

ĐÁNH GIÁ RỦI RO THỊ TRƯỜNG QUA HỆ SỐ BETA CAPM CHO CÁC NGÂN HÀNG THƯƠNG MẠI NIÊM YẾT Ở VIỆT NAM DƯỚI TÁC ĐỘNG VĨ MÔ TRONG THỜI KỲ TIỀN LẠM PHÁT THẤP - TÌNH HUỐNG VCB VÀ STB

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Tóm tắt

Nền kinh tế Việt Nam đã đạt được rất nhiều thành tựu trong thời gian qua, đặc biệt là ngành ngân hàng thương mại giai đoạn từ sau khủng hoảng 2011 đến năm 2015 với chỉ số giá tiêu dùng thấp, chỉ 0,6%. Bài báo này đo lường Beta CAPM theo mô hình truyền thống dưới tác động của các biến số vĩ mô bên trong và bên ngoài giai đoạn này. Trong những năm gần đây, vai trò của quản trị rủi ro trong các ngân hàng thương mại ngày càng được nâng cao với những quan điểm mới trong quản trị doanh nghiệp cũng như các mô hình quản trị rủi ro. Do đó, bài nghiên cứu này nhằm mục đích tìm hiểu và so sánh mức độ ảnh hưởng đến rủi ro thị trường của hai ngân hàng thương mại lớn đã niêm yết tại Việt Nam là VCB và STB với số liệu bán niên. Sử dụng phương pháp phân tích, thống kê tổng hợp và phương pháp duy vật biện chứng, kết hợp với mô hình kinh tế lượng với 9 biến vĩ mô, chúng tôi nhận thấy rằng tăng trưởng CPI và GDP, lãi suất cho vay và lãi suất phi rủi ro (R_f) có tác động đáng kể đến rủi ro thị trường trong khi các yếu tố bên ngoài như tỷ giá hối đoái và SP500 chỉ có ảnh hưởng nhỏ đến CAPM beta. Ý nghĩa chính sách rút ra là Ngân hàng Nhà nước Việt Nam, Bộ Tài chính và các cơ quan ban ngành cần gia tăng tăng trưởng GDP và giảm CPI, kết hợp với kiểm soát lãi suất phi rủi ro và lãi suất cho vay để giảm rủi ro thị trường.

Từ khóa: quản lý rủi ro thị trường, beta CAPM, lạm phát thấp, ngành ngân hàng, Việt Nam, chính sách
EVALUATING MARKET RISK VIA BETA CAPM OF LISTED BANKS IN VIETNAM UNDER MACRO EFFECTS DURING PRE-LOW INFLATION PERIOD- CASES OF VCB AND STB

Abstract

We cannot deny that the Vietnam economy has recently gained lots of achievements, especially in commercial banking industry from the year after crisis 2011 until the year 2015 with low CPI as of 0.6%. This paper measures the Beta CAPM in the traditional model under the impacts of both macro internal and external variables during this period. In recent years, the role of risk management in commercial banks has been increasing with new perspectives in management, corporate governance and risk management models. Hence, this research paper aims to figure out and make comparison on how much they affect the market risk of two big listed Vietnam commercial banks, VCB and STB, using semiannual data. Using synthesis statistical methods, and dialectical materialism method, combined with econometric model with 9 macro variables, we figure out that growth of CPI and GDP, lending rate and risk free rate (R_f) have substantial impacts on market risk while external factors such as exchange rate and SP500 just have small effects on beta CAPM. The policy implication is that the State Bank of Vietnam, the Ministry of Finance and agencies need to increase GDP growth and lower CPI growth, combined with the control of risk free rate and lending rate to reduce market risk.

Key words: market risk management, beta CAPM, low inflation, banking industry, Vietnam, policy.

JEL classification: M21, M1, G12, G30

1. Introduction

Nowadays, under 4.0 industry and Basel impacts, Vietnam banks such as Vietcombank (VCB) and Sacombank (STB) pay attention more to risk management, esp. New perspectives in governance, management and risk models. This is the 1st reason we conduct this research paper.

Second, macro policy makers will need to look at risk management in banking industry and impacts of macro factors on market risk in order to adjust macro policies. What we need to adjust in trade balance, exchange rate, lending rate and risk free rate policies? This is the 2nd reason for us to conduct this study.

Therefore, this study will calculate and figure out not only inflation but other macro factors, both internal and external, such as GDP growth, risk free rate, lending rate, SP500, trade balance and exchange rate, etc. affecting the market risk level during the pre-low (L) inflation period (2011-2015).

The paper is organized as follows: after the introduction it is the research issues, literature review, conceptual theories and methodology. Next, section 3 will cover main research findings/results. Section 4 gives us some discussion and conclusion and policy suggestion will be in the section 5.

Research Issues

Issue 1: What are impacts of internal macro variables such as inflation, GDP growth, VNIndex, risk free rate,...on market risk of 2 big banks, VCB and STB?

Issue 2: Evaluating impacts of external macro variables such as balance of trade, exchange rate and S&P500 on market risk of VCB and STB measured by Beta CAPM

This paper also tests three (3) below hypotheses:

Hypothesis 1: the beta or risk level of listed bank (VCB and STB) will increase if inflation increase and it will decrease if GDP growth increases..

Hypothesis 2: If exchange rate decreases (VND appreciation), beta CAPM will decrease.

2. Overview of literature review

2.1. Literature review

Fama, Eugene F., and French, Kenneth R., (2004) also indicated in the three factor model that “value” and “size” are significant components which can affect stock returns. They also mentioned that a stock’s return not only depends on a market beta, but also on market capitalization beta. The market beta is used in the three factor model, developed by Fama and French, which is the successor to the CAPM model by Sharpe, Treynor and Lintner.

Dimitrov (2006) documented a significantly negative association between changes in financial

leverage and contemporaneous risk-adjusted stock returns. Umar (2011) found that firms which maintain good governance structures have leverage ratios that are higher (forty-seven percent) than those of firms with poor governance mechanisms per unit of profit. Chen et al (2013) supported regulators' suspicions that over-reliance on short-term funding and insufficient collateral compounded the effects of dangerously high leverage and resulted in undercapitalization and excessive risk exposure for Lehman Brothers. The model reinforces the importance of the relationship between capital structure and risk management. And Gunaratha (2013) revealed that in different industries in Sri Lanka, the degree of financial leverage has a significant positive correlation with financial risk.

During the financial crisis 2007-2009 in Viet Nam and global financial markets, high inflation causing high lending rates have created risks for many industries such as medicine and the whole economy. Mohamad et al (2014) showed that financial risk is vital through using both return on asset and return on equity in the performance equation. This result also implied that we cannot avoid the inverse relation of financial risk and performance. Therefore, bank system would be better to make a trade-off between risk and performance.

Wang et al (2014) presented results showing that firms with long-term institutional investors receive significantly positive abnormal returns around the offering announcement.

Then, Gunarathna (2016) revealed that whereas firm size negatively impacts on the financial risk, financial leverage and financial risk has positive relationship.

Hami (2017) showed that financial depth has been affected negatively by inflation in Iran during the observation period.

The below table will summarize previous studies relating to risk management under macro impacts topic:

Table1: Summarize previous studies

Domestic researches	Authors name	Results, contents
1.Systemic risk and the problem of determining Beta coefficient in Vietnam	Vương Đức Hoàng Quân (2012)	In the first stage, in general, the information from the Vietnam stock market is not sufficient in quantity and quality to estimate the beta coefficient according to the traditional method, which is regression analysis of stock returns volatility compared to indices. VN-Index to value the listed companies and stocks.
2.Fama-French 3-Factor Model: The empirical evidence from the Ho Chi Minh City Stock Exchange	Trương Đông Lộc and Dương Thị Hoàng Trang (2014)	The research results show that earnings of stocks are positively correlated with market risk, firm size and the book value to market value (BE / ME) ratio. In other words, the Fama - French 3-factor model is suitable in explaining the change in profits of stocks listed on HOSE.
4.The theory of average return of K.Marx and model of capital asset pricing	Nguyễn Thị Hường (2017)	The limitation of Vietnam's stock market is the lack of beta in stock analysis. However, as the market portfolio matures, beta will keep pace with the development of the market.
5. Book chapter by Dinh Tran Ngoc Huy (2021, Springer Verlag book chapter) “Impacts of Internal and External Macro Factors on Firm Stock Price in An Econometric Model – A Case In Viet Nam Real Estate Industry”	Đinh Trần Ngọc Huy (2021)	Presenting a regression model analyzing the impact of internal macro variables (inflation in Vietnam, lending rate, risk-free rate) and external (US inflation, exchange rate, S&P 500) on stock prices Vingroup is as follows: $\text{Stock price_VIC} = -245.13 * \text{Inflation_CPI} + \text{Lendingrate} - 815.06 * \text{Rf_rate} - \text{USD_VND_rate} + 0.07 * \text{SP500} - 372.08 * \text{Inflation_US}, R^2 = 0.84, SER = 19.7$
6. Systemic risks in banking business - periods of crisis	Nguyễn Thanh Bé, Bùi Quang Hưng (2019)	Presented in Vietnam, the risk management system at commercial banks has been paid attention to a certain extent in the past few years, but due to its structural and technical limitations, this system has not can meet the complex requirements of a modern commercial bank operating in the current risky environment.
7. Factors affecting the return rate of listed stocks from the Fama French 5-factor model	Trịnh Minh Quang et al (2019)	Referring to factors of market change will strongly affect the share prices of large companies
International researches		Results
1. The Impact of Macroeconomic and Financial Variables on Market Risk: Evidence from International Equity Returns	Patro et al (2002)	They found that a number of variables including imports, exports, inflation, market capitalization, dividend yield, and a book-to-book price ratio significantly influence a person's world market risk at national level.
2. Do economic factors influence stock returns? A firm and industry level analysis	Butt et al (2010)	The results revealed that market returns are primarily changes in stock returns, but macroeconomic variables and industry-related variables add explanatory power in describing volatility. stock returns.
3.Macroeconomic factors and micro-level bank risk	Claudia et al (2010)	The risk of about a third of US banks increases in response to monetary easing.
4.Impact of Macroeconomic Factors on Banking Index in Pakistan	Saeed và Akhter (2012)	In Karachi stock market, Regression results show that exchange rate and short-term interest rate have a significant impact on the Banking index. Macroeconomic variables such as money supply, exchange rate, industrial production and Short-term interest rate and exchange rate have a negative effect on banking index while oil price has a positive effect on the bank index. Banking index.
5.Impact of Macroeconomic Indicators on Stock Market Performance: The Case of The Istanbul Stock Exchange	Arnes (2014)	Their analysis has shown that for investors interested in Turkey, first of all, be careful not to assume that relationships that existed in the past will continue into the future. We also find that depending on the sector, the effects of changes in macroeconomic variables will also differ. For policymakers and lawmakers, however, our findings indicate that keeping interest rates low has been a good policy for the past 20 years.
6.Bank Leverage Ratios and Financial Stability: A Micro- and Macroprudential Perspective	Emilios (2015)	The leverage cycle can cause financial instability and the impact of limited leverage on bank governance performance.

7. Effect Of Macroeconomic Variables On Stock Market Returns For Four Emerging Economies: Brazil, Russia, India, And China	Gay (2016)	According to the hypothesis, the relationship between the exchange rate and the security's price should be in the same direction.
8. The Impact of Macroeconomic Factors on the German Stock Market: Evidence for the Crisis, Pre- and Post-Crisis Periods	Celebi and Honig (2019)	In Germany, the aggregate index (OECD), the Economic Research Institute's Export Expectations index, the climate index, exports, CPI, as well as the 3-year German government bond yield has a delayed effect on stock returns
9. Impacts of macro variables on Starbucks Corp.	Kumaresan (2019)	Indicates that compared to internal corporate factors, macroeconomic factors (exchange rate) have a greater effect on firm performance.

3. Data and Methodology

We use the data from the stock exchange market in Viet Nam (HOSE and HNX) during the pre-low (L) inflation period 2011-2015 in order to estimate systemic risk results. We perform both fundamental data analysis and financial techniques to calculate beta CAPM values.

In this study, analytical research method and specially, comparative analysis method is used, combined with quantitative data analysis. Analytical data is from the situation of listed bank (VCB and STB) in Vietnam stock exchange.

Analysis of the effects of 9 macro variables on market risk of listed commercial bank, VCB

and STB. Weekly data collected from 2011-2015 for bank stock price to measure Beta and other macro data from reliable sources such as the General Statistics Office and commercial banks. Beta CAPM is a function with 9 macro variables (x1: GDP growth rate (g), x2: Risk-free rate R_f (i), x3: Loan interest rate (r), x4: Exchange rate (ex_rate), x5: S&P 500, x6: VNIndex, x7 : trade balance, x8: industrial production index, x9: CPI). We use OLS regression.

Finally, we use the results to suggest policy for both VCB and STB, relevant organizations and government. Total 9 macro variables are described with sources in the below table:

Table 2: Variables description

Variable name	Sign	Data source	Reference source
Dependent variable			
Market risk (BetaCAPM)	BetaCAPM	HOSE and HNX	Jack Treynor (1961, 1962), William F. Sharpe (1964), John Lintner (1964) và Jan Mossin (1966)
Independent variables			
GDP growth	g	Bureau statistics	Dinh Tran Ngoc Huy (2021, Springer Verlag book chapter) "Impacts of Internal and External Macro Factors on Firm Stock Price in An Econometric Model – A Case In Viet Nam Real Estate Industry"
VNIndex	VNindex	HOSE and HNX	Dinh Tran Ngoc Huy "Econometric model for ACB bank stock price 2008-2011, Sai Gon university journal, No.22, 2015"
Risk free rate	R_f	Ministry of Finance (MOF)	Dinh Tran Ngoc Huy "Econometric model for ACB bank stock price 2008-2011, Sai Gon university journal, No.22, 2015"
Lending rate	r	Commercial bank	Dinh Tran Ngoc Huy (2021, Springer Verlag book chapter) "Impacts of Internal and External Macro Factors on Firm Stock Price in An Econometric Model – A Case In Viet Nam Real Estate Industry"
Exchange erate	Ex_rate	Commercial bank	Dinh Tran Ngoc Huy (2021, Springer Verlag book chapter) "Impacts of Internal and External Macro Factors on Firm Stock Price in An Econometric Model – A Case In Viet Nam Real Estate Industry"
S&P500	SP500	NYSE	Dinh Tran Ngoc Huy "Econometric model for ACB bank stock price 2008-2011, Sai Gon university journal, No.22, 2015"
BOT(trade balance)	BOT	Bureau statistics	Author synthesis
IM (Industrial manufacturing index)	IM	Bureau statistics	Author synthesis

In the below table (VCB), we see statistics for 9 variables. We find our standard deviation of Exchange rate and trade balance with highest

values, while std. deviation of CPI, GDP growth, Rf as lowest values.

	BETA	CPI	EX RATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
Mean	0.999219	0.068270	21864.80	0.056730	154.4800	0.132500	0.073505	1701.587	-232.2000	490.1750
Median	1.160048	0.063850	21780.00	0.056500	153.9500	0.125000	0.065275	1734.160	-162.5000	492.8800
Maximum	1.764024	0.181300	23230.00	0.066800	194.8000	0.190000	0.132000	2103.840	498.0000	593.0500
Minimum	0.077529	0.006300	20618.00	0.043800	117.4000	0.100000	0.046000	1292.280	-1162.000	351.5500
Std. Dev.	0.602330	0.059925	876.1553	0.007141	25.76659	0.031380	0.024419	327.3917	465.6620	83.37681
Skewness	-0.451862	0.921046	0.108851	-0.361761	0.145331	0.844274	1.469319	-0.061715	-0.405459	-0.196155
Kurtosis	1.792164	2.637092	1.708458	2.181881	1.849123	2.335049	4.388549	1.360020	2.975371	1.735476
Jarque-Bera	0.948161	1.468753	0.714782	0.497001	0.587084	1.372230	4.401524	1.126987	0.274248	0.730387
Probability	0.622457	0.479805	0.699499	0.779970	0.745618	0.503528	0.110719	0.569217	0.871862	0.694062
Sum	9.992190	0.682700	218648.0	0.567300	1544.800	1.325000	0.735050	17015.87	-2322.000	4901.750
Sum Sq. Dev.	3.265209	0.032319	6908834.	0.000459	5975.256	0.008862	0.005367	964668.1	1951570.	62565.23

Figure 1- Descriptive statistics for 9 macro variables – Case VCB

In case of STB, we see statistics for 9 variables. We find our standard deviation of Exchange rate and trade balance and SP500 with highest values, while std. deviation of CPI, GDP

growth, Rf as lowest values. Comparing 2 cases, we find out std. deviation of beta of STB is smaller than (<) that of VCB (0.38 < 0.6).

	BETA	CPI	EX RATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
Mean	0.447765	0.068270	21864.80	0.056730	154.4800	0.132500	0.073505	1701.587	-232.2000	490.1750
Median	0.568578	0.063850	21780.00	0.056500	153.9500	0.125000	0.065275	1734.160	-162.5000	492.8800
Maximum	0.936182	0.181300	23230.00	0.066800	194.8000	0.190000	0.132000	2103.840	498.0000	593.0500
Minimum	-0.180274	0.006300	20618.00	0.043800	117.4000	0.100000	0.046000	1292.280	-1162.000	351.5500
Std. Dev.	0.381571	0.059925	876.1553	0.007141	25.76659	0.031380	0.024419	327.3917	465.6620	83.37681
Skewness	-0.343903	0.921046	0.108851	-0.361761	0.145331	0.844274	1.469319	-0.061715	-0.405459	-0.196155
Kurtosis	1.725334	2.637092	1.708458	2.181881	1.849123	2.335049	4.388549	1.360020	2.975371	1.735476
Jarque-Bera	0.874104	1.468753	0.714782	0.497001	0.587084	1.372230	4.401524	1.126987	0.274248	0.730387
Probability	0.645938	0.479805	0.699499	0.779970	0.745618	0.503528	0.110719	0.569217	0.871862	0.694062
Sum	4.477655	0.682700	218648.0	0.567300	1544.800	1.325000	0.735050	17015.87	-2322.000	4901.750
Sum Sq. Dev.	1.310369	0.032319	6908834.	0.000459	5975.256	0.008862	0.005367	964668.1	1951570.	62565.23

Figure 2- Descriptive statistics – Case STB

4. Empirical Results and Discussion

4.1. General Data Analysis

First we look at the below figure, we find out correlation matrix of internal variables. We see

that in case of VCB, Increase in industrial manufacturing index and CPI will cause Beta CAPM decreases while decrease in SP500 will make it decreases.

Table 3: Macro external and internal variables correlation matrix – Case VCB

	Beta	CPI	Exrate	G	IM	R	Rf	SP500	Tradebalance	VNIndex
Beta	1	-0.7	0.06	-0.3	-0.2	-0.1	-0.3	0.4	0.3	0.5
CPI	-0.7	1								
Exrate	0.06	-0.3	1							
G	-0.3	0.09	0.5	1						
IM	-0.2	0.5	0.03	0.4	1					
R	-0.1	0.4	0.06	0.2	0.6	1				
Rf	-0.3	0.5	-0.7	-0.4	0.1	-0.04	1			
SP500	0.4	-0.8	0.4	0.1	-0.6	-0.6	-0.6	1		
Tradebalance	0.3	0.15	-0.4	-0.1	0.1	0.5	0.2	-0.4	1	
VNIndex	0.5	-0.8	0.2	-0.01	-0.6	-0.7	-0.4	0.9	-0.37	1

Second, in case of STB, we find out that Increase in industrial manufacturing index and lending rate will cause Beta CAPM increases while decrease in SP500 will make it decreases.

Table 4: Macro external and internal variables correlation matrix – Case STB

	Beta	CPI	Exrate	G	IM	R	Rf	SP500	Tradebalance	VNIndex
Beta	1	-0.4	-0.2	-0.05	0.1	0.05	-0.1	0.2	0.4	0.29
CPI	-0.4	1								
Exrate	-0.2	-0.3	1							
G	-0.05	0.09	0.5	1						
IM	0.1	0.5	0.03	0.4	1					
R	0.05	0.4	0.06	0.2	0.6	1				
Rf	-0.1	0.5	-0.7	-0.4	0.1	-0.04	1			
SP500	0.2	-0.8	0.4	0.1	-0.6	-0.6	-0.6	1		
Tradebalance	0.4	0.15	-0.4	-0.1	0.1	0.5	0.2	-0.4	1	
VNIndex	0.29	-0.8	0.2	-0.01	-0.6	-0.7	-0.4	0.9	-0.37	1

4.2. Empirical Research Findings and Discussion

In the below section, data used are from 2011-2015 with weekly data for stock price of VCB and STB, live data on VN stock exchange (HOSE and

HNX mainly). Different scenarios are created by comparing 2 scenarios: macro internal factors impacts and macro external variables effects.

We model our data analysis as in the below figure:

Table 5: Analyzing market risk under impacts from macro factors in 2 scenarios

Low inflation period 2011-2015	Stock price	Beta CAPM	Other statistic measures	Gap
Internal variables	Scenario	Scenario	Scenario ..	Analysis
External variables				

Using OLS regression from Eviews, we find out: industrial production and VNIndex have positive correlation with market risk of VCB

while CPI, GDP growth and risk free rate has negative correlation with Beta CAPM of CTG.

Table 6: Internal and external impacts on Beta CAPM – Case VCB

Data	Internal factors	External factors
	Coefficient	Coefficient
CPI	-3.1	
G	-46.4	
IM	0.006	
R	9.8	
Rf	-2.3	
VNIndex	0.005	
Ex rate		4.11E
Trade balance		0.0009
SP500		0.0001
R squared	0.67	0.53
SER	0.59	0.5
Akaike info criterion	1.99	1.75

Looking at the below table we see internal effects on Beta CAPM of STB: Industrial product, Risk free rate , lending rate and VNindex have

positive correlation with Beta, then CPI and GDP growth have negative correlation with Beta CAPM. If risk free rate increases, market risk will increase.

Table 7 : Internal and external impacts on Beta CAPM – Case STB

Data	Internal factors	External factors
	Coefficient	Coefficient
CPI	-3.1	
G	-13.5	
IM	0.009	
R	6.4	
Rf	4.8	
VNIndex	0.003	
Ex rate		-9.77E
Trade balance		0.0007
SP500		0.0005
R squared	0.53	0.53
SER	0.45	0.32
Akaike Info criterion	1.44	0.84

5. Concluding remarks and Policy suggestion

As shown from the above regression model and equation, Government and Ministry of Finance need to increase GDP growth and reduce CPI for lower market risk. GDP growth might increase more than trade balance increase.

This research paper provides evidence that the market risk are affected much more by CPI, GDP growth, risk free rate and lending rate. It means that the role of bank system in trying to control credit growth and rates reasonably.

Our model also shows that other macro factors such as VNIndex and exchange rate just have slight impact on Beta CAPM. And macro external factors have small effects on market risk of 2 banks. Nowadays, p-value and statistic meanings do not have big impacts as economic meanings, so our model will be based on economic meanings, using statistics as references.

Management implications: Suggestions for some risk management activities at enterprise and bank level are as follows: Make a risk recognition report; Promulgating the Code of Professional Ethics;

Regulations that employees are not allowed to disclose internal information; Strengthen legal communication to raise awareness and compliance; Issue the Internal Control Procedures - With the application of macro-variable impact analysis on Beta CAPM, businesses and banks need to develop two risk causation analyzes according to the 5M model as

follows (from which proposing solutions to minimize risks): Man-Machine-Method-Material-Money.

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