Does Idiosyncratic Risk Matter? Evidence from the Philippine Stock Market

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Abstract
This research examines if the three main empirical findings on idiosyncratic volatility (IV) in the US market also apply to small but open emerging markets such as the Philippines. Our results indicate that we cannot generalise the US findings for the Philippine stock market. First, contrary to the US findings of Campbell, Lettau, Malkiel and Xu (2001), we do not find a trend in idiosyncratic volatility over our study period. Second, we find that average equal-weighted idiosyncratic volatility is negatively related to market returns, which is opposite to the findings of Goyal and Santa-Clara (2003) for the US market. Third, we find no relation between IV and abnormal returns, contrary to the findings of Ang, Hodrick, Xing and Zhang (2006), and Brockman and Yan (2006) for the US market.

Keywords: Asset Pricing, Emerging Market, Factor-Model, Idiosyncratic Volatility, Philippines

JEL Classification: G12

1. Introduction

The Capital Asset Pricing Model (CAPM) classifies risk as either systematic (non-diversifiable risk) or idiosyncratic (diversifiable risk). Systematic risk refers to risk factors common to all stocks while idiosyncratic risk refers to risk due to firm specific events. CAPM suggests that idiosyncratic risk can

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be costlessly eliminated by holding a fully diversified portfolio, therefore, there should be no compensation for bearing idiosyncratic risk. In other words, idiosyncratic risk should not be a determinant of a firm's expected returns. However, this argument relies on the assumption that investors are able to hold fully diversified portfolios. In reality, investors may not be able to hold fully diversified portfolios for various reasons such as information and transaction costs and, therefore, bear some idiosyncratic risk. In such cases, theories of underdiversification predict a positive relation between idiosyncratic risk and a stock's expected return as investors demand compensation for bearing idiosyncratic risk (Levy, 1978; Merton, 1987; Malkiel & Xu, 2006). Hence, if investors cannot fully diversify, idiosyncratic risk should matter!

The empirical evidence on the relationship between idiosyncratic risk and returns are mixed, however. A natural proxy for idiosyncratic risk in empirical studies is idiosyncratic volatility, which refers to the volatility of a firm's returns related to firm-specific events. Fama and MacBeth (1973) find no relationship between idiosyncratic risk and expected return, consistent with the prediction of CAPM. However, updating Fama and MacBeth's data set, Malkiel and Xu (2006) report a positive relationship, consistent with theories of underdiversification. More recently, Ang, Hodrick, Xing and Zhang (2006) report a puzzling negative relationship, contrary to the prediction of both the CAPM and theories of underdiversification. Fu (2009) disputes Ang et al.'s findings suggesting instead the presence of a positive relationship while using a different method of computing idiosyncratic volatility, but in a follow-up to their earlier study, Ang et al. (2009) counter with a confirmation of the negative relationship in 22 other developed markets in addition to the US.

Most of the literature on idiosyncratic risk deals with developed markets, particularly the US market. Recent literature on idiosyncratic volatility has documented three main empirical findings using US data: 1) Campbell, Lettau, Malkiel and Xu (2001) show that idiosyncratic volatility exhibits an upward trend between 1962 and 1997; 2) Goyal and Santa-Clara (2003) find that aggregate measures of idiosyncratic volatility predict one-month ahead excess market returns from 1962-1999; and 3) Ang et al. (2006) report a negative and significant relation between idiosyncratic volatility and cross-sectional stock returns from 1963-2000. Brockman and Yan (2006) examined these three findings using the US data for a different period from 1926 to 1962 and documented evidence of a statistically significant downward trend in idiosyncratic volatility; an insignificant relation between idiosyncratic volatility and one-month ahead excess market returns; and a highly significant inverse relation between idiosyncratic volatility and cross-sectional stock returns. However, all these results remain highly controversial.

The current study examines the same issues in the context of the Philippine stock market. Specifically, this study will address three questions. First, have individual stocks become more volatile in the Philippines? Second, can idiosyncratic volatility predict one-month ahead excess market returns? And, third, is there a relationship between idiosyncratic volatility and cross-sectional stock returns in the Philippine stock market?

The Philippines has a mixed economy and is considered one of the newly industrialised emerging market economies in the world. In 2007, it was among the fastest growing economies in Southeast Asia, posting a real GDP growth rate of 7.3 per cent. However, its economic performance has had a chequered past. It was one of the richest countries in Asia second only to Japan in the 1960's but the 1970's and 1980's saw the Philippine economy lag behind its Asian neighbours only to re-emerge in 2004 as one of the faster growing economies in Southeast Asia.

Organised financial markets in the Philippines are among the oldest in Southeast Asia. The Philippine Stock Exchange (PSE) is Southeast Asia's first and longest operating stock exchange starting out in 1927 as the Manila Stock Exchange (MSE) only to merge in 1992 with the Makati Stock Exchange (MkSE), which was established in 1963, to form the present-day Philippine Stock Exchange. Shortly after the merger, computerised trading was introduced using the Mak Trade System developed by the Chicago Stock Exchange. In an effort to liberalise its financial markets, the Philippine government removed all restrictions on foreign investments with the enactment of the Foreign Investment Act in 1991 (Bekaert & Harvey, 2000) effectively opening most sectors of the economy to 100 per cent foreign ownership. As of 2007, the PSE has 244 listed companies with a combined market capitalisation of USD103 billion. It has the distinction of having one of the shortest trading hours in Asia, trading only from 9:30 am to 12:30 pm.[1] The PSE was established as a non-profit, no-stock, member-governed institution but it has been a self-regulatory organisation (SRO) since 1998, enabling it to implement its own policies and penalties. In 2001 following world best practice, it was transformed into a public corporation and, in the same year, the PSE started trading bonds.

As a small but open emerging market as well as being Southeast Asia's oldest, the Philippine stock market's unique characteristics make it

[1] Trading hours are set to increase by 30 June 2009 as a result of an additional two-hour long trading session in the afternoon.

an interesting case study to test the applicability of the findings in developed markets on idiosyncratic volatility.

2. Review of Literature

2.1 Equilibrium in Imperfect Markets

CAPM assumes frictionless markets where, among other things, there is no transaction or information cost. In such an environment, idiosyncratic risk does not matter as it can be eliminated at no cost, by holding a fully diversified portfolio. However, if investors are constrained from holding fully diversified portfolios, the theory suggests that they will demand compensation for bearing idiosyncratic risk (Levy, 1978; Merton, 1987). Malkiel and Xu (2006) explain the lack of diversification in equilibrium as a result of the interaction of constrained and unconstrained investors. Unconstrained investors have the ability to hold a fully diversified portfolio while constrained investors do not. Constrained investors, therefore, create excess demand for certain assets and excess supply for others. This results in both constrained and unconstrained investors being unable to hold a fully diversified portfolio in equilibrium.

Studies have shown that in reality investors normally hold underdiversified portfolios. US and international studies show that the average investor holds less than the number of stocks normally recommended for "full diversification" and/or that investors exhibit a bias towards holding domestic stocks (French & Poterba, 1991; Tesar & Werner, 1995; Goetzman & Kumar, 2002; Polkovnichenko, 2005). Institutional investors also often deliberately bear considerable idiosyncratic risk in an attempt to earn abnormal returns (Malkiel & Xu, 2006). Several studies have identified possible reasons why investors may hold underdiversified portfolios. These include investor characteristics such as level of personal wealth (Blume & Friend, 1975; Liu, 2008), risk preference (Liu, 2008) and behavioural and cultural biases (Huberman, 2001; Guiso, Sapienza & Zingales, 2005; Siegel, Amir & Schwartz, 2006). Other reasons include transaction costs (Uppal, 1993; Rowland, 1999) and information costs (Merton, 1987).

2.2 Time Trend in Volatility

Campbell et al. (2001) document evidence of increased idiosyncratic volatility in the US relative to market volatility in the period 1962 to 1997. Numerous past studies seem to have accepted the upward trend in idiosyncratic volatility in the US, hence, the focus of subsequent studies centred on finding potential explanations for this apparent trend (Brockman & Yan, 2006). One set of explanations is based on firm characteristics. Hence, the upward trend in idiosyncratic volatility in the US has been attributed to the increasing proportion of younger firms, increasing proportion of smaller firms, increasing fundamental riskiness of firms, and to an increase in the variability of corporate earnings. Another set of explanatory variables is either institutional or environmental. These include increasing institutional ownership, increasing product market competition, and increasing capital market sophistication, which have enabled riskier firms to gain access to public markets.

However, Bekaert, Hodrick and Zhang (2008) question the existence of a trend in idiosyncratic volatility reported in previous studies. Using a regime-switching model, Bekaert et al. (2008) find no evidence of a trend in the US as well as in 23 other developed markets. They propose instead that idiosyncratic volatility follows a stationary autoregressive process that occasionally switches to a higher variance regime.

An increasing trend in idiosyncratic volatility relative to market volatility has implications for diversification. For instance, if idiosyncratic volatility has been trending upwards while market volatility has remained the same, this would imply that the correlation among stocks is decreasing. This implies further that the benefits of diversification have increased over time. This is indeed the case for the US as documented by Campbell et al. (2001). Defining excess standard deviation as the difference between the standard deviation of a given portfolio and the standard deviation of an equally weighted index of all stocks, Campbell et al. show that the excess standard deviation has generally increased over the years. Another way of interpreting the consequence of increased idiosyncratic volatility is that the number of stocks needed to attain a certain level of excess standard deviation has increased (Campbell et al., 2001).

2.3 Predicting Market Returns with Idiosyncratic Volatility

There is also considerable controversy about the ability of idiosyncratic volatility to forecast future market returns. Previous results have proven to be sensitive to model specifications, time periods and return intervals. Goyal and Santa-Clara (2003) find that idiosyncratic volatility has significant forecasting ability with respect to one-month ahead excess market returns while market volatility has no such forecasting ability. However, Bali, Cakici, Yan and Zhang (2005) argue that Goyal and Santa-Clara's results are driven by small firms and disappear in an updated sample and do not hold for value weighted volatility measures. On the other hand, Wei and Zhang (2006) find no predictability between idiosyncratic volatility and future market returns while Guo and Savickas (2006) find idiosyncratic volatility to be negatively related to future market returns after controlling for market volatility. Finally, Brown and Ferreira (2005) find small firm idiosyncratic volatility can predict future excess returns on size and age portfolios as well as on the market portfolio, and Jiang and Lee (2006) find a positive and significant relation between idiosyncratic volatility and market returns after controlling for serial correlation.

2.4 Stock Returns and Idiosyncratic Volatility

By far, the most controversial are the findings of Ang et al. (2006) which reveal that idiosyncratic volatility of US stocks is negatively related to cross-sectional stock returns. This is controversial because financial theory suggests that investors require a positive risk premium for idiosyncratic risk if they are unable to avoid it through diversification, probably because of information or transactions costs (Merton, 1987). However, evidence by Ang et al. (2006) indicates a negative and significant relation between idiosyncratic volatility and stock returns from 1963-2000 for US stocks. Ang et al.'s findings are counterintuitive but they are robust to controlling for various firm characteristics (e.g., size, value, liquidity, momentum, and analyst forecast dispersion) and market conditions (bull and bear markets, recessions and expansions, high and low market volatility). Fu (2009), however, refutes Ang et al.'s findings and suggests instead that idiosyncratic volatility and stock returns are positively related. Fu (2009) employs EGARCH to estimate time-varying expected idiosyncratic volatilities from monthly stock returns and finds a positive relation between idiosyncratic volatility and stock returns from 1963-2006. Ang et al. (2009), however, confirm their US findings of a negative relation for 22 other developed markets around the world. Ang et al.'s (2006, 2009) findings are currently considered a major puzzle in the field of finance – particularly in asset pricing.

3. Data and Methods

Daily and monthly stock returns, market capitalisation, and book-to-market ratio (B/M) for individual firms were obtained from Datastream. The data set covered the period from September 1992, with 99 firms, to November 2007, with 225 firms, with an average of 184 firms per month resulting in a total of 33,881 firm-month observations. The risk-free rate, which is defined as the 91-day T-bill rate, was also obtained from Datastream. Market returns are the value-weighted returns of all firms used in this study.

The idiosyncratic volatility of each firm was computed at the beginning of every month as the standard deviation of the residuals ($\sigma_{\varepsilon i}$) from the Fama-French (1993, 1996) 3-factor model (1), henceforth, FF3-factor model, using daily data for the previous 30 trading days.

$$R_{i,t} = \alpha + \beta_{MKT,\,i,\,m} MKT_t + \beta_{SMB,\,i\,,m} SMB_t + \beta_{HML,\,i\,,m} HML_t + \varepsilon_{i,t} \qquad (1)$$

where day t refers to the 30 trading days ending on the last trading day of month m-1.

Therefore, $\sigma_{\varepsilon i}$ is a daily volatility measure that is computed monthly. In this model, systematic risk is obviously accounted for by three betas – β_{MKT} , β_{SMB} , and β_{HML}. The betas are allowed to vary through time as the model is re-estimated every month. $R_{i,t}$ is the excess return of firm i over the risk-free rate, *MKT* is the excess return of market portfolio over the risk-free rate. *SMB* is the size factor defined as the excess return of small firms over big firms, and *HML* is the value factor defined as the excess return of high B/M firms over low B/M firms. *SMB* and *HML* were computed using an adaptation of the procedure followed by Ang et al. (2009). Accordingly, *SMB* is the return of the top half of all firms less the return of the bottom half of all firms ranked according to market capitalisation (i.e., share price times the number of shares) while *HML* is the return of the top one third of all firms with the highest book-to-market ratio less the return of the bottom third of all firms with the lowest book-to-market ratio.

To investigate the relationship between idiosyncratic volatility and one-month ahead stock return, three portfolios were formed at the beginning of every month based on idiosyncratic volatility. All firms were sorted based on idiosyncratic volatility computed from *(1)* and divided into three equal groups. Portfolio 1 was composed of the upper third of all firms with the highest idiosyncratic volatility, portfolio 2 was the middle third, and portfolio 3 was the lowest third of all firms with low idiosyncratic volatility. Each portfolio's equal-weighted and value-weighted raw return for the current month was then computed. To illustrate, portfolios formed at the beginning of October will have their return tracked for the month of October. The portfolios are re-formed every month.

We also investigated the relationship between idiosyncratic volatility and abnormal returns or Jensen's alpha of the same idiosyncratic volatility-sorted portfolios above. We computed each firm's Jensen's alpha with respect to the FF3-factor model. We took for each firm i, the fitted beta coefficients from *(1)* and computed the risk-adjusted return for month m, $R^{ra}{}_{i,m}$

$$R^{ra}{}_{i,m} = rf_m + \beta_{MKT,\,i,\,m} MKT_m + \beta_{SMB,\,i\,,m} SMB_m + \beta_{HML,\,i\,,m} HML_m \qquad (2)$$

where rf_m is the risk-free rate for month m, MKT_m , SMB_m , and HML_m are excess returns as defined previously, but for month m.

Jensen's alpha for firm i, $\alpha_{\,i,m}$ is

$$\alpha_{\,i,m} = R^{a}{}_{\,i,m} - R^{ra}{}_{\,i,m} \qquad (3)$$

where $R^{a}{}_{\,i,m}$ is the actual return of firm i in month m. Hence, Jensen's alpha is the return in excess of the risk-adjusted return.

4. Empirical Results

4.1 Descriptive Statistics

Panel A of Table 1 reports the descriptive statistics for three volatility series, MV, IV^{EW}, and IV^{VW}. MV is monthly market volatility computed using daily value-weighted market returns. For instance, MV as of the end of month m is the standard deviation of daily value-weighted market returns for the past 30 trading days ending on the last trading day of month m. Therefore, like idiosyncratic volatility, MV is a daily volatility measure that is computed monthly. IV^{EW} and IV^{VW} are, respectively, the equal-weighted and value-weighted average idiosyncratic volatility across all firms, where idiosyncratic volatility is the standard deviation of residuals from (*1*). IV^{EW} has a higher mean and median than IV^{VW}. It also has a wider range and higher standard deviation. This implies that smaller firms have higher idiosyncratic volatility, consistent with results in other markets, particularly the US. Both series have virtually the same coefficient of variation (CV) indicating that they are equally variable. Compared with MV, both IV^{EW} and IV^{VW} have a higher mean and median which implies that idiosyncratic volatility is a large component of total volatility. This is broadly consistent with the findings of Campbell et al. (2001) for the US market. However, MV is more variable than either IV^{EW} and IV^{VW}, having more than twice the CV of either series.

Panel B shows, not surprisingly, that IV^{EW} and IV^{VW} are highly correlated. More importantly, Panel B shows that MV is highly correlated with both IV^{EW} and IV^{VW} with a correlation coefficient of 0.576 and 0.648 respectively.

Table 1: Descriptive Statistics

Panel A: Summary statistics (%)

	Mean	Median	Stdev	CV	Max	Min
IV^{EW}	2.96	2.87	0.75	25.20	5.17	1.64
IV^{VW}	1.80	1.73	0.46	25.56	3.47	1.04
MV	1.18	0.96	0.64	54.24	4.04	0.46

Panel B: Correlation Table

	IV^{EW}	IV^{VW}	MV
IV^{EW}	1.000	0.801	0.576
IV^{VW}		1.000	0.647
MV			1.000

Panel C: Autocorrelation structure

	IV^{EW}	IV^{VW}	MV
ρ_1	0.748	0.806	0.469
ρ_2	0.573	0.671	0.259
ρ_3	0.529	0.627	0.249
ρ_4	0.506	0.556	0.256
ρ_6	0.452	0.502	0.014
ρ_{12}	0.391	0.427	0.131

Panel C displays the autocorrelation structure of the three volatility series. Serial correlation is fairly high in all three series; hence, we test for the presence of unit roots. The augmented Dickey and Fuller (1979) test, however, rejects the presence of unit roots for all three series at the 1 per cent level of significance, whether or not a trend is included. Hence, our analysis of the volatility series will be in levels instead of first differences.

4.2 *Time Trend in Idiosyncratic Volatility*

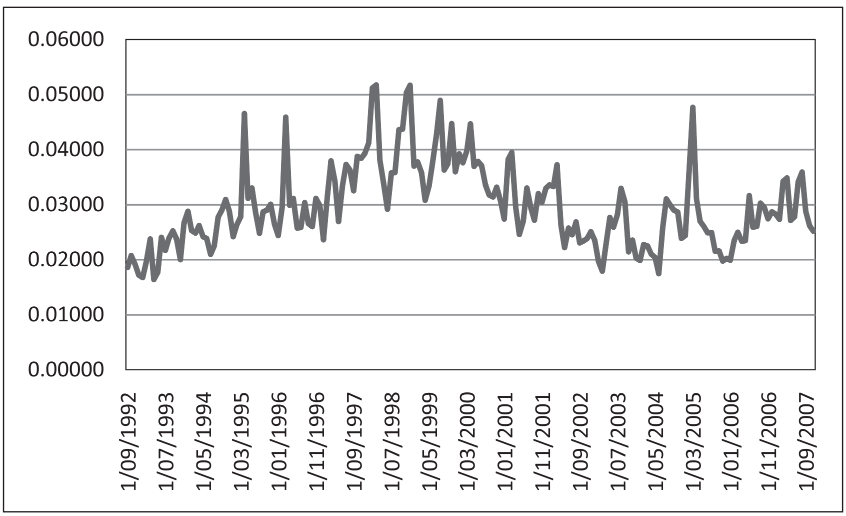
Figure 1 plots IV^{EW}, IV^{VW}, and MV. Panel A shows that IV^{EW} appears to have an upward trend peaking in February (0.051) and March (0.052) 1998, falling briefly thereafter, and then rising again in November (0.050) and December (0.052) before seemingly having a downward trend. This is mirrored by the behaviour IV^{VW} as shown in Panel B, peaking in February (0.034) and March (0.035) 1998, falling briefly thereafter, and then rising again in October (0.031), November (0.032) and December (0.032) 1998.

IV^{EW} was particularly high from February 1998 up to August 2001, averaging 3.7 percent. In addition, IV^{EW} exhibited spikes in April 1995 (0.047) (coinciding with the spike in *MV*), March 1996 (0.046), August 1999 (0.049), and March 2005 (0.048). The spikes in IV^{VW} are not as pronounced as those for IV^{EW}, which implies that the spikes in IV^{EW} are driven by small firms. Panel C plots the *MV* series and shows no apparent trend but the series is punctuated by spikes in April 1995 (0.040), March 1996 (0.023), July 1996 (0.030), October 1997 (0.030), November 1997 (0.029), February (0.033), March (0.031) 2001, and September 2007 (0.026).

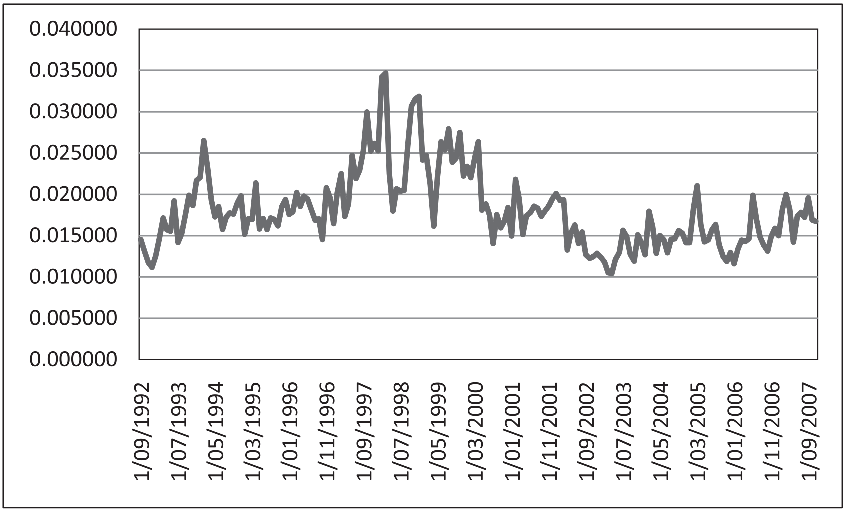
Over the study period, two events were particularly influential. One was the Asian financial crisis of 1997, and the other was the ouster of President Joseph Estrada in 2001. The spikes in both IV^{EW} and IV^{VW}, as well as for *MV* around 1997 and 1998 coincide with the Asian financial crisis, which started in July 1997 but whose effects lingered until 1998 when the growth in GDP in the Philippines dropped to virtually zero. The high idiosyncratic volatility over the period from 1997 to mid-2001 saw the Philippine peso drop from 26 pesos per US dollar to 38 pesos by mid-1999 and further down to 54 pesos by mid 2001. This was accompanied by a 30 percent drop in the PSE Composite Index from a high of some 3000 points

Figure 1: Idiosyncratic volatility and market volatility.

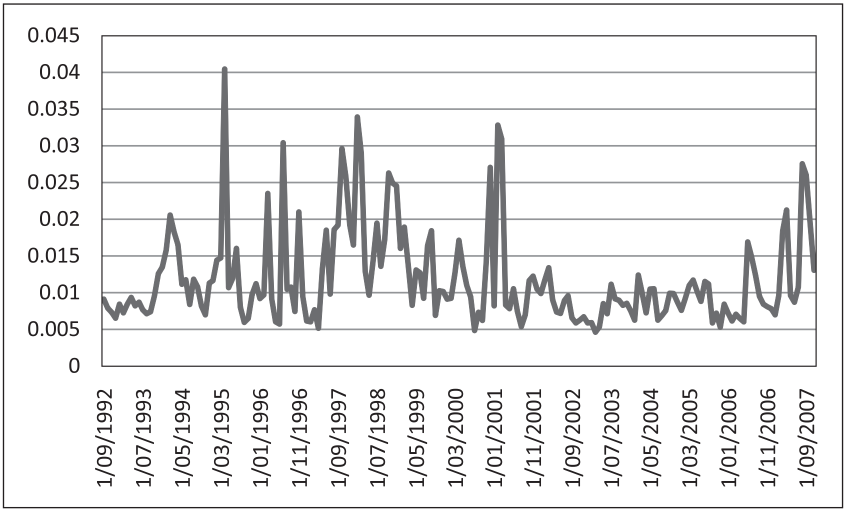
Panel A: Average Equal-Weighted IV across All Firms



Panel B: Average Value-Weighted IV across All Firms



Panel C: Market Volatility



over the same period. This is broadly consistent with the observation of Campbell et al. (2001) in the US of increased volatility during recessionary periods. On the other hand, the "jueteng"[2] scandal that plagued the Presidency of Joseph Estrada towards the end of 2000 and early part of 2001, which eventually culminated in the "EDSA II Revolution"[3] and Estrada's ouster, coincides with the spikes in market volatility in February and March 2001.

Next we explicitly estimate the deterministic time trend model for each series using the equation:

$$VOL_t = b_0 + b_1 t + \mu_t \qquad (4)$$

where *VOL* represents IV^{EW}, IV^{VW}, and *MV*, and *t* is time.

The estimated time trend b_1 *parameter* and its t-statistic are reported in Table 2. The standard t-test rejects the null hypothesis of no trend for value-weighted idiosyncratic volatility, IV^{VW}. However, Vogelsang (1998) points out that the null hypothesis of no trend is rejected too often when errors in the trend regression are persistent. Vogelsang (1998) suggests the use of t-PS1, which is a size-robust trend statistic that is valid in both *I(0)* and *I(1)* cases, i.e. whether or not a unit root exists in the error terms. In addition, Bunzel and Vogelsang (2005) developed the t-dan test, which has better power than t-PS1 while retaining its good size properties. The corresponding t-PS1 and t-dan test statistics are also reported in Table 2. Using these more powerful tests, we cannot reject the null hypothesis of no trend in all three volatility series unlike the standard t-test which cannot reject the hypothesis of no trend only for IV^{EW}. This underscores the need for caution when using the standard t-test. Hence, based on the t-PS1 and t-dan tests we conclude that there is no trend either in idiosyncratic volatility (IV^{EW}, and IV^{VW}) nor market volatility (*MV*) during our sample period.

Our results indicate that over the study period, both idiosyncratic and market volatility followed a mean-reverting process. This implies that there is also no trend in correlations among stocks and that the benefits from diversification would have likely remained the same on average over the study period, which also means that the number of stocks needed to attain a certain level of diversification would also have remained the same.

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[2] Jueteng is an illegal number forecasting game. It is alleged that Estrada received protection money from gambling lords.

[3] EDSA II is in reference to the bloodless People Power revolution of February 1986, also popularly known as the "EDSA revolution", which led to the ouster of Ferdinand Marcos who was replaced by Cory Aquino, widow of the assassinated opposition leader Ninoy Aquino.

Table 2: Time Trend of the Volatility Series

	Linear Trend (x 10 $^{-5}$)	t-stat	PS1	t-dan
IV^{EW}	-0.4	-0.3924	0.0242	-0.1596
IV^{VW}	-2.6	-4.2118	-0.2513	-1.5577
MV	-1.4	-1.5566	-0.0000	-1.2691

Note: The 5% critical value (two-sided) for t-PS1, and t-dan are 1.720 and 1.726, respectively.

4.3 Can Idiosyncratic Volatility and Market Volatility Predict Market Returns?

Goyal and Santa-Clara (2003) document evidence of a positive relationship between average stock idiosyncratic volatility and market return, while finding no significant relationship between market volatility and market return for the period 1963 to 1999. Hence, they conclude that idiosyncratic volatility matters. However, Wei and Zhang (2006) dispute this and suggest that the relationship between idiosyncratic volatility and market return documented by Goyal and Santa-Clara is driven mainly by the data in the 1990s. In addition, Bali et al. (2005) showed that Goyal and Santa-Clara's finding is driven by small stocks and is partly due to a liquidity premium. They also show that the apparent relationship disappears when they extended Goyal and Santa-Clara's sample by two years and when they used valued-weighted average measures of stock volatility instead of the equal-weighted measures used by Goyal and Santa-Clara. In addition, Brockman and Yan (2006) use the US data from 1926-1962 and find that neither equal-weighted nor value-weighted idiosyncratic volatility can predict one-month ahead market excess returns.

In this section, we verify these relationships using both equal-weighted and value-weighted measures of average idiosyncratic volatility by estimating the model:

$$MKTR_{t+1} = \alpha + \beta_{vol}\, VOL_t + \varepsilon_t \qquad (5)$$

where $MKTR_{t+1}$ is the market return in excess of the risk free rate and VOL represents IV^{EW}, IV^{VW} or MV.

Consistent with Goyal and Santa-Clara (2003), Table 3 shows that MV cannot predict one-month ahead excess market returns. The coefficient of MV is not significant and the R^2 is only 0.07 per cent. More importantly,

Table 3 shows that contrary to the findings of Goyal and Santa-Clara for the US market, the equal-weighted average idiosyncratic volatility is negatively related to one-month ahead excess market returns. This relationship is significant at the 10 per cent level. However, IV^{VW} cannot predict excess market returns, consistent with Bali et al. (2005) and Brockman and Yan (2006) for the US market. The coefficient estimate for IV^{VW} is not significant and has an R^2 of only 0.02 per cent. This implies that the negative relationship between idiosyncratic volatility and market returns is driven by small stocks as it disappears when we use value-weighted idiosyncratic volatility. Therefore, consistent with the prediction of CAPM, idiosyncratic volatility does not seem to matter in the Philippine stock market. We will present further evidence in Section 4.5.

Table 3: Predicting One-Month Ahead Excess Market Return

$MKTR_{t+1} = \alpha + \beta_{vol}\, VOL_t$

Intercept	IV^{EW}	IV^{VW}	MV	Adjusted R^2	*ARCH*	*B-G LM*
0.0462	-1.3076			0.1046	0.7587	0.2411
(1.7385)	(-1.7099)					
0.0155		-0.7557		0.0020	0.8798	0.2819
(0.6678)		(-0.6059)				
0.0058			-0.3311	0.0007	0.8912	0.2729
(0.4799)			(-0.3691)			

Notes: 1) Numbers in parenthesis are t-statistics.
2) *VOL* is volatility represented by equal-weighted IV *(IV^{EW})*, value-weighted IV *(IV^{VW})* or market volatility *(MV)*.
3) *ARCH*, Autoregressive Conditional Heteroscedasticity test *p* value.
4) *B-G LM*, Breusch-Godfrey Serial Correlation Lagrange Multiplier test *p* value.

4.4 CAPM versus the FF3-Factor Model

In this Section, we briefly digress to validate the use of the FF3-factor model to estimate idiosyncratic volatility and Jensen's alpha by comparing the FF3-factor model with the CAPM in terms of their ability to describe the returns in the Philippine stock market. We used the Black, Jensen and Scholes (1972)'s time series regression approach to estimate each pricing model for the same three idiosyncratic volatility-sorted portfolios that were used in the previous section. Merton (1973) showed that the intercept of the time series regression can be used as a simple return metric and a formal test of model misspecification. Accordingly, a well-specified model should have an intercept that is not significantly different from zero. Panels A and B of Table 4 report the coefficient estimates of the two models, as well as results of diagnostic tests of heteroscedasticity and serial correlation. The autoregressive conditional heteroscedasticity (ARCH) test rejects the null hypothesis of no heteroscedasticity in the error terms of the medium IV portfolio for both the CAPM and FF3-factor model. Likewise the Breusch-Godfrey serial correlation Lagrange Multiplier (LM) test rejects the null hypothesis of no serial correlation in the error terms of the low IV portfolio for the CAPM. To correct for either heteroscedasticity or serial correlation, we re-estimated these models using M-L ARCH (Marquardt). The reported coefficients in Table 5 for the CAPM for medium and low IV portfolios, and the FF3-factor model for the medium IV portfolio are the re-estimated coefficients.

Table 4 shows improvements in the adjusted R^2 for the FF3-factor model compared with the CAPM with the adjusted R^2 increasing by approximately 100 per cent for the high and low IV portfolios. The intercept for the FF3-factor model is insignificant as expected, while two of the three intercepts are significant at the 1 per cent level in the CAPM. Hence, the CAPM fails Merton's (1973) simple test of misspecification. In addition, the coefficient estimates of *b*, *s*, and *h* are all highly significant. Thus, there is evidence of size and B/M effects in the Philippine stock market with

Table 4: CAPM versus the FF-3 Factor Model

Panel A. CAPM: $RP(t) - RF(t) = a + b[RM(t) - RF(t)]$

	Intercept	*b*	Adjusted R^2	*ARCH*	*B-G LM*
High IV	0.0270 (3.7724)	1.0040 (10.8385)	0.3902	0.4490	0.3624
Medium IV	0.0076 (2.6104)	1.0335 (28.9931)	0.7355	0.0070[a]	0.7267
Low IV	0.0002 (0.0892)	0.3803 (10.1017)	0.2247	0.7359	0.0048[a]

Panel B. FF-3 Factor Model: $RP(t) - RF(t) = a + b[RM(t) - RF(t)] + sSMB(t) + hHML(t)$

	Intercept	*b*	*s*	*h*	Adjusted R^2	*ARCH*	*B-G LM*
High IV	-0.0018 (-0.3222)	1.1467 (17.3111)	0.9556 (13.5669)	0.3541 (6.3433)	0.6962	0.1177	0.1069
Medium IV	0.0049 (1.6966)	1.0755 (29.3411)	0.2351 (7.5545)	0.04677 (1.7745)	0.7771	0.0088[a]	0.6912
Low IV	-0.0038 (-1.1811)	0.4418 (11.4174)	0.4268 (10.3705)	0.1740 (5.3372)	0.5273	0.7317	0.8936

small and high B/M firms outperforming big and low B/M firms, respectively. This implies that investors can increase portfolio returns by increasing their holdings of small and high B/M stocks. These results show that the FF-3 factor model is better than the CAPM in explaining the returns in the Philippine stock market thereby validating the use of the FF-3 factor model in computing idiosyncratic volatility and Jensen's alpha.

4.5 *Is There a Relationship between Stock Return and Idiosyncratic Volatility?*

In this Section, we provide evidence on the relationship or lack thereof between stock returns and idiosyncratic volatility. Table 5 shows the average monthly raw returns of stock portfolios sorted according to idiosyncratic volatility. It also shows the average abnormal returns or Jensen's alpha with respect to the FF-3 factor model. Panel A reports the average equal-

Table 5: Returns of Portfolios Sorted by Idiosyncratic Volatility

	Raw Return		Size[a]	B/M	Jensen's Alpha	
	Mean	Std. Dev			Mean	Std. Dev
Panel A: Equal-Weighted						
High IV	0.0368	0.1238	1,586	2.4594	0.0068	0.1040
	(4.0275)				(0.8895)	
Medium IV	0.0194	0.0974	10,699	1.7601	0.0100	0.0725
	(2.6942)				(1.8736)	
Low IV	0.0180	0.0578	11,058	1.5271	0.0120	0.0519
	(4.2230)				(3.1198)	
High- Low	0.0188		-9,472	0.9324	-0.0051	
	(1.8637)		(-17.2305)	(5.2534)	(-0.5963)	
Panel B: Value- Weighted						
High IV	0.0073	0.1068	1,586	2.4594	0.0021	0.1194
	(0.9236)				(0.2324)	
Medium IV	0.0103	0.0901	10,699	1.7601	0.0025	0.0418
	(1.5419)				(0.7936)	
Low IV	0.0060	0.0740	11,058	1.5271	-0.0023	0.0424
	(1.0875)				(-0.7322)	
High- Low	0.0013		-9,472	0.9324	0.0043	
	(0.1397)		(-17.2305)	(5.2534)	(0.4639)	

Notes: [a] Market capitalisation in '000,000 pesos.
Numbers in parenthesis are t-statistics.

weighted raw returns and Jensen's alpha, while Panel B reports the corresponding average value-weighted returns. Table 5 also shows the average size and book to market (B/M) ratio of the three idiosyncratic volatility-sorted portfolios.

The average equal-weighted raw returns reported in Panel A are all different from zero at 1 per cent level of significance. More importantly, Panel A shows a positive relationship between idiosyncratic volatility and raw returns. We observe a monotonic fall in return from the high IV to the low IV portfolio, though there is not a significant difference between the return of the medium IV and low IV portfolios. The high IV portfolio earns an economically significant 1.88 per cent per month higher than the low IV portfolio. This difference is statistically significant at the 5 per cent level. However, this positive relationship between idiosyncratic volatility and raw returns could be simply due to the high IV portfolio being more risky than the low IV portfolio where risk is unrelated to idiosyncratic volatility. Indeed, Table 5 shows that the high IV portfolio is made up of small and high B/M firms with the high IV portfolio having an average size that is only one-sixth but a B/M that is more than 1.5 times than that of the low IV portfolio. It is, therefore, possible that the observed positive relationship between idiosyncratic volatility and raw return is due to size and B/M effects postulated by Fama and French (1993, 1996). Fama and French postulated a negative relation between size and return and a positive relation between B/M and return. Indeed the results presented in Section 4.4 are highly suggestive of these size and B/M effects. To confirm this, we compare the alpha of the IV-sorted portfolios. Comparing alphas, we find the difference between the high and low IV portfolio (-0.0051) to be statistically insignificant, which implies that the FF3-factor model is able to explain the difference in raw returns between the high and low IV portfolios. This suggests that the difference in raw returns is not due to idiosyncratic volatility but instead due to differences in size and B/M of the respective portfolios, i.e., due to the size and B/M effects.

Panel B shows the results using value-weighted raw returns and Jensen's alpha. The difference in the value-weighted returns of the high and low IV portfolios is not statistically significant. More importantly, the difference in the value-weighted alpha of the high and low IV portfolios is not statistically significant confirming the robustness of our finding of no statistically significant relationship between idiosyncratic volatility and abnormal returns in the Philippine stock market.

Our findings are contrary to the evidence documented by Ang et al. (2006, 2009) and Brockman and Yan (2006) for the US market. They are also inconsistent with the prediction of theories of underdiversification but are consistent with the prediction of CAPM. Taken at face value, our findings imply that there is no compensation for bearing idiosyncratic risk in the Philippine stock market. One possible reason for this could be the ease by which investors could hold the market portfolio, inasmuch as the market portfolio in this study consisted only of shares traded in the domestic market.

5. Summary and Conclusion

In this paper, we set out to determine if idiosyncratic risk matters in a small but open emerging market, with the Philippine stock market as a case in point. Using idiosyncratic volatility as a proxy for idiosyncratic risk, we sought to answer three questions. First, is there a trend in the average idiosyncratic volatility? Second, can idiosyncratic volatility predict market returns? Third, is there a relationship between idiosyncratic volatility and cross-sectional stock returns? In the process we also tested if the empirical findings related to these questions in the US market can be generalised to all countries including small emerging markets.

Our results indicate that we cannot generalise the US findings for the Philippine stock market. First, contrary to the US findings of Campbell et al. (2001), we do not find a trend in idiosyncratic volatility over our study period. The Philippine stock market was subjected to shocks resulting in several spikes in both idiosyncratic and market volatility but both series appear to be stationary. This implies that the benefits from diversification have remained stable over the study period in spite of spikes in volatility, which means that the number of stocks needed to attain a certain level of diversification has remained the same.

Second, we find that average equal-weighted idiosyncratic volatility is negatively related to market returns, which is opposite to the findings of Goyal and Santa-Clara (2003) for the US market. However, this negative relationship is also driven by small stocks just as Goyal and Santa-Clara's positive relationship, so the apparent relationship could simply be due to a size effect.

Third, we find no relation between idiosyncratic volatility and abnormal returns, contrary to the findings of Ang et al. (2006) and Brockman and Yan (2006) for the US market. Instead, we find that the FF3-factor model can adequately explain the difference in returns between our high and low idiosyncratic volatility portfolios with the apparent difference in raw returns attributed to size and B/M effects. Our results indicate that small firms have higher expected returns than big firms, and high B/M firms outperform low B/M firms. Taken at face value, our findings imply that a) investors should not expect to be compensated for bearing idiosyncratic risk; b) cost of capital estimates would be more accurate using the FF3-factor model rather than the CAPM; c) portfolio managers can increase portfolio returns by holding small and/or high B/M firms; and d) portfolio performance evaluation should take into account size and B/M effects.

Our study contributes to the literature in two ways. First, to the best of our knowledge, it is the first piece of research which describes the time series behaviour of idiosyncratic volatility and market volatility for the Philippine stock market. Second, it contributes to the debate on whether there is a relationship between idiosyncratic volatility and stock returns. So to answer our original question, does idiosyncratic risk matter in the Philippine stock market? Based on this study, it does not!

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