

The Meanings of Weighted Beta in Better Risk Management – Case of Listed Banks in Vietnam During Post-Low Inflation Stage 2015-2020

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Abstract: In this research we confirm again and present meanings and values of weighted beta CAPM model in banking sector which can be expended for other industries and markets. Vietcombank (VCB) and Asia Commercial Bank (ACB) are 2 big banks listed on Vietnam stock exchange and have positive effects on economic growth although they also face challenges and risks. In recent years, role of risk management in commercial bank 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 effects in the market risk of two big listed Vietnam commercial bank, VCB and ACB with semiannual data. Using analysis, synthesis statistics methods, and dialectical materialism method, combined with econometric model with 9 macro variables, we figure out that CPI and GDP growth, lending rate and risk free rate (Rf) have much more impacts on market risk while external factors such as exchange rate and SP500 just have small effect on beta CAPM. Next research finding is that we mention value of weighted beta CAPM calculated as a common risk measure of a single industry such as banking sector. The policy implication is that State Bank of Vietnam, Ministry of Finance and agencies need to implement risk analysis models under the impact of monetary and financial policies.

Keywords: Weighted Beta CAPM, Vietnam Listed Banks, Risk Management.

JEL: M10, M21, N15, N25

1. Introduction

First, until now Vietnam banks not pay attention much to detailed analysis of market risk measured by beta CAPM, and even weighted beta CAPM like we present in this research. And 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. These are among vital reasons for us to conduct this study.

Therefore, this study will calculate beta and weighted beta CAPM 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 post-L (low) inflation time in the country.

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.

2. Previous Studies

First, Mullins (1982) point out that CAPM, a theoretical representative of financial market behavior, can be used to estimate the cost of equity of a firm. Despite the limitations, the model can be a useful addition to the financial manager's analytical toolset.

Fama and French (1993) said On a CAPM basis, Fama and French (1993) added variables of firm size (measured by capitalization) and firm value (measured by the book value to market value ratio - BE / ME). Into the model to account for the change in the returns of the stocks. Called the Fama - French three-factor model (Fama - French Three Factor Model).

Specifically, this model looks like this:

$E(R_i) - R_f = \alpha + \beta_i[E(R_m) - R_f] + \beta_iSMB + \beta_iHML$ in which:

$E(R_i)$: Expected return of portfolio i .

Rf: Risk-free rate of return (interest rate).

E (Rm): The expected rate of return of the market.

SMB (small minus big): Return rate of a small portfolio minus the rate of return of a large portfolio.

HML (high minus low): The profitability rate of a portfolio with a high BE / ME ratio minus the rate of return of a portfolio with a low BE / ME ratio.

β_i , s_i , h_i are regression coefficients and are expected to be positive.

Then, Butt et al (2010) presented Results revealed market returns were mainly changes in stock returns, but macroeconomic variables and industry-related variables added more Explanatory power in describing stock returns volatility. The relationship is as follows:

$$Kit = b_0 + b_1 KSEt + b_2 CPIt + b_3 RFRt + b_4 IPT + b_5 ExRt + b_6 M2t + b_7 IIPt + eit$$

The dependent variable Kit represents the monthly stock returns of company i , in month t . The b_i measures the industry's stock sensitivity for each independent variable. There are seven independent variables that need to be tested. Six of them are Variables macroeconomic, market returns (KSE), changes in Consumer price index (CPI), risk-free rate of return (RFR), internal growth industrial production (IP), exchange rate change (ExR) and money supply growth (M2) and IIP are industry specific. The variable measures the growth in industrial production of an individual industry.

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

Next, Nguyen Thi Huong (2017) said 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.

Dinh Tran Ngoc Huy (2021) presented 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:

$$\text{Stock price_VIC} = -245.13 * \text{Inflation_CPI} + \text{Lendingrate} - 815.06 * \text{Rf_rate USD_VND_rate} + 0.07 * \text{SP500} - 372.08 * \text{Inflation_US}, R^2 = 0.84, SER = 19.7$$

Beside, Kumaresan (2019) showed the independent variable-firm ROA is affected by: (1) internal factors, (2) external macro factors, (3) both internal and external factors.

Dependent variables - internal and external factors are current ratio, fast ratio, average, collection period, debt to income, operating rate, operating profit margin, corporate governance index, gross domestic product (GDP), exchange rate, interest rate, standard deviation and inflation rate. The relationship is as follows:

$$ROA = a + a_1 CRI + a_2 QRI + a_3 ACPi + a_4 DEPTLi + a_5 ORI + a_6 OMi + a_7 INDEXi + a_8 GDPi + a_9 INFLATIONi + a_{10} ERi + a_{11} STDVi + \epsilon_{it}$$

This study focuses on the Starbucks group. The data used to do this research was collected from this company's annual report from 2014 to 2018.

The linear regression method is the important methodology used to do this work. It is much simpler and more practical to use (OLS) to predict regression compared to other approaches.

Hence, we identify research gap:

Thereby we see previous studies such as Kumaresan (2018) focusing on factors inside the company and the macro (outside the company) affecting the company's ROA. In the study, we will divide the macro factors into internal and external factors and evaluate their impact on beta coefficient to measure risk risk. This is the difference of the topic compared to the previous author.

So far, we see that until now, no author has analyzed and compared market risks through the beta CAPM for the commercial banking sector listed on the stock market in Vietnam during the period of inflation. US-China trade and trade warfare, and linked weighted beta CAPM estimation analysis for banking industry, as well as analysis assessing the impact of internal and external macroeconomic variables on risk (Beta CAPM) to propose

solutions and recommend risk reduction policies for the banking system, the government of Vietnam, the Ministry of Finance, the State Bank and relevant government agencies. This is a research gap that the topic aims to exploit.

3. Methodology

Qualitative analysis: we use analytical, synthesis, explaining methods, combined with dialectical materialism method.

Quantitative method: we use regression model to measure macro effects on beta CAPM during post-L inflation period 2015-2020.

Data: interest rates and exchange rate data from commercial banks, risk free rate (Rf), GDP growth and CPI from Bureau statistics, stock price and SP500 from stock exchange. These are reliable information sources.

Total 9 macro variables are described with sources in the below table:

Table 1. 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	Rf	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

4. Main findings

4.1. The Estimation of Weighted beta CAPM in Banking Sector and Meanings

First of all, we can calculate weighted beta CAPM through several steps as follows and presented in blow figure:

Step 1: collect weekly data stock price from stock exchange for specific industry such as bank sector

Step 2: estimate beta CAPM by using traditional formula.

Step 3: collect market value data or calculate it from stock price and number of shares outstanding.

Step 4: present above data for listed banks in bank sector or a single industry.

Step 5: estimate weighted beta CAPM as below.

	Beta (CTG)	MV (CTG)	Beta (EIB)	MV (EIB)	Beta (SHB)	MV (SHB)	Beta (NVB)	MV (NVB)	Beta (ACB)	MV (ACB)	Beta (STB)	MV (STB)	Beta (VCB)	MV (VCB)	Weighted Beta CAPM
Jun-15	0.5	49148.94	1.0	23605.11	0.9	7677.960	0.0	2053.92	0.7	18821.75	0.9	20679.46	1.6	119126.41	1.20
Dec-15	0.8	40957.45	1.3	22252.74	0.6	5783.40	0.0	1817.578	0.9	17208.46	0.8	21102.75	1.7	113263.36	1.36
Jun-16	0.4	42446.81	1.1	20531.53	0.8	5783.40	1.1	1666.95	0.4	17208.46	0.8	20381.28	0.8	124722.95	0.78
Dec-16	0.5	33510.64	0.5	18502.97	1.1	5148.29	-	1420.36	0.4	15774.42	0.5	17044.52	2.1	126641.45	1.45
Jun-17	2.5	53989.37	2.5	24896.02	-	8391.46	3.5	2589.73	3.3	25732.02	2.6	25611.88	0.7	138514.09	1.65
Dec-17	1.2	59946.81	2.0	29752.28	0.6	10408.49	0.6	2143.560	0.7	36379.76	1.1	23176.95	1.1	195358.83	1.16
Jun-18	0.4	53989.37	1.5	29813.75	1.0	9865.58	0.6	2264.80	1.0	38607.91	1.1	20832.20	1.3	208670.58	1.17
Dec-18	0.3	52313.83	1.5	23728.06	1.0	8662.46	0.8	2831.00	1.0	36916.09	1.4	21553.66	1.0	192469.92	1.02
Jun-19	-	70000.01	1.6	23973.94	0.6	8181.22	0.4	2384.00	0.8	36043.07	1.0	20471.47	0.5	261475.86	0.55
Dec-19	0.6	62925.54	1.3	25387.79	0.9	7699.97	0.6	3825.80	0.6	37602.90	0.8	18307.08	1.3	335653.41	1.20
Jun-20	0.1	66090.43	0.3	54104883.24	0.1	24574.72	-	3500.20	0.5	39240.60	0.8	20381.28	0.6	308949.49	0.39
Dec-20	0.3	71117.0	1.4	42661.32	0.8	30542.8	0.2	3744.40	1.0	60415.5	1.2	30571.4	1.0	361986.4	0.99

Figure 1. Estimation of Weighted beta CAPM for bank sector in post-L inflation time (source: authors calculation and stock exchange)

Then we can compare weighted beta CAPM in various economic stages and make further analysis and policy suggestions, as well as compare weighted beta CAPM in different industries and make analysis.

4.2. The Impacts of Macro Factors on Beta CAPM and Meanings

In the below section, data used are from 2015-2020 with weekly data for stock price of Vietnam listed banks, 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 2. Analyzing market risk under impacts from macro factors in 2 scenarios

Post - L inflation period 2015-2020	Stock price	Beta CAPM	Other statistic measures	Gap
Internal variables	Scenario	Scenario	Scenario ..	Analysis
External variables				

We run regression OLS for some listed Vietnam banks, accordingly:

Using OLS regression from Eviews, we find out: industrial production and VNIndex have positive correlation with market risk of VCB while CPI, lending and risk free rate has negative correlation with Beta CAPM of VCB.

Table 3. Internal and external impacts on Beta CAPM – Case VCB

Data	Internal factors Coefficient	External factors Coefficient
CPI	-9.9	
G	47.2	
IM	0.004	
R	-1.1	
Rf	-36.9	
VNIndex	0.005	
Ex rate		-0.0001
Trade balance		0.003
SP500		-0.002
R squared	0.67	0.53

(source: authors calculation and stock exchange)

Looking at the below table we see internal effects on Beta CAPM of ACB: Industrial product, Risk free 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 4. Internal and external impacts on Beta CAPM – Case ACB

Data	Internal factors Coefficient	External factors Coefficient
CPI	-5.2	
G	-45.01	
IM	0.004	
R	-33.5	
Rf	43.2	
VNIndex	0.005	
Ex rate		0.0001
Trade balance		-0.0004
SP500		-0.001
R squared	0.53	0.53

(source: authors calculation and stock exchange)

5. Concluding Remarks and Policy Suggestion

Calculation of weighted beta CAPM will have meanings in finding a common risk measure for a single industry such as our chosen banking sector in this study, from that we can analyze its fluctuation over years s market risk measure, s well as estimate effects of internal and external macro or micro indicators on this common risk measure.

Nguyen Thanh Be, Bui Quang Hung (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.

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.

From the above regression model and equation, Government and Ministry of Finance need to perform:

- Policy of reasonable inflation control, exchange rate stabilization, no currency manipulation.
- Completed implementation of risk analysis models under the impact of monetary and financial policies.

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