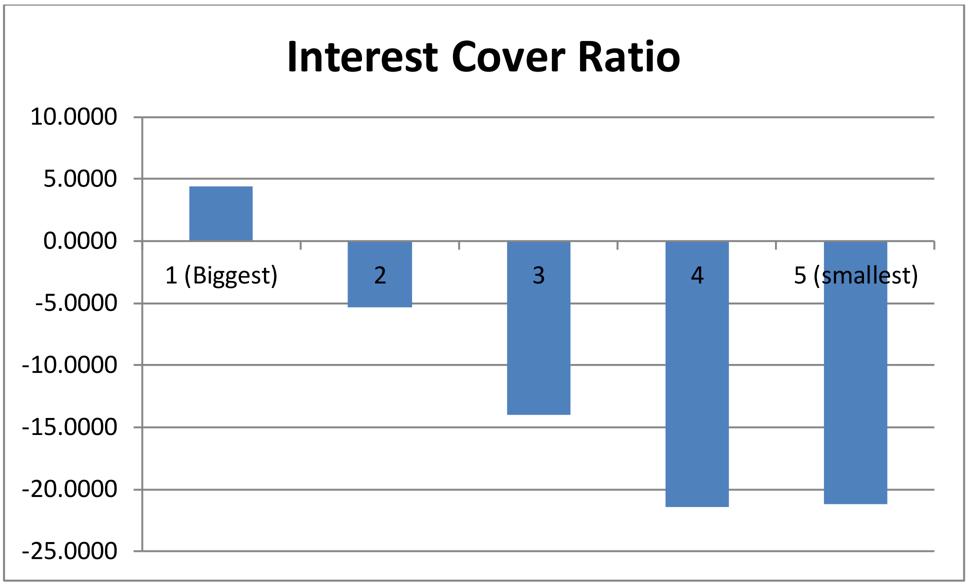

Figure 5. This figure shows the average Return of Equity ratios for five size sorted portfolios. Portfolios 1 consists of biggest companies by size and portfolio 5 consists of smallest companies by size.

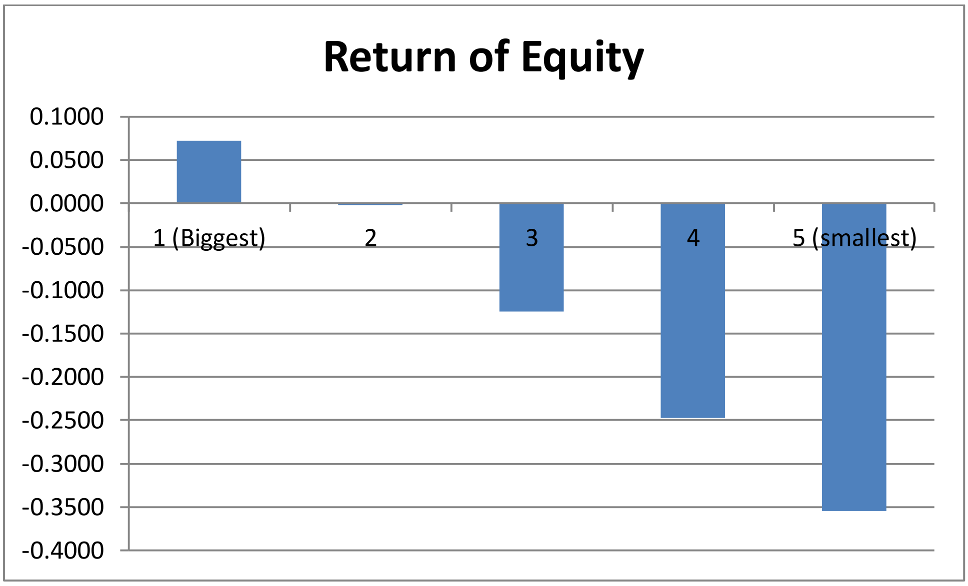

Figure 6. This figure shows the average Earnings Per Share ratios for five size sorted portfolios. Portfolios 1 consists of biggest companies by size and portfolio 5 consists of smallest companies by size.

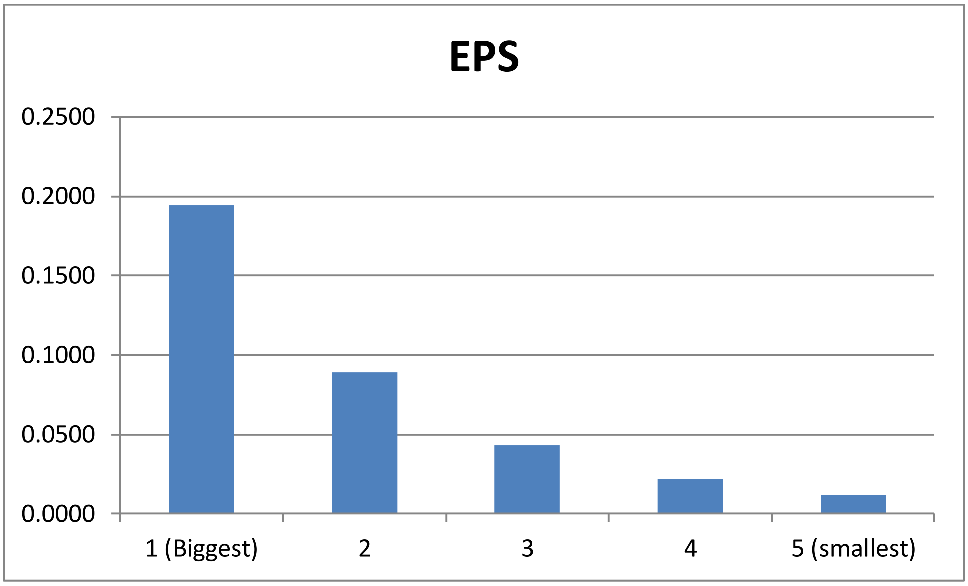

Figure 7. This figure shows the average Price to Earnings ratios for five size sorted portfolios. Portfolios 1 consists of biggest companies by size and portfolio 5 consists of smallest companies by size.

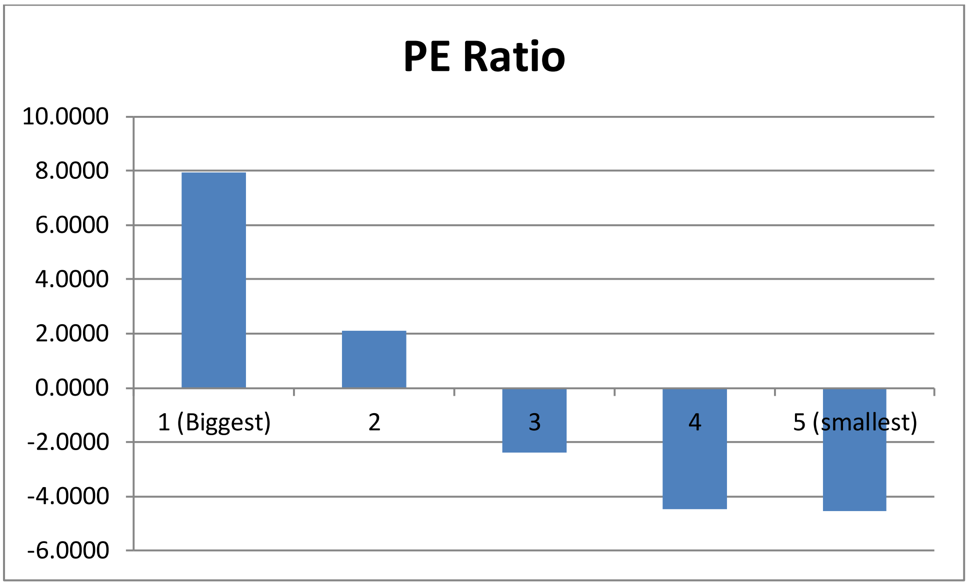

Table 3. This table shows equally weighted average of the variables in five idiosyncratic volatility sorted portfolios. Size is scaled by taking natural logarithm, other variables are the levels. Idiovol is idiosyncratic volatility, Icover is interest cover ratio, PE is price-to-earnings ratio, ROE is return on equity, and EPS is earnings per share. The portfolios are rebalanced on annual basis.

Portfolios sorted by idiosyncratic volatility					
	1 (highest)	2	3	4	5 (lowest)
Size	0.8270	1.1242	1.5535	2.1149	2.3134
Dividend Yield	0.0344	0.0409	0.0443	0.0450	0.0442
Interest Cover Ratio	-26.8481	-21.9364	-11.2798	0.3008	3.8067
Return of Equity	-0.3649	-0.2196	-0.0862	0.0625	0.0878
EPS	0.0075	0.0172	0.0389	0.1093	0.1763
PE Ratio	-5.1012	-5.4231	-1.9451	4.6272	6.1745

Figure 8. This figure shows the average sizes for five idiosyncratic volatility sorted portfolios. Portfolios 1 consists of companies with highest idiosyncratic volatility and portfolio 5 consists of companies with lowest idiosyncratic volatility.

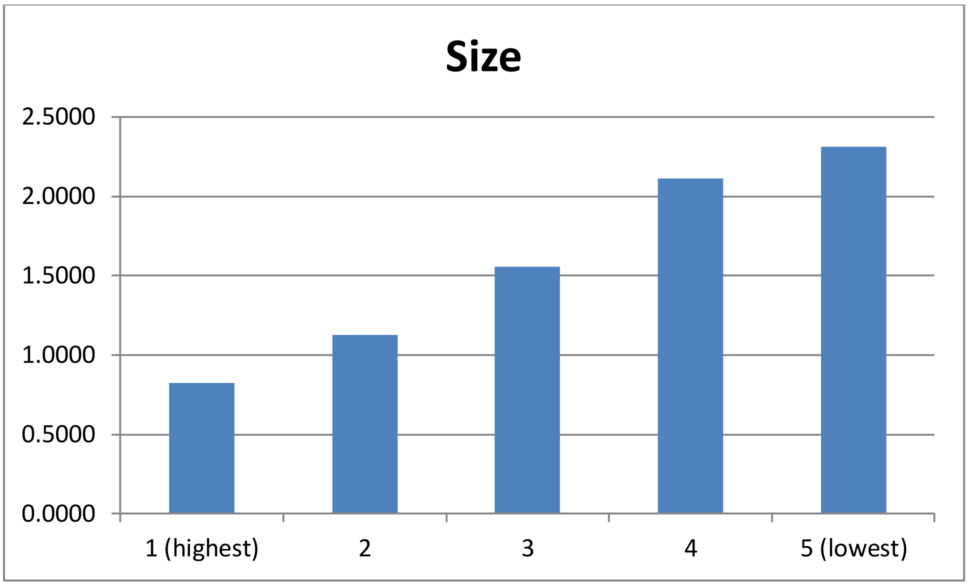

Figure 9. This figure shows the average Dividend Yields for five idiosyncratic volatility sorted portfolios. Portfolios 1 consists of companies with highest idiosyncratic volatility and portfolio 5 consists of companies with lowest idiosyncratic volatility.

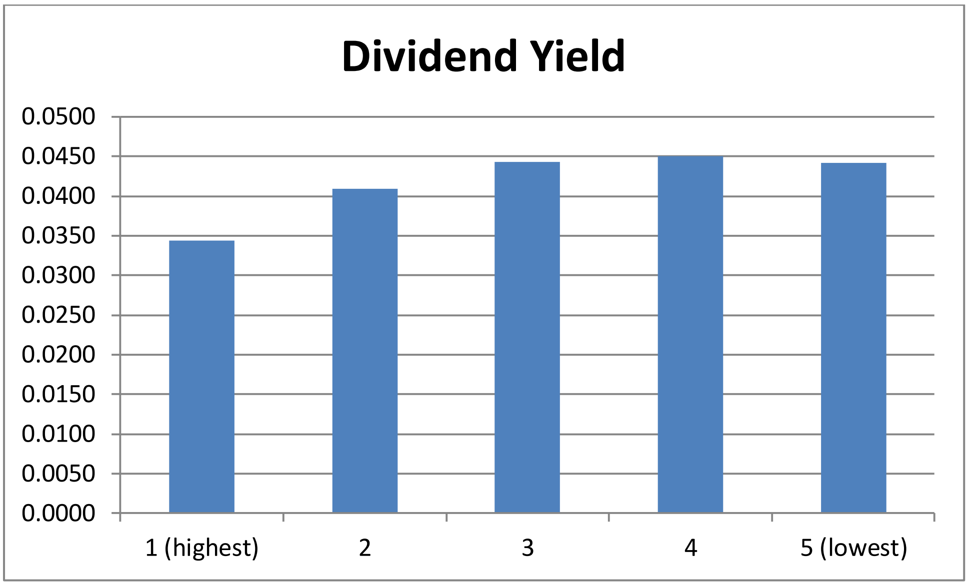

Figure 10. This figure shows the average Interest Cover ratios for five idiosyncratic volatility sorted portfolios. Portfolios 1 consists of companies with highest idiosyncratic volatility and portfolio 5 consists of companies with lowest idiosyncratic volatility.

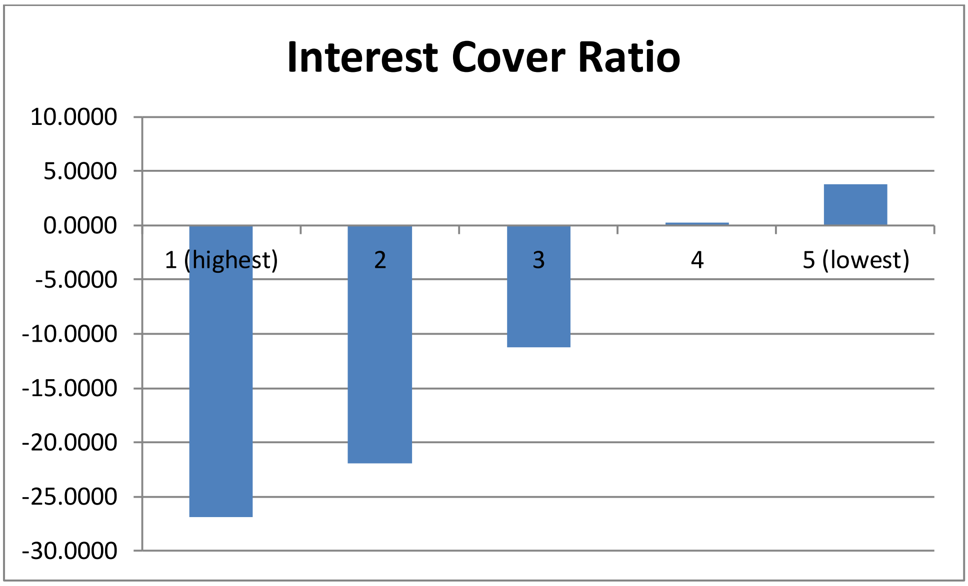

Figure 11. This figure shows the average Return of Equity ratios for five idiosyncratic volatility sorted portfolios. Portfolios 1 consists of companies with highest idiosyncratic volatility and portfolio 5 consists of companies with lowest idiosyncratic volatility.

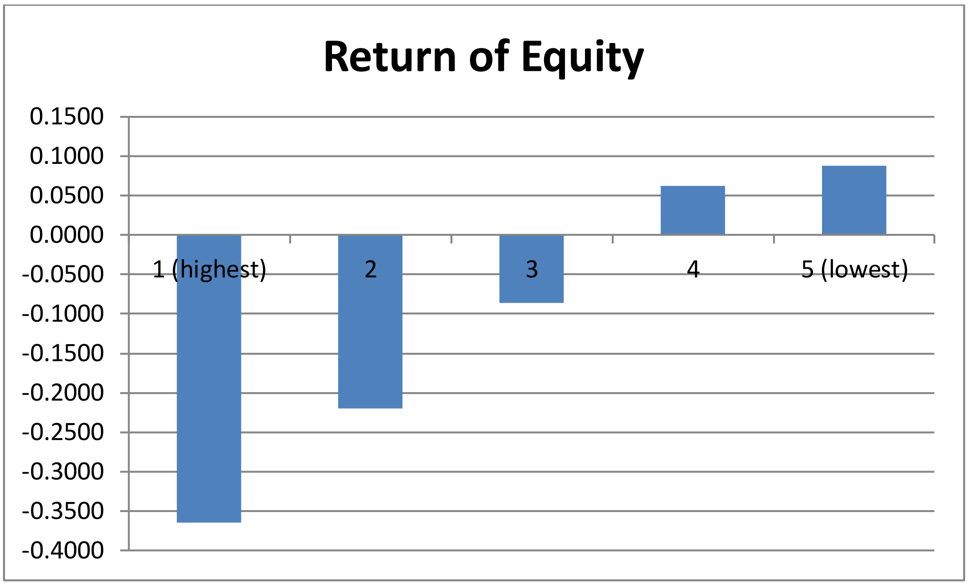

Figure 12. This figure shows the average Earnings Per Share ratios for five idiosyncratic volatility sorted portfolios. Portfolios 1 consists of companies with highest idiosyncratic volatility and portfolio 5 consists of companies with lowest idiosyncratic volatility.

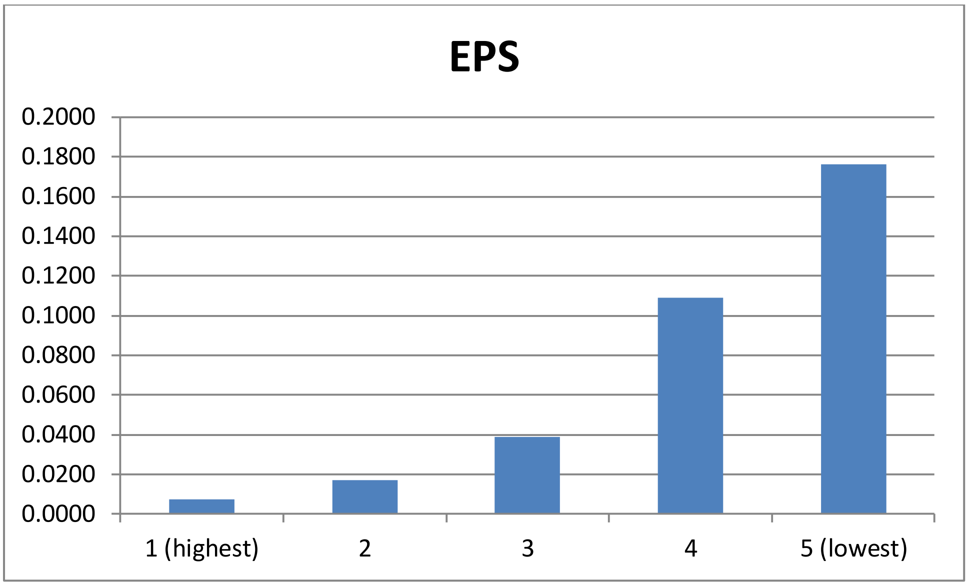

Figure 13. This figure shows the average Price to Earnings ratios for five idiosyncratic volatility sorted portfolios. Portfolios 1 consists of companies with highest idiosyncratic volatility and portfolio 5 consists of companies with lowest idiosyncratic volatility.

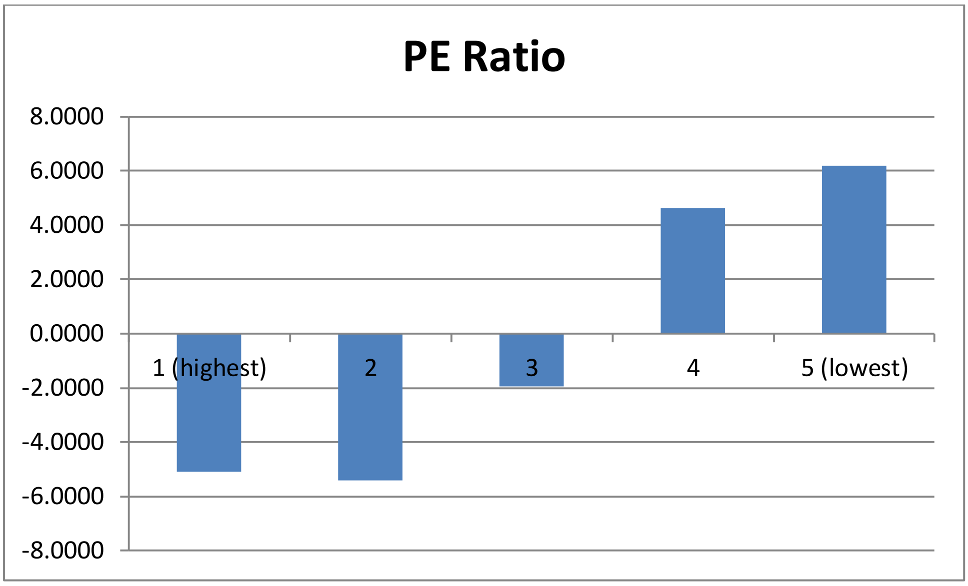

Table 4. This table shows regression results of idiosyncratic volatility on the stock fundamental ratios. The dependent variable is the idiosyncratic volatility (idiovol). The independent variables are dividend yield, interest cover ratio, size (scaled by taking naturel logarithm), price to earnings ratio (PE ratio), return to equity (ROE), and earnings per share (EPS).

Dependent Variable	Idiovol						
	a	b	c	d	e	f	g
Intercept	0.01894***	0.0289***	0.0204***	0.0290***	0.0282***	0.0282***	0.0286***
	57.35	27.54	59.17	26.96	27.01	27.00	26.48
Dividend Yield	0.0701***	0.0723***	0.0657***	0.0659***	0.0736***	0.0736***	0.0660***
	10.90	11.22	10.21	10.21	11.50	11.49	10.17
Interest Cover Ratio	-0.00001**	-0.0000108**	-0.0000108**	-0.0000111**	-7.82E-06	-8.03E-06	-8.48E-06
	-2.19	-2.17	-2.12	-2.21	-1.57	-1.61	-1.66
Size		-0.0040***		-0.0035***	-0.0039***	-0.0039***	-0.0034***
		-10.01		-8.39	-9.72	-9.68	-8.28
PE Ratio						-0.00000404**	-0.00000329*
						-2.16	-1.83
ROE			-0.0153***	-0.0144***			-0.0135***
			-15.65	-14.74			-13.01
EPS					-1.81E-06	-1.79E-06	4.18E-07
					-0.19	-0.18	0.04
Adjusted R-squared	0.5618	0.5717	0.5910	0.6001	0.5654	0.5647	0.5847