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Impacts of Variables on Returns and Risk of the Securities Listed on Vietnamese Stock Market

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Abstract: This paper aims to assess the impacts of variables such as D/P, E/P and B/P which influence on the interest rate and risk of the securities listed. The result of this research reflects that such variables do affect the interest rate, yet the D/P and B/P do not follow the theory of risk and return. To a certain extent, such outcome indicates that Vietnamese investors care less about security's dividend or book value in which they invest but majorly more depend on their own sensation and may end up getting themselves under control of institutional investors.

Keywords: CAMP; Interest rate and securities risk; D/P; B/P; E/P.

1. Introduction

Channeling investment into securities might bring high return yet along with high risk. Thus, investors in general and economists in particular relentlessly keep seeking quantitative and qualitative tools in order to enhance their investment outcome. It has been over 50 years since the Capital Asset Pricing Model (CAPM) was set up by Sharpe and Lintner (1964 ; 1965). Owing to the longtime fluctuation of economy in general and securities market in particular, the CAPM nowadays has failed to sustain its position. Its limitation did lead to a series of supplement researches.

As regards Basu (1983), securities ranking was based on E/P ratio (earnings-price ratio) discovering that the future interest rate of the securities at higher E/P ratio was anticipated to be well purchased, in a better way of valuation compared with the CAPM. Banz (1981) pointed out that the "size element" evaluated by market capitalization interpreted the interest rate more effectively than the CAPM did. The research of (Bhandari, 1988) figured out the leverage (measured by debt ratio – D/E) when having carried out the combination of the more compatible interest rate and the market beta. The research of Rosenberg, Reid and Lanstein (1985) discovered that securities at higher BE/ME (book to market equity ratio) would raise a better interest rate. Fama and French (1988) research came to a conclusion that the D/P ratio explained about interest rate in a better way than the E/P ratio did. Fama and French (1992) besides found out the size elements that were the E/P, B/P having explained about the market more precisely than the market beta did. Fama and French (1995) at the end came up with the three-factor model explaining about securities interest rate. Moreover, they considered that there were other factors relating to securities interest rate such as E/P, CF/P, revenue growth rate. The research of Carhart (1997) set up a four-factor model (FF4), let alone the three factors in FF3, there was also a momentum factor which divided the market into 2 portfolios, in which it demonstrated the subtraction of interest rate of 30% of the highest interest rate securities and interest rate of 30% of the lowest interest rate securities. Consequently, after adding up momentum factor into FF4, it interpreted more effectively securities interest rate compared to FF3. On the whole, these researches focused on two sides: first was to discover specific elements that themselves were "abnormal" causing effects to listed securities interest rate and risk (in which the ratios such as D/P, E/P, B/P played significant roles). Second, dividing the data into separated portfolios when analyzing was for an accurate assessment without any errors (bias), resembling the CAPM.

2. Overviews

Stock market has its potential risk due to the random allocation of different outcomes. The common assessment of such allocation is standard deviation or variance. Any risks are likely to be divided into two parts. One is *unique risk* (or *diversifiable risk*) that happens to one only security. And another one is *market risk* appertaining to the

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whole market's risk. *Unique risk* deriving from some random reasons such as strike, lawsuit... of one own company could be eliminated by adding that asset to a diversified investment portfolio. On the contrary, *market risk* relating to some systematic risks such as inflation, economy crisis, confliction... Providing that interest rates cover most of the risks, investors will channel their money in. The investors may be able to eliminate some specific risks by a diversified portfolio yet they just cannot eliminate market risks. They are rational investors. Risk of one separated security will be assessed by that asset's impact on the whole investment portfolio. This kind of risk refers to the CAPM, that risk of one separated security is an additional part of the whole risk of the well-diversified investment portfolio. Thus, the required interest rate of a security equals the sum of risk-free interest rate and market risk premium reflecting the risks left after having diversified a portfolio. Rating of one security's portion that it gets involved in the risk of a well-diversified investment portfolio depends on its sensitivity level of market changes. This sensitivity is called *beta*.

In the same way, as regards securities investment, we are going to get to know more about theory of risk and returns, it is *Modern portfolio theory* of Harry Markowitz in 1950s. Modern portfolio theory suggests that investors should minimize the market risk percent at an expected interest rate by setting up a diversified investment portfolio. Such theory enhances the diversification of investment portfolio compared to choices of separated securities. Markowitz did mention about the practice of choosing differently non-correlative securities that would help investors decrease the standard deviation of interest rate. But he did not put an end there and went on to expand the principles of portfolio establishment. The simplified quote of the modern portfolio theory is "*Do not put all your eggs in one basket.*" The theory also set up the notion of "*efficiency sideline*". An efficient portfolio is the one that with a default interest rate, there would be the lowest risk rate. And the higher risk rate is, the higher interest rate is. In order to set up the most appropriate portfolio in accordance with modern portfolio theory, investors have to evaluate the covariance of different assets as well as risk management/ interest rate of each asset. This means that diversifying portfolio of non-correlative assets would help us diminish risk. Modern portfolio theory provides us with a scientifically disciplinary approach thus it has been used widely for long until now. One noticeable point is that, in fact, a completely risk-free portfolio does not exist. A diversified portfolio only helps to minimize risk yet not to eliminate it.

3. Model and Methodology

3.1. The Research Model

To evaluate risk premium of valuation ratios affecting security interest rate, the authors applied the model as following:

$$R_{it} = \alpha_0 + \beta_1 R_{(D/P)it} + \beta_2 R_{(E/P)it} + \beta_3 R_{(B/P)it} + \varepsilon_i$$

In which:

R_{it} refers to monthly average interest rate of the i security portfolio;

$R_{(D/P)it}$ refers to average interest rate difference between the higher D/P ratio group and the lower D/P ratio group in a month t ;

$R_{(E/P)it}$ refers to average interest rate difference between the higher D/P ratio group and the lower E/P ratio group in a month t ;

$R_{(B/P)it}$ refers to average interest rate difference between the higher D/P ratio group and the lower B/P ratio group in a month t ;

α_0 refers to original coordinate (intercept ratio);

$\beta_1, \beta_2, \beta_3$ refer to beta ratios which are the risk sensitivity of securities interest rate;

ε_i refers to random error.

3.2. Based on the Research Model, the Author Brought Out the Hypotheses as Following

- **H1:** The securities with D/P = 0 or high D/P were securities groups that were from the firms being at their loss, or gaining interest yet paying no dividend, or paying dividend yet investors found the firm in trouble, or due to un-prosperous business industry,... thus it ended up with no high interest rate to be gained by investors. As a result, these securities which might come with higher risk should be purchased at a higher returns as demanded by investors, or $\beta_1 > 0$.
- **H2:** The securities with E/P < 0 or relatively high E/P derived from the firms being stuck in their financial problem, so investors should require for higher returns in this group than other ones.
- **H3:** The firms with B/P > 1 might get into trouble, or due to bad business environment, or the market was on its fast downward trend owing to psychological impacts or economic crises... Consequently, investors should demand for higher returns in this group for such a compensation of higher risk (or $\beta_3 > 0$) than other ones.

3.3. Data source

The security codes selected in this research had been listed constantly for 5 years and had not been transferred to another trading floor at Ho Chi Minh Stock Exchange (HOSE) and Ha Noi Stock Exchange (HNX). The data was collected over the past 5 years from 2010 to 2014, constantly. The result technically pointed out that there were 213 qualified security codes, in the sum of $213 \times 5 \times 12 = 12.780$ views to be calculated. The figures were solved by

quantitative model calculated by crossed data (based on monthly average), so the sum of views reached at the n = 60. The data collected and calculated was from Ho Chi Minh Stock Exchange and Hanoi Stock Exchange, via integrated Metastock software.

➤ Monthly interest rate is calculated by: $R_{it} = \frac{P_t - P_{t-1}}{P_{t-1}}$.

In which P_t and P_{t-1} are closing prices on the date of month start and month end. The size is calculated as follows the logarithm of monthly capitalization arrangement in firm.

➤ D/P ratio (Dividend/ Market price) reflects the expecting dividend of investors at current time. Monthly

D/P is calculated by: $D/P = \frac{D_{\text{previous year}}}{P_{\text{current}}}$.

➤ E/P ratio (Earning per share/ Market price) reflects the earning of securities in accordance with their

current price. Monthly E/P is calculated by: $E/P = \frac{EPS_{\text{previous year}}}{P_{\text{current}}}$.

➤ B/P ratio (Book value/ Market value) is used to make a comparison between one security's book value

and its current market price. Monthly B/P is calculated by: $B/P = \frac{BVPS_{\text{previous year}}}{P_{\text{current}}}$.

4.The Results

Table-1. Average interest rate in accordance with specified elements

Element	Portfolio average interest rate		Portfolio standard deviation	
	The 50% highest	The 50% lowest	The 50% highest	The 50% lowest
D/P	-0.60%	0.40%	2,78%	2.49%
E/P	-0.50%	0.30%	2,69%	2.60%
B/P	-0.70%	0.50%	2,93%	2.38%

Source: Based on the author's own analysis from data collected.

Table 1 shows the calculated average interest rate of the two groups divided by ratios, the data was calculated averagely by each month (from January 2010 to December 2014). Technically, the result indicated that higher interest rates derived from the group of lower ratios, while higher standard deviations derived from the group of higher ratios. It could be inferred that higher ratio group might come with lower interest rate as well as higher risk.

Table-2. Variables

Portfolio	Min	Max	Average	Standard deviation	P-Value	P-Value
					(JB)	(ADF)
$R_{(D/P)}$	-4.45	1.55	-1.03	1.09	0.042	0.000
$R_{(E/P)}$	-4.29	1.56	-0.75	1.15	0.047	0.000
$R_{(B/P)}$	-4.21	2.68	-1.17	1.30	0.052	0.000

Source: Based on the author's own analysis from data collected.

Table 2 demonstrates the variation of average interest rates from portfolios arranged by valuation ratios which have average variation from -1.17% to -0.75%. Standard deviation ranged from 1.09% to 1.30%. P-value of JB (Jarque-Bera) statistic was both over 0.01, so the variables had their significance level of 99% of standard distribution. The result of unit verification (ADF-Augmented Dickey Fuller) proclaimed the P-values <= 0.01, proving that with a significance level of 99%, most of the variables achieved their halts. Such outcome was likely to be sensible with the practice of having used the GMM method (according to Jagannathan and Zhenyu (2002)).

Table-3. Matrix plot of variables

	$R_{(D/P)}$	$R_{(E/P)}$	$R_{(B/P)}$
$R_{(D/P)}$	1,00		
$R_{(E/P)}$	0.51	1,00	
$R_{(B/P)}$	0.67	0.33	1,00

Source: Based on the author's own analysis from data collected.

Table 3 performs the matrix plot of variables, such result showed that independent variables' correlation ratios were low (<0.80), thus, the variables applied did not cope with multicollinearity issue.

Table-4. The result of linear regression model

Variables	Coefficients	Significance level
Intercept	0,55	(*)
$R_{(D/P)}$	-5,45	(**)
$R_{(E/P)}$	4,33	(**)
$R_{(B/P)}$	-0,35	(***)
R- Square	28.97%	

Source: Based on the author's own analysis by Stata application with GMM method; (*) Significance level of 1%, (**) Significance level of 5%, (***) Significance level of 10%; Ratios were calculated averagely by regression models within 24 months (in which the I/V variable was in accordance with the R_{i-1} variable).

Table 4 shows that only $R_{(E/P)}$ followed the research theory (H2 hypothesis), the other ones as $R_{(D/P)}$ and $R_{(B/P)}$ did not follow the risk and return theory (violating the H1 and H3 hypotheses). This result led to some judgments below:

- Investors in Vietnam rarely pay much attention to dividend or book value. What they care is interest rates derived from price fluctuation in market.
- The firms with low D/P or B/P are likely to bring investors higher interest rate. These ones are highly priced by the market since they have potential power or invest in main-forced industries (such as oil and gas, milk...).
- Investors are manipulated considerably by their own sensation over the interest rate premium between the high E/P group and the low E/P group. However, the market outcome is rational (following the theory) as institutional investors are leading the market. Moreover, institutional investors have wider knowledge, more experiences and better information channels than individual investors do.

The main purpose of the series of Table 5 here is to figure out which way investors should channel their money. The author hereby, by 3 analytical tables below, suggested an ideal portfolio based on own analysis from the **Table 1** to **Table 5.1**, **Table 5.2** and **Table 5.3**. This is not a non-risk portfolio and not the only way to meet the high interest rate outcome as investors ever expect. The author conducted such calculation just in order to demonstrate the best approach in this case to solve the investment problem, regarding the variables given.

Table-5.1. High returns codes

	12/2014	R	D/P	E/P	B/P
1	VNM	-0.0156	0.0348	0.0610	0.1838
2	TCT	-0.0282	0.0180	0.0595	0.2000
3	SGH	0.0055	0.0122	0.0120	0.2028
4	DHG	0.0091	0.0244	0.0658	0.2370
5	VIC	-0.0054	0.0635	0.0581	0.2439
6	LGC	0.1066	0.1236	0.0072	0.2755
7	DRC	-0.0039	0.0638	0.0806	0.2967
8	SEB	0.1357	0.0290	0.0676	0.3155
9	NSC	0.0055	0.0451	0.1064	0.3731
10	SSC	-0.0158	0.1030	0.0885	0.3731
11	TRA	-0.0030	0.0375	0.0741	0.3922
12	VDL	0.0068	0.0000	0.0833	0.4016
13	SAF	0.0223	0.1203	0.0943	0.4016
14	VNT	0.0348	0.0652	0.1087	0.4292
15	FPT	-0.0009	0.0954	0.1000	0.4367
16	PNJ	-0.0108	0.1381	0.0746	0.4367
17	TAC	0.0096	0.0760	0.0442	0.4695
18	LIX	-0.0054	0.1466	0.1000	0.4695
19	OPC	-0.0121	0.1321	0.0741	0.4831
20	GDT	-0.0266	0.1652	0.1064	0.4831
21	KDC	-0.0262	0.0669	0.0524	0.4902
22	VCB	0.0613	0.1025	0.0585	0.4975
23	NHC	0.0000	0.2000	0.0649	0.5000
24	SSI	-0.0407	0.1324	0.0641	0.5435
25	TMS	-0.0253	0.0720	0.1020	0.5495
26	HCM	-0.0573	0.1747	0.0719	0.5650

Source: Based on the author's own analysis from codes listed in accordance with the interest rates.

Based on the analysis of **Table 5.1**, the result indicated that higher interest rates derived from the group of lower ratios, while higher standard deviations derived from the group of higher ratios. On the other hand, according to **Table 4**, investors in Vietnam rarely pay much attention to dividend or book value. What they care is interest rates derived from price fluctuation in market. The author chose the latest time as 12/2014 so as to pick out the 26

satisfied securities codes, which meant that they might have the higher interest rates when ranking by E/P in priority, then by D/P and B/P.

Table-5.2. High returns interest rate codes in comparison with all of the codes listed

12/2014			
Average interest rate		Standard deviation	
Optimal codes	All codes	Optimal codes	All codes
0.46%	-0.90%	4.09%	4.38%

Source: Based on the author's own calculation from the 26 codes chosen.

After the selection of optimal codes, the author started to calculate and analyze these codes' average interest rates compared to all of 213 codes' in the market in December 2014. The result is easily observed through the [table 5.2](#) which shows that 26 selected codes have the higher interest rates and lower standard deviations indicating a lower risk level.

Table-5.3. Optimal portfolio

	TCT	VDL	VNM	SEB	NSC	DHG	SAF	TRA	DRC	VIC
Portion	47.54%	8.60%	43.86%	0%	0%	0%	0%	0%	0%	0%
Portfolio variance	0.00098									
Expected returns	1.00%									
Required returns	1.00%									

Source: Based on the author's analysis by Microsoft Excel function.

The authors conducted the analysis of 5-year period with 26 selected security codes and picked out 10 codes with highest interest rates to put into the investment portfolio. Based on the required interest rate of 1% each month, it means that 12% per year and higher than bond interest rate, the author calculated to choose the 3 codes TCT, VDL and VNM that met the requirement with the portions as in the [Table 5.3](#). Portfolio variance reaches at 0.00098, much lower than separated codes'.

5. Conclusion

The research result of impact of variables on interest rate and risk of the securities listed on Vietnamese security market in the period 2010-2014 proves that such variables are rational to interpret the listed securities' average interest rate. On another hand, these results just appear to be contrary to the risk and return theory given by hypotheses. Such outcome is also a partial connection with the research of [Tran Viet et al. \(2012;2013;2014\)](#) and a similar result turning up is that in Vietnamese stock market, investors often break the rules of the risk and return theory then make their investment plan by own sensation, by this an issue could arise that institutional investors may have a chance to take control over them.

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