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Solutions for Enhancing Risk Management Mechanism of Vietnam Bank System - Case of Listed Banks

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Abstract
This study uses weekly data from listed banks system on Vietnam stock exchange into 2 groups: group 1: previous Private banks (including Saigon Hanoi Bank-SHB, Eximbank-EIB, Navibank-NVB, Sacombank-STB and Asia Commercial Bank-ACB), and group 2: Previous SOEs banks (including Vietcombank-VCB and Vietinbank-CTG).
We called the period 2011-2015 as pre- low (L) inflation period. After global crisis 2008-2009, Banks in Vietnam both enhance risk management mechanisms and contribute to community activities over years.
This study mainly use combination of quantitative methods (statistics, calculation formulas) and qualitative methods including synthesis, inductive and explanatory methods.
The research findings tell us that mean of beta CAPM values in group 2 is (<) lower than 1. While that of beta in group 1 is higher than 1 (in case of EIB, NVB and SHB).
Besides, this study also give out recommendations for enhancing risk management system of Vietnam banks in future and give out directions or implications for banking policies.

Key-words: Risk Management Solutions, Vietnam Banks, Beta CAPM, Low Inflation, Economic Development, Vietnam.
JEL: M21, G30, G32, G38.

1. Introduction

First, we recognize the importance of banking in contributing for socio-economy in Vietnam over years.

Next, We emphasize that the role of reliable internet data increasing in recent years. There is evidence in banking sector showing that internet data serving better for building information system for better bank management. Balasubramanian et al (2014) specified that the banking sector has always been in the vanguard of technology in order to add value to its products, services and efficiency. The Internet has galvanized business by increasing customer base, reducing transaction costs, and enabling sale of products globally. Khrais (2019) mentioned Business information systems are interconnected structures or procedures within a business entity that uses information and communication technology (ICT) to support decision making by generating, processing and providing useful information for the entity. Business information systems have five key components. These are the people using the system, the hardware, software, database and network. Good business information systems are flexible such that they can be able to anticipate and adapt to changes in the information needs of the business. They are also must efficient, meet the demands of the business, and are designed according to the financial and human resource capacity of the business entity. Furthermore, good businesses are cost effective.

In this paper we mainly focus on using reliable internet data in comparing and evaluating 2 key factors: stock price and beta CAPM under macro factors effects, for 2 groups of big banks in Vietnam: group 1: Saigon Hanoi Bank-SHB, Eximbank-EIB, Navibank-NVB which later became NCB, Sacombank-STB and Asia Commercial Bank-ACB (previously, private banks) and group 2: Vietcombank - VCB and Vietinbank-CTG (previously, SOE banks).

2. 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.

Reinhart and Rogoff (2009) pointed the history of finance is full of boom-and-bust cycles, bank failures, and systemic bank and currency crises. As Luis E. Peirero (2010) pointed, the task of estimating cost of equity in emerging markets is more difficult because of problems such as collecting data in short periods. Then, Velez-Pareja (2011) referred to the lack of inadequate information on the stock market in emerging countries may undermine beta and relevant formulas. Marcin, Mariusz,

Marek, and Karol (2012) mentioned that the reliability and fitness of calculated betas are relevant to the valuation and investment of investors in merging markets.

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 all (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. Then, Al cock et all (2013) found evidence that leverage cannot be viewed as a long-term strategy to enhance performance, but in the short term, managers do seem to add significantly to fund excess returns by effectively timing leverage choices to the expected future market environment.

And Gunaratha (2013) revealed that in different industries in Sri Lanka, the degree of financial leverage has a significant positive correlation with financial risk.

Trivelas and Satouridis (2013) stated that in Greece a) the externally focused Management Information System (MIS) effectiveness archetypes (OS, RM) reflecting innovation, creativity, goal setting and planning enhance task productivity b) the Internal process (IP) model of MIS effectiveness influences negatively task productivity.

Arasu et al (2014) found the Internet has revolutionized services across institutions. The Banking sector has registered significant change in the quality of service owing to the bandwidth of information flow ensuring greater customer-satisfaction. This has also brought into perspective the security environment within which information flow takes place.

Moreover, Gupta (2019) specified that Information system (IS) is important in almost all the functional areas of any bank i.e. HR, Marketing, Finance, etc. It also helps in risk management and cash management along with maintaining long run customer relationship.

Then, We summarize previous studies as follows:

Table 1 – Summary of Previous Studies

Authors	Year	Contents, results
Fama, Eugene F. and French, Kenneth R.	2004	"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.
Karim, A. J	2011	Management Information Systems (MIS) is the key factor to facilitate and attain efficient decision making in an organization.
Avegrou, C.	2008	Information system (IS) in emerging markets research has expanded the IS research agenda and developed new understanding of IS innovation phenomena, mainly through its attention to social context and strategic concerns associated with socio-economic development.
Peirero	2010	The task of estimating cost of equity in emerging markets is more difficult because of problems such as collecting data in short periods.
Gunaratha	2013	In different industries in Sri Lanka, the degree of financial leverage has a significant positive correlation with financial risk.
Giebe et al	2019	A progressive tool for providing customer-oriented services and products, in the banking sector, is currently defined as "Big Data & Analytics".

3. Methodology

Method and Data

This study mainly use combination of quantitative methods and qualitative methods including synthesis, inductive and explanatory methods. And it emphasizes again important roles of internet data in sustainable modern bank management.

For quantitative analysis, the study is supported with statistics, mathematics.

All internet data such as stock price-weekly data, inflation, risk free rate, lending rate we take from reliable internet data sources, esp. from stock exchanges, Bureau of statistics, Ministry of Finance, banks, etc.

Figure 1 – EIB Beta and other Factors Correlation Matrix

Correlation Matrix										
	BETAEIB	CPI	EX_RATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
BETAEIB	1.000000	0.406334	-0.589294	-0.080846	0.264906	-0.223848	0.788821	-0.415616	0.227360	-0.200664
CPI	0.406334	1.000000	-0.382440	0.090566	0.500206	0.428665	0.580486	-0.844053	0.156409	-0.861426
EX_RATE	-0.589294	-0.382440	1.000000	0.519076	0.038528	0.006143	-0.772931	0.476195	-0.491811	0.295409
G	-0.080846	0.090566	0.519076	1.000000	0.440105	0.223263	-0.421402	0.136776	-0.107369	-0.016434
IM	0.264906	0.500206	0.038528	0.440105	1.000000	0.663798	0.117679	-0.613771	0.161388	-0.664368
R	-0.223848	0.428665	0.006143	0.223263	0.663798	1.000000	-0.045403	-0.664122	0.553061	-0.746263
RF	0.788821	0.580486	-0.772931	-0.421402	0.117679	-0.045403	1.000000	-0.652624	0.264192	-0.444136
SP500	-0.415616	-0.844053	0.476195	0.136776	-0.613771	-0.664122	-0.652624	1.000000	-0.485719	0.950618
TRADEBA...	0.227360	0.156409	-0.491811	-0.107369	0.161388	0.553061	0.264192	-0.485719	1.000000	-0.375438
VNINDEX	-0.200664	-0.861426	0.295409	-0.016434	-0.664368	-0.746263	-0.444136	0.950618	-0.375438	1.000000

Figure 2 – SHB Beta and other Factors Correlation Matrix

Correlation Matrix										
	BETASHB	CPI	EX_RATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
BETASHB	1.000000	0.281708	-0.463483	-0.038732	0.595530	0.745907	0.245152	-0.631007	0.805984	-0.555125
CPI	0.281708	1.000000	-0.382440	0.090566	0.500206	0.428665	0.580486	-0.844053	0.156409	-0.861426
EX_RATE	-0.463483	-0.382440	1.000000	0.519076	0.038528	0.006143	-0.772931	0.476195	-0.491811	0.295409
G	-0.038732	0.090566	0.519076	1.000000	0.440105	0.223263	-0.421402	0.136776	-0.107369	-0.016434
IM	0.595530	0.500206	0.038528	0.440105	1.000000	0.663798	0.117679	-0.613771	0.161388	-0.664368
R	0.745907	0.428665	0.006143	0.223263	0.663798	1.000000	-0.045403	-0.664122	0.553061	-0.746263
RF	0.245152	0.580486	-0.772931	-0.421402	0.117679	-0.045403	1.000000	-0.652624	0.264192	-0.444136
SP500	-0.631007	-0.844053	0.476195	0.136776	-0.613771	-0.664122	-0.652624	1.000000	-0.485719	0.950618
TRADEBA...	0.805984	0.156409	-0.491811	-0.107369	0.161388	0.553061	0.264192	-0.485719	1.000000	-0.375438
VNINDEX	-0.555125	-0.861426	0.295409	-0.016434	-0.664368	-0.746263	-0.444136	0.950618	-0.375438	1.000000

Figure 3 – NVB Beta and other Factors Correlation Matrix

Correlation Matrix										
	BETANVB	CPI	EX_RATE	G	IM	R	SP500	RF	TRADEBA...	VNINDEX
BETANVB	1.000000	0.198754	-0.495650	0.095546	0.356647	0.058524	-0.168160	0.226459	0.044034	-0.191149
CPI	0.198754	1.000000	-0.382440	0.090566	0.500206	0.428665	-0.844053	0.580486	0.156409	-0.861426
EX_RATE	-0.495650	-0.382440	1.000000	0.519076	0.038528	0.006143	0.476195	-0.772931	-0.491811	0.295409
G	0.095546	0.090566	0.519076	1.000000	0.440105	0.223263	0.136776	-0.421402	-0.107369	-0.016434
IM	0.356647	0.500206	0.038528	0.440105	1.000000	0.663798	-0.613771	0.117679	0.161388	-0.664368
R	0.058524	0.428665	0.006143	0.223263	0.663798	1.000000	-0.664122	-0.045403	0.553061	-0.746263
SP500	-0.168160	-0.844053	0.476195	0.136776	-0.613771	-0.664122	1.000000	-0.652624	-0.485719	0.950618
RF	0.226459	0.580486	-0.772931	-0.421402	0.117679	-0.045403	-0.652624	1.000000	0.264192	-0.444136
TRADEBA...	0.044034	0.156409	-0.491811	-0.107369	0.161388	0.553061	-0.485719	0.264192	1.000000	-0.375438
VNINDEX	-0.191149	-0.861426	0.295409	-0.016434	-0.664368	-0.746263	0.950618	-0.444136	-0.375438	1.000000

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Figure 4 – ACB Beta and other Factors Correlation Matrix

Correlation Matrix										
	STOCKPRI...	CPI	G	IM	R	RF	VNINDEX	EX_RATE	SP500	TRADEBA...
STOCKPRI...	1.000000	-0.336842	-0.269912	-0.119953	0.380217	-0.085374	-0.015662	-0.101928	-0.006414	0.327307
CPI	-0.336842	1.000000	0.090566	0.500206	0.428665	0.580486	-0.861426	-0.382440	-0.844053	0.156409
G	-0.269912	0.090566	1.000000	0.440105	0.223263	-0.421402	-0.016434	0.519076	0.136776	-0.107369
IM	-0.119953	0.500206	0.440105	1.000000	0.663798	0.117679	-0.664368	0.038528	-0.613771	0.161388
R	0.380217	0.428665	0.223263	0.663798	1.000000	-0.045403	-0.746263	0.006143	-0.664122	0.553061
RF	-0.085374	0.580486	-0.421402	0.117679	-0.045403	1.000000	-0.444136	-0.772931	-0.652624	0.264192
VNINDEX	-0.015662	-0.861426	-0.016434	-0.664368	-0.746263	-0.444136	1.000000	0.295409	0.950618	-0.375438
EX_RATE	-0.101928	-0.382440	0.519076	0.038528	0.006143	-0.772931	0.295409	1.000000	0.476195	-0.491811
SP500	-0.006414	-0.844053	0.136776	-0.613771	-0.664122	-0.652624	0.950618	0.476195	1.000000	-0.485719
TRADEBA...	0.327307	0.156409	-0.107369	0.161388	0.553061	0.264192	-0.375438	-0.491811	-0.485719	1.000000

Figure 5 – STB Beta and other Factors Correlation Matrix

Correlation Matrix										
	BETASTB	CPI	EX_RATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
BETASTB	1.000000	-0.521372	0.195472	0.244043	-0.054093	-0.403233	-0.442207	0.593128	-0.132213	0.603455
CPI	-0.521372	1.000000	-0.382440	0.090566	0.500206	0.428665	0.580486	-0.844053	0.156409	-0.861426
EX_RATE	0.195472	-0.382440	1.000000	0.519076	0.038528	0.006143	-0.772931	0.476195	-0.491811	0.295409
G	0.244043	0.090566	0.519076	1.000000	0.440105	0.223263	-0.421402	0.136776	-0.107369	-0.016434
IM	-0.054093	0.500206	0.038528	0.440105	1.000000	0.663798	0.117679	-0.613771	0.161388	-0.664368
R	-0.403233	0.428665	0.006143	0.223263	0.663798	1.000000	-0.045403	-0.664122	0.553061	-0.746263
RF	-0.442207	0.580486	-0.772931	-0.421402	0.117679	-0.045403	1.000000	-0.652624	0.264192	-0.444136
SP500	0.593128	-0.844053	0.476195	0.136776	-0.613771	-0.664122	-0.652624	1.000000	-0.485719	0.950618
TRADEBA...	-0.132213	0.156409	-0.491811	-0.107369	0.161388	0.553061	0.264192	-0.485719	1.000000	-0.375438
VNINDEX	0.603455	-0.861426	0.295409	-0.016434	-0.664368	-0.746263	-0.444136	0.950618	-0.375438	1.000000

Figure 6 – VCB Beta and other Factors Correlation Matrix

Correlation Matrix										
	BETAVCB	CPI	EX_RATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
BETAVCB	1.000000	-0.714050	0.063332	-0.305593	-0.284749	-0.115950	-0.376364	0.419680	0.319218	0.511416
CPI	-0.714050	1.000000	-0.382440	0.090566	0.500206	0.428665	0.580486	-0.844053	0.156409	-0.861426
EX_RATE	0.063332	-0.382440	1.000000	0.519076	0.038528	0.006143	-0.772931	0.476195	-0.491811	0.295409
G	-0.305593	0.090566	0.519076	1.000000	0.440105	0.223263	-0.421402	0.136776	-0.107369	-0.016434
IM	-0.284749	0.500206	0.038528	0.440105	1.000000	0.663798	0.117679	-0.613771	0.161388	-0.664368
R	-0.115950	0.428665	0.006143	0.223263	0.663798	1.000000	-0.045403	-0.664122	0.553061	-0.746263
RF	-0.376364	0.580486	-0.772931	-0.421402	0.117679	-0.045403	1.000000	-0.652624	0.264192	-0.444136
SP500	0.419680	-0.844053	0.476195	0.136776	-0.613771	-0.664122	-0.652624	1.000000	-0.485719	0.950618
TRADEBA...	0.319218	0.156409	-0.491811	-0.107369	0.161388	0.553061	0.264192	-0.485719	1.000000	-0.375438
VNINDEX	0.511416	-0.861426	0.295409	-0.016434	-0.664368	-0.746263	-0.444136	0.950618	-0.375438	1.000000

Figure 8 – CTG Beta and other Factors Correlation Matrix

Correlation Matrix										
	BETACTG	CPI	EX_RATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
BETACTG	1.000000	-0.256954	-0.006887	0.165498	0.489180	0.481114	-0.160791	-0.144525	0.641423	-0.075537
CPI	-0.256954	1.000000	-0.382440	0.090566	0.500206	0.428665	0.580486	-0.844053	0.156409	-0.861426
EX_RATE	-0.006887	-0.382440	1.000000	0.519076	0.038528	0.006143	-0.772931	0.476195	-0.491811	0.295409
G	0.165498	0.090566	0.519076	1.000000	0.440105	0.223263	-0.421402	0.136776	-0.107369	-0.016434
IM	0.489180	0.500206	0.038528	0.440105	1.000000	0.663798	0.117679	-0.613771	0.161388	-0.664368
R	0.481114	0.428665	0.006143	0.223263	0.663798	1.000000	-0.045403	-0.664122	0.553061	-0.746263
RF	-0.160791	0.580486	-0.772931	-0.421402	0.117679	-0.045403	1.000000	-0.652624	0.264192	-0.444136
SP500	-0.144525	-0.844053	0.476195	0.136776	-0.613771	-0.664122	-0.652624	1.000000	-0.485719	0.950618
TRADEBA...	0.641423	0.156409	-0.491811	-0.107369	0.161388	0.553061	0.264192	-0.485719	1.000000	-0.375438
VNINDEX	-0.075537	-0.861426	0.295409	-0.016434	-0.664368	-0.746263	-0.444136	0.950618	-0.375438	1.000000

4. Main Results

4.1. Overall Results

We recognize from above figures that lending rate - R has positive correlation with CTG, STB, SHB, NVB and ACB beta. Whereas Risk free rate has negative correlation with CTG, STB, VCB and ACB beta.

4.2. Mathematics Applied in Estimating Beta CAPM for Banking Sector

We get the data of weekly stock price for listed banking group as below chart.

Then, we apply the mathematical formula to calculate beta CAPM, a common systemic risk measurement for banking industry.

Next we look at below charts.

Chart 1 - Movement of Beta in group 2 joint Stock Banks (Previously SOE Banks) during Pre-L inflation Time

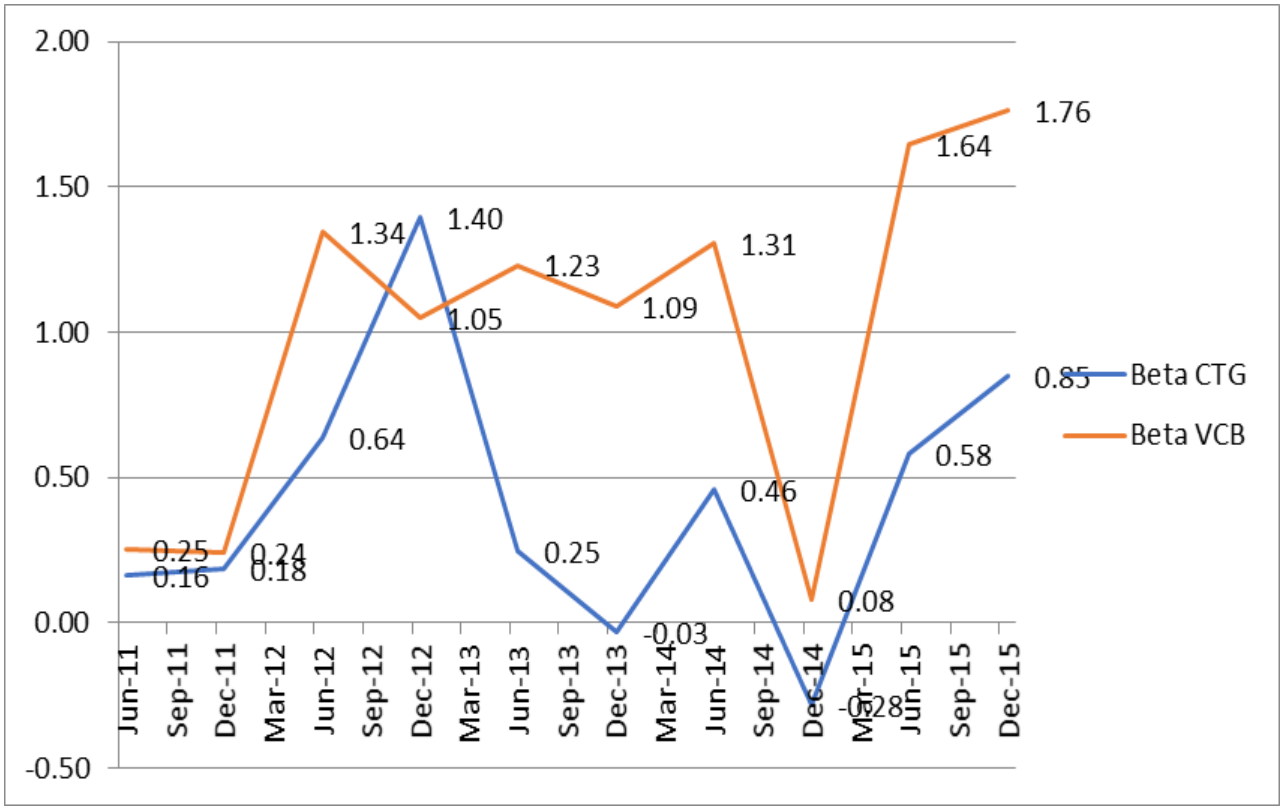


Chart 2 - Movement of Beta in Group 5 Joint Stock Banks (Previously Private Banks) during Pre-L inflation Time

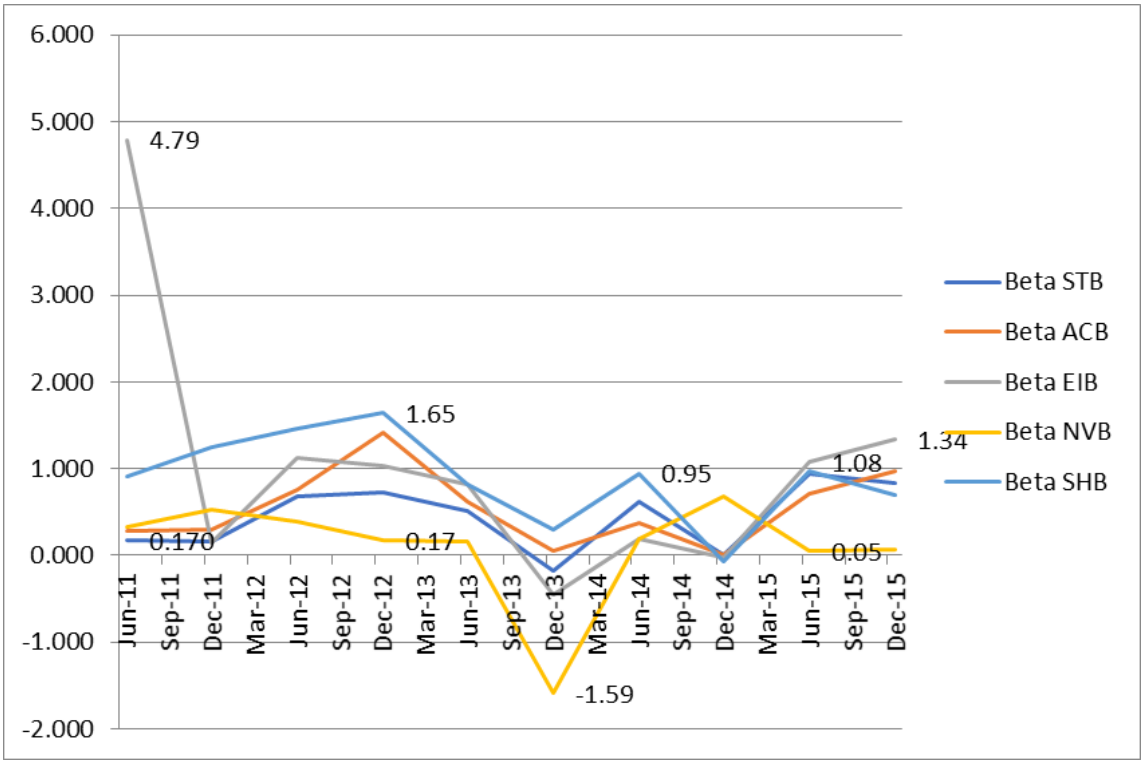
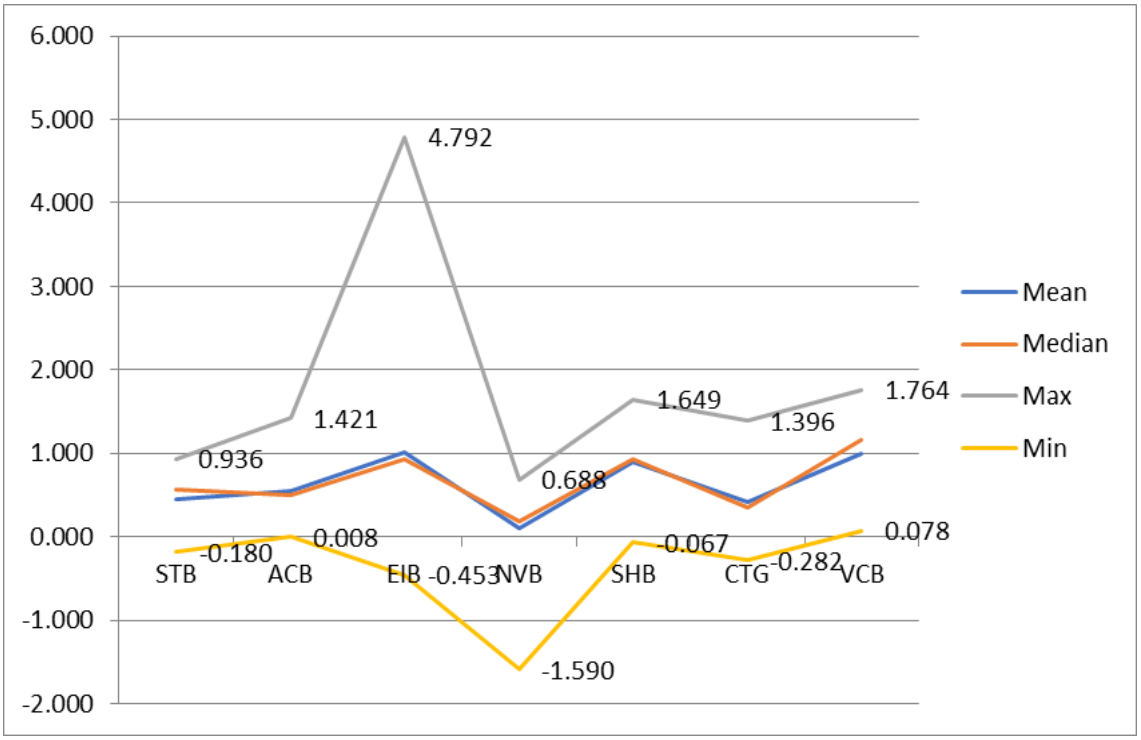


Chart 3 - Comparing Statistics Measures in 7 Listed Banks



Apply mathematics we can calculate below results:

Table 2- Beta CAPM Results for Group 5 joint Stock Banks (Previously Private Banks) during Pre-L Inflation Time

	Beta STB	Beta ACB	Beta EIB	Beta NVB	Beta SHB
June-11	0.170	0.278	4.79	0.33	0.90
Dec-11	0.156	0.293	0.15	0.53	1.25
June-12	0.686	0.762	1.12	0.39	1.46
Dec-12	0.730	1.421	1.03	0.17	1.65
June-13	0.516	0.613	0.82	0.16	0.83
Dec-13	-0.180	0.047	-0.45	-1.59	0.31
June-14	0.621	0.372	0.20	0.19	0.95
Dec-14	0.008	0.008	-0.02	0.69	-0.07
June-15	0.936	0.708	1.08	0.05	0.97
Dec-15	0.835	0.970	1.34	0.07	0.69
Mean	0.448	0.547	1.005	0.100	0.893
Median	0.569	0.492	0.922	0.180	0.926
Max	0.936	1.421	4.792	0.688	1.649
Min	-0.180	0.008	-0.453	-1.590	-0.067

Table 3- Beta CAPM results for group 2 joint stock banks (previously SOE banks) during pre-L inflation time

	Beta CTG	Beta VCB
June-11	0.16	0.25
Dec-11	0.18	0.24
June-12	0.64	1.34
Dec-12	1.40	1.05
June-13	0.25	1.23
Dec-13	-0.03	1.09
June-14	0.46	1.31
Dec-14	-0.28	0.08
June-15	0.58	1.64
Dec-15	0.85	1.76
Mean	0.420	0.999
Median	0.352	1.160
Max	1.396	1.764
Min	-0.282	0.078

Analysis

We can infer from the above tables that mean of beta CAPM values in group 2 is (<) lower than 1. While that of beta in group 1 is higher than 1 (in case of EIB, NVB and SHB).

We see that max of beta values in case of ACB and EIB are highest (1.421 and 4.792), in group 1, and max of beta of VCB is highest (1.764) in group 2.

5. Discussion

During Pre – L Inflation

From above charts:

In groups of banks (SOEs previously) VCB and CTG we find out: mean values of beta of VCB is among highest.

In groups of joint stock banks (private banks) we figure out: max value of beta in case of Eximbank is highest. While max value of beta of NVB is the lowest.

Thats happen during post –L inflation stage.

Factors affect the Risk of Commercial Banks and Businesses in Vietnam

There are internal and external factors, including micro and macro economic factors, social and technological trends.

First, inflation, GDP growth, lending rate, risk free rate, VN Index, stock price, cost and net sale,…. are those internal macro and micro factors that affect ROI and risk of a specific firm. Changes in 4.0 technology with Artificial Intelligence also have impacts on the ways banks and financial service firms perform transactions with clients.

Second, external factors such as exchange rate, S&P 500, inflation and GDP growth in US, China, Japan, Korea, Europe, etc. might have certain impacts on export-import transactions and therefore, on net profit and risk of companies, esp. those deal with commerce clients and sectors.

Third, social factors such as tourism tendency, unemployment, income per capita in each country also affects the sale of financial service firms. Recently, dangerous diseases and viruses (Covid19, SARS, Ebola…) also present threats on business operation.

6. Conclusion

Because in many cases, lending rate has positive correlation with beta of banks, bank system do not need to increase lending rates too much.

Above results of beta CAPM also warns us that in many cases, bank ssystem do need to enhance risk management system, esp. joint stock banks (previous private banks).

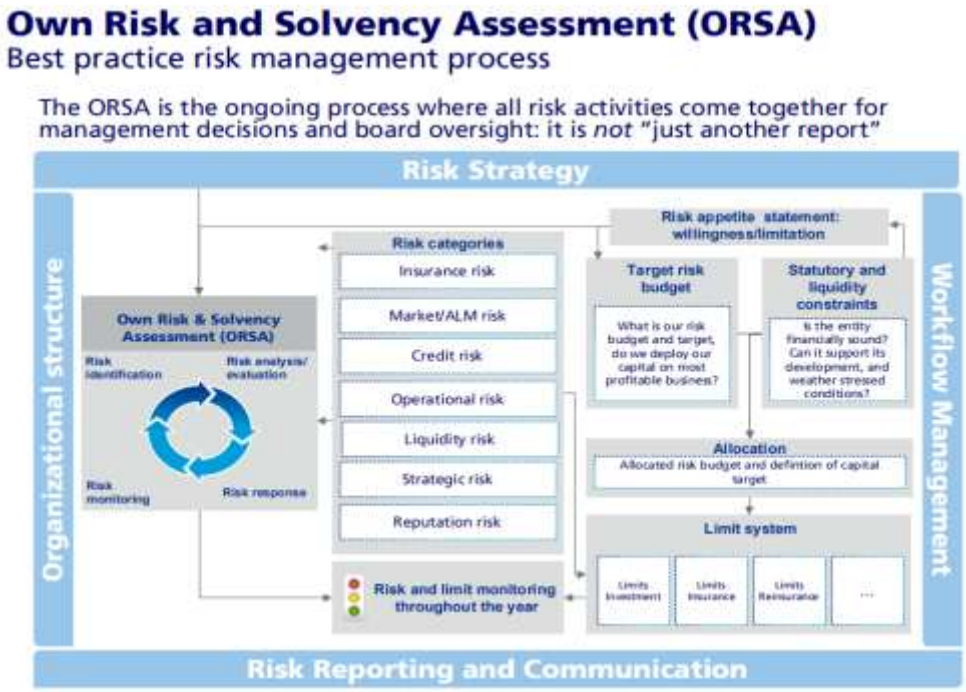
The management of the State Bank of Vietnam (SBV) over the risk activities of commercial banks (commercial banks) is the impact of the SBV's orientation, purpose, and plans to the risks of banks. to control and promptly introduce intervention policies to help the bank branches operate stably and safely in business.

The management of the State Bank of Vietnam on the risk risk activities of commercial banks includes building a system of policies and management methods of the State Bank for risks of commercial banks.

Mukhamadeev et al (2019) stated that the role of information systems for entrepreneurship education in developing countries on the example of the Azerbaijan education system and Internet banking. The information systems role in entrepreneurship education was determined with the help of online questionnaire. As a result of the study, it was found out that about 29% of higher entrepreneurship education institutions use IT technologies and e-learning principles in the learning process.

We also Suggest Risk Management Solutions -Examples of Risk management (RM) Model

We can refer to RM models as in the below figure:



(Source: Zurich insurance group Ltd.)

Limitation of Research

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

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