Evaluating and Comparing Beta CAPM in 2 Listed Vietnam Banks for Banking Sustainable Development During Period 2011-2020

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Abstract
Authors selected 2 big listed banks Vietcombank and Sacombank in order to calculate market risk and make comparison, in Vietnam financial market. There are both strengths and weaknesses in risk management processes in commercial banks in emerging markets such as Vietnam. Huy, D.T.N (2015) has done a research to state that risk management and corporate governance standards need to enhance in corporations. Study results tell us that CPI has negative effect and higher impact on beta of both banks (table 3), while \(R_f\) has high impact and positive effect on beta of the banks, we suggest relevant governmental agencies need to control CPI (not decrease much) and rates of T-bill (not increase much) in order to reduce market risk. Finally, we make recommendations on risk management.

Key-words: Risk Management Policies, Sustainability, Vietnam Banks, Beta CAPM.
JEL: M21, G30, G32, G38.

1. Introduction

First, we recognize the relation between risk management and banking sustainability has been rising in recent years.

Until now, There are various approaches in sustainability.
As Uddin and Ahmmed (2018) specified that in case of Islamic banks, green banking will contribute to sustainability through activities of cost and energy savings, as well as preservation of natural resources.

Ziolo et al (2021) stated that the link between sustainable finance and SDGs which means Sustainable development goals- and authors make sure that social and environmental sustainability are reflected.

Under quantitative and econometric model, beta CAPM of the 2 selected banks VCB and STB calculated and compared under macro effects, both internal and external.

2. Literature Review

First, Arasu et al (2014) found the rules of internet in banking, change of service and their linkage and stated the revolutionized role of internet.

Moreover, Gupta (2019) specified that with support of IS or information system organized, we can help better process of cash management and risk management in many bank functions (HR and finance as well).

And last but not least, Aracil et al (2021) found out there are certain perspectives stating that banks have vital roles and can engage in strategies of sustainability.

Then, We summarize previous studies as follows:

| Authors          | Year | Contents, results                                                                                                                                 |
|------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Karim            | 2011 | Stated that in order to achieve decision making, in our firms we need Management Information Systems (MIS) to facilitate it.                        |
| Giebe et al      | 2019 | There is a good tool considered as Big data and analytics which can help banks in offering products/services                                     |
| Feitosa et al    | 2019 | We can change in client relation and employee skills, as well as structure of organization though Disruptive technologies.                        |
| Huy, D.T.N       | 2015 | Stated that we can apply risk management standards parallel with other corporate governance standards in companies                              |
| Gonzalez et al   | 2018 | mentioned in a MIDAS frame which show that mixed and conditional beta, from that we can calculate beta determinants from macro context..          |
3. Methodology

Method and Data

This study explores 2 real case studies in banking industry in Vietnam: Vietcombank and Sacombank, from a risk management approach.

OLS regression still has advantage in quantitative so we use it to run for data from reliable sources such as bank system and statistics Bureau.

We Recognize From Below Figures that:

- We experience standard deviation get highest values in case of exchange rate and SP500 (figure 1).
- We experience correlation between SP500 and beta higher than that between beta and exchange rate (figure 2).
- Highest values of standard deviation belong to VNIndex (figure 3).
- Correlation between IM and beta higher than that between beta and GDP growth (figure 4).

![Figure 1 - STB and External Descriptive](source: authors calculation and stock exchange)

![Figure 2 - STB and External Correlation](source: authors calculation and stock exchange)
Figure 3 – STB and Internal Descriptive

|                      | BETA_STB | CPI       | G        | IM       | R         | RF       | VNINDEX   |
|----------------------|----------|-----------|----------|----------|-----------|----------|-----------|
| Mean                 | 0.011000 | 0.049970  | 0.057150 | 0.162050 | 0.112630  | 0.05213  | 0.062135  |
| Median               | 0.045000 | 0.035350  | 0.059200 | 0.150400 | 0.102500  | 0.059850 | 0.606300  |
| Maximum              | 2.680000 | 0.161000  | 0.070200 | 0.267200 | 0.199000  | 0.132000 | 1.067600  |
| Minimum              | -0.38000 | 0.006600  | 0.018100 | 0.117400 | 0.098000  | 0.011200 | 0.361600  |
| Std. Dev.            | 0.560736 | 0.447665  | 0.039317 | 3.869882 | 0.036432  | 0.025759 | 2.267034  |
| Skewness             | 1.124974 | 1.298664  | -1.442505| 1.394274 | 1.039477  | 0.911109 | 0.267939  |
| Kurtosis             | 5.686445 | 5.913603  | 4.632989 | 4.628737 | 4.016385  | 4.234518 | 1.664441  |

(source: authors calculation and stock exchange)

Figure 4 - STB and Internal Correlation

|                      | BETA_STB | CPI       | G        | IM       | R         | RF       | VNINDEX   |
|----------------------|----------|-----------|----------|----------|-----------|----------|-----------|
| BETA_STB             | 1.000000 | -0.422385 | 0.931454 | 0.370030 | -0.390622 | -0.484372 | 0.581177  |
| CPI                  | -0.422385| 1.000000  | 0.330867 | 0.164050 | 0.547153  | 0.652133  | -0.554245 |
| G                    | 0.330867 | 0.330867  | 1.000000 | 0.244021 | -0.042164 | 0.066576  | 0.12195   |
| IM                   | 0.370030 | 0.154056  | 0.244021 | 1.000000 | 0.128743  | -0.013849 | 0.052852  |
| R                    | -0.390622| 0.547153  | 0.042164 | 0.128743 | 1.000000  | 0.484905  | -0.790569 |
| RF                   | -0.484372| 0.603133  | 0.068576 | -0.013949| 0.484905  | 1.000000  | -0.004579 |
| VNINDEX              | 0.581177 | 0.581177  | 0.352852 | 0.12195  | 0.052852  | 1.000000  | 0.000000  |

(source: authors calculation and stock exchange)

Figure 5 - VCB and External Descriptive

|                      | BETA_VCB | EX_RATE  | SP500    | TRADEBA...|
|----------------------|----------|----------|----------|-----------|
| Mean                 | 1.044750 | 223.9420 | 224.4543 | -75.16000 |
| Median               | 1.076500 | 227.0000 | 213.7200 | -125.0000 |
| Maximum              | 2.099000 | 233.0000 | 370.0600 | -498.0000 |
| Minimum              | 0.078000 | 206.1800 | 129.2200 | -116.0000 |
| Std. Dev.            | 0.518725 | 83.7304  | 685.2655 | 402.1638  |
| Skewness             | -0.097955| 0.853154 | 0.363508 | -0.567135 |
| Kurtosis             | 2.638444 | 2.379814 | 2.307065 | 3.840862  |
| Jarque-Bera          | 0.140750 | 2.746765 | 0.840594 | 2.084063  |
| Probability          | 0.932044 | 0.253249 | 0.656852 | 0.352737  |
| Sum                  | 28.95000 | 447.8400 | 449.0996 | -150.2000 |
| Sum Sq. Dev.         | 5.12432 | 1332.3677| 892.2186 | 3072.975  |

(source: authors calculation and stock exchange)

Figure 6 - VCB and External Correlation

|                      | BETA_VCB | EX_RATE  | SP500    | TRADEBA...|
|----------------------|----------|----------|----------|-----------|
| BETA_VCB             | 1.000000 | 0.069274 | 0.113225 | 0.117981  |
| EX_RATE              | 0.069274 | 1.000000 | 0.720764 | 0.048661  |
| SP500                | 0.113225 | 0.720764 | 1.000000 | 0.375157  |
| TRADEBA...           | 0.117981 | 0.048661 | 0.375157 | 1.000000  |

(source: authors calculation and stock exchange)
4. Main Results
4.1 Overall Results

As seeing in below charts, we find that:

- Between CPI and beta: there is negative relation (chart 1).
- Between exchange rate, G and beta: there are positive relation (chart 2 and 3).
- Between VNIndex and beta: there is also positive relation (chart 6).
Chart 2 - Exchange Rate and Beta of 2 Banks

(source: authors calculation and stock exchange)

Chart 3 - G and Beta of 2 Banks

(source: authors calculation and stock exchange)

Chart 4 - IM and Beta of 2 Banks

(source: authors calculation and stock exchange)
4.2 OLS Regression Results

In below section, we have result of OLS for 1 factor and see that:

- Because coefficient calculated of -7.7, R and beta STB has negative correlation (see figure 9).
- Because coefficient calculated of 0.006, IM and beta STB has positive correlation (see figure 10).
- Because coefficient calculated of 0.001, VNIndex and beta STB has positive correlation (see figure 11).
• Because coefficient calculated of -2.9, and -7.2, CPI, Rf and beta STB has negative correlation (see figure 12).

Figure 9 - STB – 1 Factor OLS - R

(source: authors calculation and stock exchange)

Figure 10 - STB – 1 Factor OLS - IM

(source: authors calculation and stock exchange)
Next We Run OLS and Got Results in 2 below Tables

Table 2 - OLS for External Factors

| Variable       | Beta STB | Beta VCB |
|----------------|----------|----------|
| Exchange rate  | -3.03E   | 1.05E    |
| SP500          | 0.0004   | 5.03E    |
| Trade balance  | 0.0002   | 0.0001   |
| C              | 0.56     | 0.7      |
| SER            | 0.55     | 0.55     |
| Akaike info criteria | 1.84 | 1.85 |

(source: authors calculation and stock exchange)
Table 3 - OLS for Internal Factors

| Coefficient | Beta STB | Beta VCB |
|-------------|---------|---------|
| CPI         | -4.5    | -7.8    |
| G           | -2.9    | 6.5     |
| IM          | 0.006   | 0.002   |
| R           | 3.8     | 2.5     |
| Rf          | 5.1     | 3.3     |
| VNIndex     | 0.001   | 1.21E   |
| C           | -1.8    | 0.5     |
| R-squared   | 0.51    | 0.32    |
| SER         | 0.5     | 0.51    |

(source: authors calculation and stock exchange)

5. Discussion

During Period 2011-2020

From internal element approach for STB and VCB we see R and RF have positive correlation with beta for both banks, and from external element approach study shows, SP500 and trade balance have positive correlation with beta of 2 banks.

Next, we see that CPI has negative effect and higher impact on beta of both banks (table 3), while Rf has high impact and positive effect on beta of the banks.

6. Conclusion

Therefore we can have implications for policies as below:

As CPI has negative effect and higher impact on beta of both banks (table 3), while Rf has high impact and positive effect on beta of the banks, we suggest relevant agencies need to control CPI (not decrease much) and rates of T-bill (not increase much) in order to reduce market risk.

Build Better Risk Management Information System (RMIS) Implications

Macro risk is a type of political risk that affects all businesses operating in the same country, whether they are domestic or foreign. In this paper, we emphasizes on analysis of macro effects on beta - market risk of banks.
So banks need to evaluate proper scenarios of macro situation on market risk.

**Limitation of Research**

We can expand our research model for other industries and other markets.

**References**

Cheng, L.Y., Wang, M.C., and Chen, K.C. (2014). Institutional Investment Horizons and the Stock Performance of Private Equity Placements: Evidence from the Taiwanese Listed Firms, *Review of Pacific Basin Financial Markets and Policies*, 17(2).

Aracil, E., Sanchez, J.J.N., & Forcadel, F.J. (2021). Sustainable banking: A literature review and integrative framework, *Finance Research Letters*, 1. DOI:10.1016/j.frl.2021.101932

Duong Thi Tinh, Nguyen Thu Thuy, Dinh Tran Ngoc Huy. (2021). Doing Business Research and Teaching Methodology for Undergraduate, Postgraduate and Doctoral Students-Case in Various Markets Including Vietnam, *Elementary education online*, 20(1).

Dinh Tran Ngoc Huy, Nguyen Thi Hang. (2021). Factors that affect stock price and Beta CAPM of Vietnam Banks and Enhancing Management information system - Case of Asia Commercial Bank, *Revista geintec Inovacao E Tecnologias*, 11(2).

Dinh Tran Ngoc Huy, Pham Ngoc Van, Nguyen Thi Thu Ha. (2021). Education and computer skill enhancing for Vietnam laborers under industry 4.0 and evfta agreement, *Elementary education online*, 20(4).

Dinh Thi Hien, Dinh Tran Ngoc Huy, Nguyen Thi Hoa. (2021). Ho Chi Minh Viewpoints about Marxism Moral Human Resource for State Management Level in Vietnam, *Psychology and education*, 58(5).

Dinh Tran Ngoc Huy. (2021). Banking sustainability for economic growth and socio-economic development–case in Vietnam, *Turkish Journal of computer and mathematics education*, 12(2).

Dimitrov V, Jain PC. (2006). *The Value Relevance of Changes in Financial Leverage*, SSRN Working Paper.

Emilios, A. 2015, *Bank Leverage Ratios and Financial Stability: A Micro-and Macroprudential Perspective* &SSRN Working Paper No.849, Levy Economics Institute.

Eugene FF, French KR. (2004). The Capital Asset Pricing Model: Theory and Evidence, *Journal of Economic Perspectives*.

González, Mariano &; Nave, Juan &; Rubio, Gonzalo, 2018. Macroeconomic determinants of stock market betas, *Journal of Empirical Finance, Elsevier*, vol. 45(C), pages 26-44.

Gunaratha V. (2013). The Degree of Financial Leverage as a Determinant of Financial Risk: An Empirical Study of Colombo Stock Exchange in Sri Lanka, *2nd International Conference on Management and Economics Paper*. 
Hac, L.D., Huy, D.T.N., Thach, N.N., Chuyen, B.M., Nhung, P.T.H., Thang, T.D., Anh, T.T. (2021). Enhancing risk management culture for sustainable growth of Asia commercial bank - ACB in Vietnam under mixed effects of macro factors, *Entrepreneurship and Sustainability Issues*, 8(3).

Hang, T.T.B., Nhung, D.T.H., Hung, N.M., Huy, D.T.N., Dat, P.M. (2020). Where Beta is going—case of Viet Nam hotel, airlines and tourism company groups after the low inflation period, *Entrepreneurship and Sustainability Issues*, 7(3).

Huy, D.T.N. (2015). The Critical Analysis of Limited South Asian Corporate Governance Standards After Financial Crisis, *International Journal for Quality Research*, 9(4): 741-764.

Huy, D.T.N. (2012). Estimating Beta of Viet Nam listed construction companies groups during the crisis, *Journal of Integration and Development*, 15(1), 57-71.

Huy, D. T.N., Loan, B. T., and Anh, P. T. (2020). Impact of selected factors on stock price: a case study of Vietcombank in Vietnam, *Entrepreneurship and Sustainability Issues*, vol.7, no.4, pp. 2715-2730. https://doi.org/10.9770/jesi.2020.7.4(10)

Huy, D. T.N., Dat, P. M., và Anh, P. T. (2020). Building and econometric model of selected factors’ impact on stock price: a case study, *Journal of Security and Sustainability Issues*, vol.9(M), pp. 77-93. https://doi.org/10.9770/jssi.2020.9.M(7).

Huy D.T.N., Nhan V.K., Bich N.T.N., Hong N.T.P., Chung N.T., Huy P.Q. (2021). Impacts of Internal and External Macroeconomic Factors on Firm Stock Price in an Expansion Econometric model—A Case in Vietnam Real Estate Industry, *Data Science for Financial Econometrics-Studies in Computational Intelligence*, vol.898, Springer. http://doi-org-443.webvpn.fjmu.edu.cn/10.1007/978-3-030-48853-6_14

Huy, D.T.N., An, T.T.B., Anh, T.T.K., Nhung, P.T.H. (2021). Banking sustainability for economic growth and socio-economic development – case in Vietnam, *Turkish Journal of Computer and Mathematics Education*, 12(2), pp.2544–2553.

Huy, D.T.N., An, T.T.B., Anh, T.T.K., Nhung, P.T.H. (2021). Banking sustainability for economic growth and socio-economic development –case in Vietnam, *Turkish Journal of Computer and Mathematics Education*, 12(2), pp. 2544–2553.

Khwaja, Asim Ijaz., and Mian, Atif. (2005). Unchecked intermediaries:Price manipulation in an emerging stock market, *Journal of Financial Economics* 78, 243 – 241.

Nguyen Thi Hang, Dinh Tran Ngoc Huy. (2021). Better Risk Management of Banks and Sustainability-A Case Study in Vietnam, *Revista geinotec Inovacao E Tecnologias*, 11(2).

Nguyen, T. P. L., Tran, N. M., Doan, X. H., & Nguyen, V. H. (2019). The impact of knowledge sharing on innovative work behavior of Vietnam telecommunications enterprises employees. *Management Science Letters*, 10(2020), 53-62.

Nguyen Thi Hoa, Nguyen Thi Hang, Nguyen Thanh Giang, Dinh Tran Ngoc Huy. (2021). Human resource for schools of politics and for international relation during globalization and EVFTA, *Elementary education online*, 20(4).

Pham Minh Dat, Nguyen Duy Mau, Bui Thi Thu Loan, Dinh Tran Ngoc Huy. (2020). Comparative China corporate governance standards after financial crisis, corporate scandals and manipulation, *Journal of security & sustainability issues*, 9(3).

Pham Van Hong, Huynh Xuan Nguyen, Dinh Tran Ngoc Huy, Le Thi Viet Nga, Nguyen Thi Ngoc Lan, Nguyen Ngoc Thach, Hoang Thanh Hanh.(2021). Sustainable bank management via evaluating...
impacts of internal and external macro factors on lending interest rates in Vietnam, *Linguistica Antverpiensia*, Issue 1, pp.76-87.

Perkovic, A. (2011). Research of Beta As Adequate Risk Measure - Is Beta Still Alive?, *Croatian Operational Research Review (CRORR)*, vol. 2, pp.102-111.

Puspitaningtyas, Z. (2017). Estimating systematic risk for the best investment decisions on manufacturing company in Indonesia, *Investment Management and Financial Innovations*, vol.14, no.1, pp. 46-54. doi:10.21511/imfi.14(1).2017.05

Park, J.C, Ali, F.D., & Mbanga, C. (2019). Investor sentiment and aggregate stock returns: the role of investor attention, *Review of Quantitative Finance and Accounting*, 53(2), 397 - 428.

Phung Tran My Hanh, Nguyen Thi Hang, Dinh Tran Ngoc Huy, Le Ngoc Nuong. (2021). Enhancing Roles of Banks and the Comparison of Market Risk and Risk Policy Implications in Group of Listed Vietnam Banks During 2 Stages: Pre and Post-Low Inflation Period, *Revista geintec-gestao Inovacao e Tecnologias*, Vol.11(2).

Uddin, M.N., & Ahmmed, M. (2018). Islamic Banking and Green Banking for Sustainable Development: Evidence from Bangladesh, *Jurnal Ilmu Ekonomi Syariah (Journal of Islamic Economics)* Volume 10 (1).

Ziolo, M., Bak, I., & Cheba, K.. (2021). The role of sustainable finance in achieving Sustainable Development Goals: does it work?. *Technological and Economic Development of Economy*, 27(1), 45-70. https://doi.org/10.3846/tede.2020.13863.