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The Determinants of Systematic Risk in Vietnam*

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Abstract

The capital asset pricing model is generally considered as a cornerstone in modern finance since its inception because it is extensively used in both financial management and portfolio management for estimating a return on equity. Within its framework, a systematic risk, generally termed as beta, plays an essential role. However, the determinants affecting the level of systematic risk of firms have been largely ignored in the current literature, in particular for emerging markets such as Vietnam. This paper is conducted to examine the determinants of systematic risk of listed firms in Vietnam. Data from 532 listed firms in Vietnam are used for the period from 2008 to 2017. The empirical findings from this paper indicate that financial leverage, profit margin on total assets, operational efficiency of enterprises, inflation and economic growth rate have a negative relationship with the system risk of listed firms in Vietnam whereas firm size is positively correlated with a systematic risk. The paper fails to establish a robust link between liquidity and firm growth rate and the level of the systematic risk. Robustness checks have also been conducted by utilizing analyses at the industry level of listed firms. It is the claim of this paper that empirical studies on systematic risks should be conducted at the economy wide level. Findings from this paper indicate that listed firms in Vietnam are encouraged to consider fundamental determinants to ensure that the systematic risk will not cause a major concern for their operations.

Keywords: Systematic risk, determinants, capital asset pricing model, listed firms, Vietnam.
JEL: G10, G11, G12.

1. Introduction

When forecasting the volatility of securities in the market, a very important aspect related to the overall risk is systematic risk, which has been discussed in financial theories and also tested in previous studies. The most critical factor to measure risks related to financial decisions is systematic risk. Systematic risk is estimated through beta. The beta factor plays an important role because it involves both company decisions and the stock market.

Moreover, beta represents an inherent relationship between risks and returns on investment, which is formalised in the capital asset pricing model (CAPM). Markowitz (1952) identified this type of risk as systematic risk, which cannot be determined. On the other hand, non-systematic risk involves the internal subjective factors of the company.

As the risk of systematic failure can be mitigated through diversification, Sharpe (1964) and Lintner (1965) found that the expected return of a portfolio is directly affected by systematic risk, represented by beta. CAPM describes the relationship between portfolio risks and expected returns. It is also a quantitative measure of investment performance. Risks related to the investment help to determine the returns that investors can expect. This means that if the investor has fixed the rate of return, then the risk must be the lowest, while if the investor has accepted a fixed level of risk, the desired rate of return must be the highest.

Some previous studies have also found that financial variables have a close relationship with the systematic risk of enterprises. However, recent studies have offered different perspectives from the previous. Researchers gradually learn more about the relationship between systematic risk and the collapse of the banking system as well as between systematic risk and banks' operations (Lueven et al., 2016).

This paper conducts regression testing of companies listed on the Vietnamese stock exchange to find out the relationship between financial variables and systematic risk of enterprises. The main objective of the paper is to understand the determinants of systematic risk in the context of a normal economy.

This paper is valuable for investors and financial policymakers as it provides an overview of the impact of financial variables on systematic risk and whether the impact is positive or negative. From an investor's perspective, the main aim is to maximize profits and minimize risks. On the other hand, financial policymakers want to increase companies' profits and efficiency and to minimize the level of risks to attract capital investment from the stock market.

The eight determinants of systematic risk proposed by this paper are financial leverage, firm size, liquidity of the enterprise, rate of return on total assets, operational efficiency of the enterprise, inflation and growth rate of the economy. These factors have been incorporated into a complete model for this current research.

This paper is structured as follows. Following this Introduction, brief discussions on the capital asset pricing model are discussed in Section 2, followed by a summary of relevant empirical studies worldwide. Section 3 presents data and empirical findings are presented in Section 4, followed by concluding remarks in Section 5.

2. Capital Asset Pricing Model and Existing Empirical Studies

The capital asset pricing model (CAPM) shows that there are two components that constitute the overall risk: systematic risk and unsystematic risk. Unsystematic risk is an impact factor associated with each individual company, such as its business risk or financial risk, without affecting other companies (except big companies). To minimize this type of risk, investors often diversify their portfolios. Therefore, unsystematic risk is also known as diversifiable risk (Markowitz, 1952).

On the other hand, systematic risk is a factor affecting all companies in the market. Since all companies are exposed to systematic risk, investors cannot diversify to reduce or minimize this risk. As a result, this risk is also known as non-diversifiable risk (Markowitz, 1952). Systematic risk is expressed through Beta (β), meaning that changes in stock prices

are due to market changes or can be calculated through the covariance of stock returns on the market.

In CAPM, systematic risk is the most important factor in determining an investor's return on investment. The math equation of CAPM is expressed as follows:

$$E(R_i) = r_f + \beta_i \; x \; [E(R_m) - r_f]$$

where:

$E(R_i)$: expected rate of return of the investment
r_f: risk-free rate
$E(R_m)$: expected market rate of return
β_i: systematic risk
$[E(R_m) - r_f]$: market risk premium

To determine the impact of fiscal policies on systematic risk, different types of variables have been used in previous studies (Vo et al. (2017), Lee and Hooy (2012), Nguyen et al. (2019), Hamada (1971), Bowman (1979), Hill et al. (1980), Milicher and Rush (1974), Ben-Zion and Shalit (1975), Mandelker and Rhee (1984), Pham et al. (2017)).

In this paper, the proposed variables to be used to test the relationship with systematic risk (beta) are financial leverage, firm size, liquidity of the enterprise, rate of return on total assets, operational efficiency of the enterprise, growth rate, inflation and growth rate of the economy. These variables are essential for investors and financial managers of companies because they combine both micro factors (internal of the company) and macro factors (the impact of the economy) in assessing risks arising from the operational process and in planning reasonable business strategies to maximize company value.

2.1. Financial Leverage

In previous studies, the positive relationship between systematic risk and financial leverage of enterprises has been shown. Studies of Lee and Hooy (2012), Rowe and Kim (2008), Hamada (1971), Bowman (1979), Hill et al. (1980), Milicher and Rush (1974), Ben-Zion and Shalit (1975) and Mandelker and Rhee (1984) all show that enterprises with a higher leverage ratio have higher systematic risk.

In addition, the research supports the suggestion that firms with higher market value to book value ratios will use more financial leverage to increase efficiency by scale, taking advantage of tax breaks and hence increasing the value of the company.

 Nawar et al. (2017) consider that financial leverage has a negative relationship with systematic risk, which is contrary to the original assumption. They also identify a new point for future research, which is to use more macro variables such as inflation rate and economic growth rate and to group enterprises by scale to reflect systematic risk more accurately.

2.2. Firm Size

Most of the studies are in favor of the view that firm size has a positive impact on systematic risk, such as Lee and Hooy (2012), Bowman (1979), Milicher and Rush (1974), Ben-Zion and Shalit (1975). Accordingly, for large enterprises, the systematic risk that it suffers is greater than that of small businesses because large enterprises often participate in the economy deeply and widely.

However, when the economy has a problem, these large enterprises will be directly affected. Meanwhile, due to their ability to diversify, small businesses participate in the market less extensively, hence less affected when problems occur. Contrary to this view, Nawar et al (2017) argue that larger enterprises with deeper market penetration can be more successful. These enterprises have more experience accumulated. Therefore, when economic problems occur, they will have more ways to overcome.

Although there are two contradictory views, many empirical studies on systematic risk and firm size suggest that larger enterprises often face higher systematic risk than smaller enterprises due to market access and economic risks (Rowe and Kim, 2008).

2.3. Liquidity of the Enterprise

Nawar et al (2017) argue that businesses are highly liquid, which means that a large amount of liquid assets can be used as soon as businesses encounter problems in the market so that businesses can cope with their liabilities. For businesses with lower liquidity, when problems occur due to the business environment, they will not be able to keep up as they cannot use existing liquid assets such as cash, short-term investments or receivables to meet their liabilities.

According to Lee and Hooy (2012), the higher the liquidity of the enterprise, the greater the systematic risk as the business process has gradually accumulated the risk of future systematic risk.

2.4. Rate of Return on Total Assets

Rowe and Kim (2008) suggest a negative relationship between rate of return on total assets and systematic risk because firms with a higher rate of returns can avoid risks that may arise from the business environment. Contrary to this view, Lee and Hooy (2012) and Bowman (1979) argue that systematic risk and rate of return on total assets have a positive relationship due to investment in fixed assets and mobile assets depending on the profitability of the business.

As enterprises cannot have idle cash, they have to invest in assets. It is this investment that raises risks in the future that businesses cannot anticipate by diversifying. Moreover, when businesses invest massively in the market, high profitability and high-risk issues will always go hand-in-hand.

2.5. Operational Efficiency of the Enterprise

Nawar et al (2017) argue that the efficiency of asset utilization has a positive relationship with systematic risks. The risk that businesses may face is that the investment in assets and the spreading of business activities cannot be managed in the best way, leading to the risks that businesses can encounter at any time. Although the value can be high, the risks are still hidden from the business environment.

On the contrary, Rowe and Kim (2008) consider that enterprises with inefficient operations will have higher systematic risk. Internal uncertainties within the enterprise together with unreasonable asset investment and changes from the business environment increase the systematic risk for the business.

2.6. Growth Rate of the Enterprise

According to Lee and Hooy (2012) and Bowman (1979), businesses with a high growth rate often invest a lot of resources in asset formation, thus changing the capital structure of enterprises. This change will cause many risks for businesses.

Rowe and Kim (2008) consider that the growth rate of enterprises has a negative impact on systematic risk. They argue that when a business achieves a high growth rate, it means that the enterprise uses its resources to form assets appropriately and effectively, thus minimizing the risk of impact from business environment. These studies suggest that growth rate does not affect systematic risk.

2.7. Inflation

Stocks represent real ownership of assets and it is a tool to prevent inflation. The nominal profit rate of a stock consists of real profit rate and expected inflation. In particular, the real rate of return is independent of any changes in inflation. In addition, the real rate of return is determined by the real economic factors as well as the productivity of capital.

These factors are independent of factors such as money supply or inflation. When inflation increases, the nominal profit rate will increase accordingly, but the real profit rate does

not. This means that the value of assets and / or rights related to real assets from stocks is not affected by inflation. The inflation prevention mechanism of stocks implies an independent or mutually exclusive relationship between profitability of stocks and inflation. Therefore, the nominal profit rate will generally increase by 1: 1 along with the increase of inflation. However, when the inflation rate is low, it may stimulate economic growth which will encourage businesses to borrow to expand production, thus increasing output.

2.8. Growth Rate of the Economy

The growth rate of the economy reflects the general development trend of the economy with regards to the ability to expand or narrow the business scale of each business. Thus, it has a very close relationship with the firm size (SIZE) and financial leverage (LEV). When the economy develops, enterprises will expand their production and business activities and diversify their business, hence expanding their size. Enterprises will change the financial structure to suit each period such that the enterprise value reaches the maximum level.

When the economy falls into a recession period, negative growth will cause companies to narrow down production and business activities to overcome the difficult period. The economy growing at a high rate will affect businesses in two ways. First, growth raises the income of the population, leading to a higher ability to pay for their needs. This results in diversification of demands and a common trend is to increase demand.

Second, economic growth allows businesses to increase output, helping to increase the efficiency of these businesses. Therefore, they can accumulate more capital to increase investment in production and business expansion, making the business environment more attractive.

3. Data

The data of this paper consist of 4,788 observations collected from the Vietnam Stock Exchange. We use the data of 532 non-financial companies from 2008 to 2017 using convenient sampling. The data are available on the Vietnam Stock Exchange website and other financial websites. All financial companies are excluded from the model due to the big difference in capital structure.

Table 2 shows the descriptive statistics about systematic risk (beta) and eight independent variables for 532 listed companies in the period of 9 years from 2008 to 2017. The average value of beta is 0.6523. The average value of this beta is lower than the market beta (always considered equal to 1), indicating that the sample of listed companies is less risky than the market.

Financial leverage has an average of 0.5098 and a standard deviation of 0.2206. The average size of enterprises is 11.7176, the standard deviation is 0.6322. Liquidity level of the average business is 1.8088, the standard deviation is 4.5346. The average return on total assets is 0.0621, the standard deviation is 0.0904.

The average operational efficiency of enterprises is 1.1715, the standard deviation is 1.0594. The average growth rate of enterprises is 0.1234, the standard deviation is 33.8879. Vietnam's inflation rate is 6.75% on average, the standard deviation is 0.0518. The economic growth of Vietnam according to the General Statistics Office ranges from 5% to 7% in the period of 2009 - 2017, with an average of 5.98% and a standard deviation of 0.0065.

From the results, the correlation coefficient shows the pair-wise relationship between the dependent variable (beta) and the independent variables. Considering that the correlation coefficients between the independent variables are all less than 0.8, we may conclude that the correlation between the independent variables in the model is not strict, hence there is no serious multi-linear phenomenon occurring in this study. Only financial leverage and firm size have a high correlation (0.2953).

Table 1

Variables

No.	Variable	Name	Measurement
Dependent variable			
1	**BETA**	Systematic risk	Covariance of stock returns and market returns divided by the variance of market returns = $\beta_i = Cov(R_i, R_m)/Var(R_m)$
Explanatory variables			
1	**LEV**	Financial leverage	Total liabilities / Total assets
2	**SIZE**	Firm size	Log(Total assets)
3	**LIQ**	Liquidity	Current assets / Total liabilities
4	**PROF**	Rate of return on total assets	Net profit / Total assets
5	**OE**	Operational efficiency of enterprises	Revenue / Total assets
6	**GROWTH**	Growth rate of firms	$(EBIT_t - EBIT_{t-1})/EBIT_{t-1}$ x100%
7	**CPI**	Inflation	Inflation rate
8	**TT**	Growth rate of economy	Growth rate of economy

Table 2

Descriptive Statistics

Variable	No. of Observations	Mean	Standard deviation	Min	Max
BETA	4,788	0.652	1.261	-18.81	69.07
LEV	4,788	0.510	0.221	0.002	1.409
SIZE	4,788	11.718	0.632	9.28	14.33
LIQ	4,788	1.809	4.535	0.018	219.8
PROF	4,788	0.062	0.090	-1.779	0.784
OE	4,788	1.172	1.059	0.0002	12.74
GROWTH	4,788	0.123	33.88	-135	1253
CPI	4,788	0.068	0.052	0.006	0.186
TT	4,788	0.060	0.007	0.050	0.068

Table 3

Correlations of Variables

	BETA	LEV	SIZE	LIQ	PROF	OE	GROWTH	CPI	TT
BETA	**1.000**								
LEV	0.030	**1.000**							
SIZE	0.087	0.295	**1.000**						
LIQ	-0.017	-0.321	-0.115	**1.000**					
PROF	-0.016	-0.378	-0.050	0.100	**1.000**				
OE	-0.041	-0.011	-0.194	-0.025	0.177	**1.000**			
GROWTH	0.001	-0.023	-0.006	0.001	0.003	-0.008	**1.000**		
CPI	0.065	0.018	-0.073	-0.036	0.071	0.018	0.010	**1.000**	
TT	-0.049	-0.023	0.073	0.022	0.005	-0.014	0.033	-0.133	**1.000**

4. Empirical Results

The proposed regression model is given below:

$$BETA_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 SIZE_{it} + \beta_3 LIQ_{it} + \beta_4 PROF_{it} + \beta_5 OE_{it} + \beta_6 GROWTH_{it}$$
$$+ \beta_7 CPI_t + \beta_8 TT_t + \varepsilon_{it}$$

where:

BETA: Systematic risk
LEV: Financial leverage
SIZE: Firm size
LIQ: Liquidity of the enterprise
PROF: Rate of return on total assets
OE: Operational efficiency of the enterprise
GROWTH: Growth rate of the enterprise
CPI: Inflation rate
TT: Growth rate of the economy

As presented in Table 4, Financial leverage (LEV), return on total assets (PROF), operational efficiency (OE), inflation rate (CPI) and economic growth rate (TT) have a negative impact on the systematic risk of the business (BETA). Firm size (SIZE) has a positive relationship with the systematic risk of the enterprise (BETA). The remaining variables are not statistically significant, thus not showing correlation with the system risk of the enterprise. The regression coefficients have changed to show that the estimates have been more effective.

From the regression results of 532 enterprises listed on the Vietnamese stock market, it is concluded that there is a negative relationship between financial leverage and systematic risk. In addition, businesses with a higher financial leverage are ROE amplifiers, taking advantage of tax shield benefits but faced with the pressure to raise huge revenues to ensure profitability.

Using debts will incur fixed interest expense which will be deducted from the taxable income. Therefore, when using debts as a source of financing, in a favorable business condition, the profitability of investment will be amplified. When EBIT is higher than interest expense, a high-debt company's income is much higher than that of a low-debt company. That is, when the business is operating effectively, the greater financial leverage will amplify the financial indicators of the company. Thus, financial leverage is considered to have a negative effect on the systematic risk.

Firm size (SIZE) has a positive relationship with the systematic risk of enterprises (BETA). This result concurs with the views of Adhikari (2015), Lee and Hooy (2012), Bowman (1979), Milicher and Rush (1974), Ben-Zion and Shalit (1975).

Accordingly, for large enterprises, the systematic risk that they suffer is greater than that of small businesses because large enterprises often participate in the economy extensively. However, when the economy has a problem, these large enterprises will be directly affected. On the other hand, small businesses, due to their ability to diversify, participate in the market superficially and weakly. Thus, when problems occur, they will be less affected.

A positive relationship between liquidity (LIQ) and systematic risk (BETA) suggests that businesses that are highly liquid, (a large amount of liquid assets can be used as soon as the business faces problems in the market), can better cope with existing liabilities. For businesses with lower liquidity, when incidents occur due to the business environment, they will not be able to keep up as they do not have sufficient existing liquid assets such as cash, to serve their liabilities.

The higher the liquidity of enterprises, the greater the systematic risk, as the business process has gradually accumulated more systematic risk in the future. This result is in contrast with the assumptions but consistent with the results of studies of Lee and Hooy (2012). However, the result is not statistically significant given the data set from the Vietnamese stock exchange.

Table 4

Empirical Results

Variable	Correlation coefficients	p-value
LEV	-0.179 ***	0.00
	(0.038)	
SIZE	0.249 ***	0.00
	(0.011)	
LIQ	0.075	0.73
	(0.214)	
PROF	-0.710 ***	0.00
	(0.081)	
OE	-0.030 ***	0.00
	(0.007)	
GROWTH	-0.021	0.35
	(0.022)	
CPI	-22.30***	0.00
	(4.228)	
TT	-109.938***	0.00
	(11.105)	

Note: Standard errors are in parentheses. *** denotes significance at the 1% level.

The higher the liquidity of enterprises, the greater the systematic risk, as the business process has gradually accumulated more systematic risk in the future. This result is in contrast with the assumptions but consistent with the results of studies of Lee and Hooy (2012). However, the result is not statistically significant given the data set from the Vietnamese stock exchange.

From the regression results of 532 enterprises listed on the Vietnam stock market in the 2009 – 2017 period, we find that return on total assets (PROF) and systematic risk of enterprises (BETA) have an inverse relationship. Businesses with high profits can avoid risks that may arise due to the business environment.

This is true for the business environment in Vietnam, where the term "big fish swallowing small fish" applies: once the business has the financial strength, it will dominate and push out competitors, while overcoming all difficulties and risks that may be encountered during business operation. In other countries in the world, this may be met with opposition from the government for using financial power to crush opponents. However, in Vietnam, because the legal framework for Business Law is not clear, it is not strictly legal, and many small businesses have to accept being wiped out in the market due to the lack of financial strength.

Operational efficiency of enterprises or asset utilization performance is inversely related to business systematic risk (BETA) of enterprises listed on Vietnam stock market in the period of 2009 – 2017. Businesses that operate poorly will increase systematic risk. Internal uncertainties plus unreasonable asset investment and changes from the business environment increase the systematic risk of business.

From the regression results of 532 enterprises listed on the Vietnam stock market in the period of 2008 - 2017, it can be seen that growth rate (GROWTH) has no relationship with the systematic risk of the enterprise (BETA).

These studies have shown that businesses with high or low growth rates do not affect the systematic risk of enterprises. The growth rate only represents the change in numbers on

the financial statements of the enterprises over the years, while systematic risks occur because of many factors and the enterprise growth rate is not a factor.

The regression results of 532 enterprises listed on the Vietnam stock market in the period of 2009 - 2017 and the macroeconomic situation in this period show that the inflation rate (CPI) has an inverse relationship with systematic risk (BETA). This result is contrary to the original assumption of the topic. The nominal profit rate of a stock consists of two components: real profit rate and expected inflation.

A low inflation rate, which does not affect the economy, may stimulate economic growth. As such, it will encourage businesses to borrow to expand production and increase output, reducing systematic risk. The data series of the paper corresponds to a period with one-digit inflation rates. This is a period of stimulated investment and expanded production. Thus, there is an inverse correlation between inflation rate and systematic risk.

The regression results of 532 enterprises listed on the Vietnam stock market in the period of 2009 - 2017 and the macroeconomic situation in this period show that the economic growth rate has a negative relationship with the systematic risk of the business (BETA). This result is consistent with the original assumption of the topic.

5. Concluding Remarks

The most essential purpose of a business is to maximize profits for investors. Profits can be maximized by reducing risks. A full understanding of factors related to systematic risk is very valuable to investors and financial policymakers. This paper examines the relationship between systematic risk and financial variables. Eight financial variables (financial leverage, firm size, corporate liquidity, return on total assets, operational efficiency, enterprise growth rate, inflation rate and economic growth rate) are considered the determinants of systematic risk.

Data of 532 non-financial companies (2008-2017) collected from the Vietnam Stock Exchange are used. Based on previous studies, eight hypotheses have been proposed.

Regression models have been used to estimate. The results show that six variables (financial leverage, firm size, return on total assets, operational efficiency, inflation rate and economic growth rate) are statistically significant while the other two variables (liquidity of the business and enterprise growth rate) are not statistically significant.

However, because the sample size is small, it is not possible to generalize for the whole market as there are still many variables that affect systematic risk. Future research efforts, in addition to using more financial variables, should take into account the economic features of the country because each country will have different economic development policies.

In addition, this paper tests the relationship between financial variables and systematic risk at the industry level/ the economic sectors. The paper finds that the systematic risk is only meaningful when considered for the entire market. When specific industries are considered, the systematic risk is not fully explained by each financial variable of the business. As a result, it is a claim of this paper that any empirical paper on systematic risk should be conducted for an entire financial market.

Findings from this empirical paper provide additional empirical evidence to Vietnam's listed firms in relation to important aspects of their business operation. These aspects should be taken into careful consideration so that systematic risk of listed firms can be minimized so that the ultimate objective of profit maximization for firms can be achieved.

References

Ben-Zion, S and S. Shalit, (1975), Size, Leverage, and Dividend Record as Determinants of Equity Risk, *Journal of Finance*, 30(4), 1015-1026.

Bowman, R. (1979), The Theoretical Relationship Between Systematic Risk and Financial (Accounting) Variables, *Journal of Finance*, 34(3), 617-630.

Hamada, R. (1971), The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks, *Journal of Finance,* 27(2), 435-452.

Hill, N. and B. Stone (1980), Accounting Betas, Systematic Operating Risk, and Financial Leverage: A Risk-Composition Approach to the Determinants of Systematic Risk, *Journal of Financial and Quantitative Analysis*, 15(3), 595-637.

Laeven, L., L. Ratnovski, and H. Tong (2016), Bank Size, Capital, and Systemic Risk: Some International Evidence, *Journal of Banking and Finance,* 69(1), 25-34.

Lee, C.-H. and C.-W. Hooy (2012), Determinants of Systematic Financial Risk Exposures of Airlines in North American, Europe and Asia, *Journal of Air Transport Management*, 24(12), 31-35.

Lintner, J. (1965), The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets, *Review of Economics and Statistics,* 47(1), 13-37.

Mandelker, N.G. and S.G. Rhee (1984), The Impact of the Degrees of Operating and Financial Leverage on Systematic Risk of Common Stock, *Journal of Financial and Quantitative Analysis,* 19(1), 45-57.

Markowitz, H. (1952), Portfolio Selection, *Journal of Finance,* 7(1), 77-91.

Milicher, R. W. and D. Rush (1974), Systematic Risk, Financial Data, and Bond Rating Relationships in a Regulated Industry Environment, *Journal of Finance,* 29(2), 537–544.

Nawaz, R., W. Ahmed, S. Sabeela, A. Muhammad (2017), Financial Variables and Systematic Risk, *Chinese Business Review*, 16(1), 36-46.

Nguyen, C.T., T.N. Vu, T.T. Do, V.M. Nguyen and D.H. Vo (2019), Systematic Risk in the Asia Pacific Region: A Clinical Death? *Review of Pacific Basin Financial Markets and Policies, forthcoming*.

Pham, N.T. and D.H. Vo (2017). Equity Beta for Regulated Energy Businesses in Australia: A Revisit, *International Journal of Energy Economics and Policy*, 7(6), 11-18.

Rowe, T. and S. Kim (2008), Analyzing the Relationship Between Systematic Risk and Financial Variables in Casino Industry, *UNLV Gaming Research & Review Journal*, 14(2), 47-58.

Sharpe, W. (1964), Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risks, *Journal of Finance,* 19(3), 425-442.

Vo, D.H., and T. N. Pham (2017), Systematic Risk in Energy Businesses: Empirical Evidence for the ASEAN, *International Journal of Economics and Financial Issues*, 7(1), 553-565.