

## **Suggested Risk Policies from Comparison of 2 Groups of Vietnam Banks - Previous SOE Banks and Private Banks During Post-Low Inflation Period 2015-2020**

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### **Abstract**

*As fast growth of Vietnam banks going with risk policies, We categorize listed banks on Vietnam stock exchange into 2 groups: Previous SOEs banks (including Vietcombank and Vietinbank) and Previous Private banks (including SHB, EIB and ACB).*

*Authors then use combination of quantitative methods (statistics, calculation formulas) and qualitative methods including synthesis, inductive and explanatory methods.*

*The research findings tell us that In groups of banks (SOEs previously) VCB and CTG we find out: G and Risk free rate (Rf) have higher impacts on beta CAPM, for internal factors. While In groups of joint stock banks (private banks) SHB, ACB and EIB we figure out: exchange rate and SP500 have higher impacts on beta CAPM, for external factors.*

*Besides, this study also give out recommendations for enhancing socio-economic roles of Vietnam banks in future and give out directions or implications for socio-economic policies.*

**Key-words:** Risk Policies, Vietnam Banks, Beta CAPM, Inflation, Economic Development, Vietnam.

**JEL:** M21, G30, G32, G38.

### **1. Introduction**

First, we recognize the importance of building better risk management information system (RMIS) in banking also increase to a new level in recent 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 the key factor: beta CAPM under macro factors effects, for 2 big bank groups in Vietnam: a) group 1: Vietcombank - VCB and Vietinbank - CTG (previously, SOE) and b) group 2: Asia Commercial Bank - ACB, Eximbank -EIB, Saigon Hanoi Bank -SHB (previously, private bank).

All internet data such as stock price, exchange rate, inflation, GDP growth, risk free rate we take from reliable internet data sources , esp. from website of State Bank of Vietnam, Bureau of Statistics, Minsitry of Finance, banks, etc.

We recognize from below charts with all data from reliable internet sources (mentioned above) that:

## **2. Literature Review**

First, Karim (2011) pointed Management Information Systems (MIS) is the key factor to facilitate and attain efficient decision making in an organization.

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

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.
3.The econometric model for stock prices in the period 2008-2011 - Case of stock prices ACB, VNIndex, risk free rate and S& P500	Đình Trần Ngọc Huy (2015)	Analyze the impact of VNIndex and internal and external macro variables on the stock price of ACB.
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 Đình Trần Ngọc 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”	Đình 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	Authors name	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. 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 bank risk management

We use both quantitative and qualitative analytical methods, with OLS regression supported by Eviews. Data is collected from reliable internet sources and websites as below:

Most data from stock exchange and reliable. Stock price from HOSE or HNX stock exchange, rates from bank system, GDP and CPI from Bureau statistics and Ministry of Finance.

This research paper establishes correlation among econ factors and uses OLS regression model. Beta CAPM is a function with 9 variables presented below.

Y (beta CAPM) = f (x1: G, x2: CPI, x3: R, x4: Rf, x5: VNIndex, x6; exchange rate, x7: SP500, x8: trade balance, x9: Industrial manufacturing).

We therefore can estimate effects and impacts of multi factors on bank .

### Looking at Descriptive Statistics Below, We See That

- In group of previous SOE banks (CTG and VCB): range of beta CAPM mean values vary from -0.27 to 2.5, beta mean highest in case VCB (1.19). Standard deviation of exchange rate, SP500 and trade balance get highest values.
- In group of previous private banks (EIB, SHB and ACB): range of beta CAPM mean values vary from -1.46 to 3.3, beta mean highest in case EIB (1.39). Max beta highest (3.3) in case of ACB. Standard deviation of exchange rate, SP500 and trade balance get highest values.

Figure 1 - CTG

	BETA CTG	CPI	EXRATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
Mean	0.656675	0.028008	22809.67	0.057983	166.6833	0.095217	0.039517	2670.148	4.483333	822.8833
Median	0.491700	0.030200	22923.00	0.065200	150.4000	0.095000	0.037000	2590.230	-100.0000	858.8200
Maximum	2.533700	0.047400	23230.00	0.070800	267.2000	0.110000	0.061800	3703.060	410.0000	1067.500
Minimum	-0.275800	0.006300	21780.00	0.018100	127.3000	0.080000	0.012200	2043.940	-500.0000	579.0300
Std. Dev.	0.701284	0.012080	427.6367	0.017170	42.17356	0.010451	0.016243	513.0916	313.6589	172.2477
Skewness	1.607032	-0.262708	-1.235511	-1.467570	1.446639	-0.011162	-0.030322	0.526233	0.289823	-0.244276
Kurtosis	5.507438	2.206974	3.825801	3.807463	3.903326	1.815576	1.919779	2.340080	1.781900	1.596927
Jarque-Bera	8.308726	0.452476	3.393948	4.633522	4.593525	0.701679	0.585278	0.771590	0.909879	1.103648
Probability	0.015696	0.797528	0.183237	0.098592	0.100584	0.704097	0.746292	0.679910	0.634486	0.575898
Sum	7.880100	0.336100	273716.0	0.695800	2000.200	1.142600	0.474200	32041.77	53.80000	9874.600
Sum Sq. Dev.	5.409784	0.001605	2011605.	0.003243	19564.70	0.001201	0.002902	2895893.	1082201.	326362.0

Figure 2 – VCB

	BETA VCB	CPI	EXRATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
Mean	1.192525	0.028008	22809.67	0.057983	166.6833	0.095217	0.039517	2670.148	4.483333	822.8833
Median	1.084800	0.030200	22923.00	0.065200	150.4000	0.095000	0.037000	2590.230	-100.0000	858.8200
Maximum	2.099400	0.047400	23230.00	0.070800	267.2000	0.110000	0.061800	3703.060	410.0000	1067.500
Minimum	0.590600	0.006300	21780.00	0.018100	127.3000	0.080000	0.012200	2043.940	-500.0000	579.0300
Std. Dev.	0.471423	0.012080	427.6367	0.017170	42.17356	0.010451	0.016243	513.0916	313.6589	172.2477
Skewness	0.455134	-0.262708	-1.235511	-1.467570	1.446639	-0.011162	-0.030322	0.526233	0.289823	-0.244276
Kurtosis	2.252966	2.206974	3.825801	3.807463	3.903326	1.815576	1.919779	2.340080	1.781900	1.596927
Jarque-Bera	0.693324	0.452476	3.393948	4.633522	4.593525	0.701679	0.585278	0.771590	0.909879	1.103648
Probability	0.707044	0.797528	0.183237	0.098592	0.100584	0.704097	0.746292	0.679910	0.634486	0.575898
Sum	14.31030	0.336100	273716.0	0.695800	2000.200	1.142600	0.474200	32041.77	53.80000	9874.600
Sum Sq. Dev.	2.444631	0.001605	2011605.	0.003243	19564.70	0.001201	0.002902	2895893.	1082201.	326362.0

Figure 3 - EIB

	BETA EIB	CPI	EXRATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
Mean	1.388333	0.028008	22809.67	0.057983	166.6833	0.095217	0.039517	2670.148	4.483333	822.8833
Median	1.425000	0.030200	22923.00	0.065200	150.4000	0.095000	0.037000	2590.230	-100.0000	858.8200
Maximum	2.500000	0.047400	23230.00	0.070800	267.2000	0.110000	0.061800	3703.060	410.0000	1067.500
Minimum	0.390000	0.006300	21780.00	0.018100	127.3000	0.080000	0.012200	2043.940	-500.0000	579.0300
Std. Dev.	0.569399	0.012080	427.6367	0.017170	42.17356	0.010451	0.016243	513.0916	313.6589	172.2477
Skewness	0.036050	-0.262708	-1.235511	-1.467570	1.446639	-0.011162	-0.030322	0.526233	0.289823	-0.244276
Kurtosis	2.933702	2.206974	3.825801	3.807463	3.903326	1.815576	1.919779	2.340080	1.781900	1.596927
Jarque-Bera Probability	0.004797 0.997604	0.452476 0.797528	3.393948 0.183237	4.633522 0.098592	4.593525 0.100584	0.701679 0.704097	0.585278 0.746292	0.771590 0.679910	0.909879 0.634486	1.103648 0.575898
Sum	16.66000	0.336100	273716.0	0.695800	2000.200	1.142600	0.474200	32041.77	53.80000	9874.600
Sum Sq. Dev.	3.566367	0.001605	2011605.	0.003243	19564.70	0.001201	0.002902	2895893.	1082201.	326362.0

Figure 4 - SHB

	BETA SHB	CPI	EXRATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
Mean	0.635833	0.028008	22809.67	0.057983	166.6833	0.095217	0.039517	2670.148	4.483333	822.8833
Median	0.865000	0.030200	22923.00	0.065200	150.4000	0.095000	0.037000	2590.230	-100.0000	858.8200
Maximum	1.130000	0.047400	23230.00	0.070800	267.2000	0.110000	0.061800	3703.060	410.0000	1067.500
Minimum	-1.460000	0.006300	21780.00	0.018100	127.3000	0.080000	0.012200	2043.940	-500.0000	579.0300
Std. Dev.	0.707267	0.012080	427.6367	0.017170	42.17356	0.010451	0.016243	513.0916	313.6589	172.2477
Skewness	-2.401782	-0.262708	-1.235511	-1.467570	1.446639	-0.011162	-0.030322	0.526233	0.289823	-0.244276
Kurtosis	7.721237	2.206974	3.825801	3.807463	3.903326	1.815576	1.919779	2.340080	1.781900	1.596927
Jarque-Bera Probability	22.68216 0.000012	0.452476 0.797528	3.393948 0.183237	4.633522 0.098592	4.593525 0.100584	0.701679 0.704097	0.585278 0.746292	0.771590 0.679910	0.909879 0.634486	1.103648 0.575898
Sum	7.630000	0.336100	273716.0	0.695800	2000.200	1.142600	0.474200	32041.77	53.80000	9874.600
Sum Sq. Dev.	5.502492	0.001605	2011605.	0.003243	19564.70	0.001201	0.002902	2895893.	1082201.	326362.0

Figure 5 - ACB

	BETA ACB	CPI	EXRATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
Mean	0.990000	0.028008	22809.67	0.057983	166.6833	0.095217	0.039517	2670.148	4.483333	822.8833
Median	0.805000	0.030200	22923.00	0.065200	150.4000	0.095000	0.037000	2590.230	-100.0000	858.8200
Maximum	3.370000	0.047400	23230.00	0.070800	267.2000	0.110000	0.061800	3703.060	410.0000	1067.500
Minimum	0.400000	0.006300	21780.00	0.018100	127.3000	0.080000	0.012200	2043.940	-500.0000	579.0300
Std. Dev.	0.786789	0.012080	427.6367	0.017170	42.17356	0.010451	0.016243	513.0916	313.6589	172.2477
Skewness	2.524943	-0.262708	-1.235511	-1.467570	1.446639	-0.011162	-0.030322	0.526233	0.289823	-0.244276
Kurtosis	8.372413	2.206974	3.825801	3.807463	3.903326	1.815576	1.919779	2.340080	1.781900	1.596927
Jarque-Bera Probability	27.18209 0.000001	0.452476 0.797528	3.393948 0.183237	4.633522 0.098592	4.593525 0.100584	0.701679 0.704097	0.585278 0.746292	0.771590 0.679910	0.909879 0.634486	1.103648 0.575898
Sum	11.88000	0.336100	273716.0	0.695800	2000.200	1.142600	0.474200	32041.77	53.80000	9874.600
Sum Sq. Dev.	6.809400	0.001605	2011605.	0.003243	19564.70	0.001201	0.002902	2895893.	1082201.	326362.0

## 4. Main Results

### 4.1 Overall Results

First we analyze correlation:

#### Looking at Figures Below, We See That

- In group of previous SOE banks (CTG and VCB): trade balance has highest negative correlation, in case of CTG (-0.42) and of VCB (-0.6). Higher than correlation of



VNIndex (-0.15) in case of CTG and (-0.44) in case of VCB. Lending rate has positive correlation with beta of CTG and VCB.

- In group of previous private banks (EIB, SHB and ACB): trade balance has lower negative correlation, in case of EIB (-0.05) and of SHB (0.01) and of ACB (-0.16). VNIndex has positive correlation with beta of these 3 private banks, while negative relationship in case previous SOE banks. Lending rate has negative correlation in 2 cases: EIB and SHB.

Figure 6 - CTG

Correlation Matrix										
	BETACTG	CPI	EXRATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
BETACTG	1.000000	0.336933	-0.208220	0.148388	0.764773	0.138517	0.258014	-0.279036	-0.421643	-0.150356
CPI	0.336933	1.000000	0.355839	0.084484	0.413563	-0.414518	-0.181729	0.255209	-0.220207	0.414535
EXRATE	-0.208220	0.355839	1.000000	-0.085689	-0.083666	-0.775791	-0.724295	0.686922	0.531029	0.767832
G	0.148388	0.084484	-0.085689	1.000000	0.183953	-0.269621	0.461428	-0.451641	-0.519267	-0.057490
IM	0.764773	0.413563	-0.083666	0.183953	1.000000	0.092188	0.151470	-0.215029	-0.381218	0.008190
R	0.138517	-0.414518	-0.775791	-0.269621	0.092188	1.000000	0.639799	-0.670855	-0.392501	-0.877965
RF	0.258014	-0.181729	-0.724295	0.461428	0.151470	0.639799	1.000000	-0.834478	-0.664628	-0.821145
SP500	-0.279036	0.255209	0.686922	-0.451641	-0.215029	-0.670855	-0.834478	1.000000	0.841299	0.865637
TRADEBA...	-0.421643	-0.220207	0.531029	-0.519267	-0.381218	-0.392501	-0.664628	0.841299	1.000000	0.604803
VNINDEX	-0.150356	0.414535	0.767832	-0.057490	0.008190	-0.877965	-0.821145	0.865637	0.604803	1.000000

Figure 7 - VCB

Correlation Matrix										
	BETAVCB	CPI	EXRATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
BETAVCB	1.000000	0.010098	-0.383907	0.400397	-0.010006	0.128686	0.447294	-0.454337	-0.602414	-0.447930
CPI	0.010098	1.000000	0.355839	0.084484	0.413563	-0.414518	-0.181729	0.255209	-0.220207	0.414535
EXRATE	-0.383907	0.355839	1.000000	-0.085689	-0.083666	-0.775791	-0.724295	0.686922	0.531029	0.767832
G	0.400397	0.084484	-0.085689	1.000000	0.183953	-0.269621	0.461428	-0.451641	-0.519267	-0.057490
IM	-0.010006	0.413563	-0.083666	0.183953	1.000000	0.092188	0.151470	-0.215029	-0.381218	0.008190
R	0.128686	-0.414518	-0.775791	-0.269621	0.092188	1.000000	0.639799	-0.670855	-0.392501	-0.877965
RF	0.447294	-0.181729	-0.724295	0.461428	0.151470	0.639799	1.000000	-0.834478	-0.664628	-0.821145
SP500	-0.454337	0.255209	0.686922	-0.451641	-0.215029	-0.670855	-0.834478	1.000000	0.841299	0.865637
TRADEBA...	-0.602414	-0.220207	0.531029	-0.519267	-0.381218	-0.392501	-0.664628	0.841299	1.000000	0.604803
VNINDEX	-0.447930	0.414535	0.767832	-0.057490	0.008190	-0.877965	-0.821145	0.865637	0.604803	1.000000

Figure 8 - EIB

Correlation Matrix										
	BETA EIB	CPI	EXRATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
BETA EIB	1.000000	0.155218	0.159855	0.394881	0.508124	-0.320816	-0.086799	0.056751	-0.054852	0.364282
CPI	0.155218	1.000000	0.355839	0.084484	0.413563	-0.414518	-0.181729	0.255209	-0.220207	0.414535
EXRATE	0.159855	0.355839	1.000000	-0.085689	-0.083666	-0.775791	-0.724295	0.686922	0.531029	0.767832
G	0.394881	0.084484	-0.085689	1.000000	0.183953	-0.269621	0.461428	-0.451641	-0.519267	-0.057490
IM	0.508124	0.413563	-0.083666	0.183953	1.000000	0.092188	0.151470	-0.215029	-0.381218	0.008190
R	-0.320816	-0.414518	-0.775791	-0.269621	0.092188	1.000000	0.639799	-0.670855	-0.392501	-0.877965
RF	-0.086799	-0.181729	-0.724295	0.461428	0.151470	0.639799	1.000000	-0.834478	-0.664628	-0.821145
SP500	0.056751	0.255209	0.686922	-0.451641	-0.215029	-0.670855	-0.834478	1.000000	0.841299	0.865637
TRADEBA...	-0.054852	-0.220207	0.531029	-0.519267	-0.381218	-0.392501	-0.664628	0.841299	1.000000	0.604803
VNINDEX	0.364282	0.414535	0.767832	-0.057490	0.008190	-0.877965	-0.821145	0.865637	0.604803	1.000000

Figure 9 - SHB

Correlation Matrix										
	BETASHB	CPI	EXRATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
BETASHB	1.000000	-0.228581	-0.011854	0.244650	-0.480409	-0.208929	-0.055766	0.037226	0.014026	0.066297
CPI	-0.228581	1.000000	0.355839	0.084484	0.413563	-0.414518	-0.181729	0.255209	-0.220207	0.414535
EXRATE	-0.011854	0.355839	1.000000	-0.085689	-0.083666	-0.775791	-0.724295	0.686922	0.531029	0.767832
G	0.244650	0.084484	-0.085689	1.000000	0.183953	-0.269621	0.461428	-0.451641	-0.519267	-0.057490
IM	-0.480409	0.413563	-0.083666	0.183953	1.000000	0.092188	0.151470	-0.215029	-0.381218	0.008190
R	-0.208929	-0.414518	-0.775791	-0.269621	0.092188	1.000000	0.639799	-0.670855	-0.392501	-0.877965
RF	-0.055766	-0.181729	-0.724295	0.461428	0.151470	0.639799	1.000000	-0.834478	-0.664628	-0.821145
SP500	0.037226	0.255209	0.686922	-0.451641	-0.215029	-0.670855	-0.834478	1.000000	0.841299	0.865637
TRADEBA...	0.014026	-0.220207	0.531029	-0.519267	-0.381218	-0.392501	-0.664628	0.841299	1.000000	0.604803
VNINDEX	0.066297	0.414535	0.767832	-0.057490	0.008190	-0.877965	-0.821145	0.865637	0.604803	1.000000

Figure 10 - ACB

Correlation Matrix										
	BETAACB	CPI	EXRATE	G	IM	R	RF	SP500	TRADEBA...	VNINDEX
BETAACB	1.000000	0.301399	0.012415	0.015720	0.399435	0.010349	0.040732	-0.040497	-0.163941	0.051257
CPI	0.301399	1.000000	0.355839	0.084484	0.413563	-0.414518	-0.181729	0.255209	-0.220207	0.414535
EXRATE	0.012415	0.355839	1.000000	-0.085689	-0.083666	-0.775791	-0.724295	0.686922	0.531029	0.767832
G	0.015720	0.084484	-0.085689	1.000000	0.183953	-0.269621	0.461428	-0.451641	-0.519267	-0.057490
IM	0.399435	0.413563	-0.083666	0.183953	1.000000	0.092188	0.151470	-0.215029	-0.381218	0.008190
R	0.010349	-0.414518	-0.775791	-0.269621	0.092188	1.000000	0.639799	-0.670855	-0.392501	-0.877965
RF	0.040732	-0.181729	-0.724295	0.461428	0.151470	0.639799	1.000000	-0.834478	-0.664628	-0.821145
SP500	-0.040497	0.255209	0.686922	-0.451641	-0.215029	-0.670855	-0.834478	1.000000	0.841299	0.865637
TRADEBA...	-0.163941	-0.220207	0.531029	-0.519267	-0.381218	-0.392501	-0.664628	0.841299	1.000000	0.604803
VNINDEX	0.051257	0.414535	0.767832	-0.057490	0.008190	-0.877965	-0.821145	0.865637	0.604803	1.000000

## 4.2 OLS Regression Results

We run regression OLS for 5 banks, accordingly:

First, For CTG external factors:

We found out from the below figure that external macro factors such as exchange rate, trade balance have negative correlation with market risk. An increase in these factors might cause beta decrease.

Table 1 - Internal vs. External Macro Effects on Beta CAPM Period 2015-2020 - Case CTG

Data	Internal effects		External effects	
	Co-efficient	R-squared, SER	Co-efficient	R-squared, SER
G	-17.1			
CPI	-0.6			
R	-55.6			
Rf	13.7			
VNIndex	-0.002			
IM	0.01			
Ex rate			-0.0001	
SP500			0.0004	
Trade balance			-0.001	
		0.67; 0.59		0.2; 0.7



We found out from the above table that internal macro factors such as IM and Rf has positive correlation with market risk while CPI, GDP growth, and R have negative correlation with beta. An increase in lending rate might cause beta decrease.

Second, For VCB

We see from the below table that external macro variables (exchange rate and trade balance) have negative correlation with market risk. An increase in trade balance might cause beta decrease.

Table 2 - Internal vs. External Macro Effects on Beta CAPM Period 2015-2020 - Case VCB

Data	Internal effects		External effects	
	Co-efficient	R-squared, SER	Co-efficient	R-squared, SER
G	3.8			
CPI	7.5			
R	-46			
Rf	-8.9			
VNIndex	-0.004			
IM	0.0004			
Ex rate			-0.0002	
SP500			0.0003	
Trade balance			-0.001	
		0.5; 0.4		0.3; 0.4

We see from the above table that internal macro factors such as g and CPI have positive correlation with market risk while R, VNIndex, and risk free rate have negative correlation with beta. An increase in Rf might cause beta decrease.

Third, For EIB

We recognize from the below table that external macro factors (exchange rate and SP500) have positive correlation with market risk.

Table 3 - Internal vs. External Macro Effects on Beta CAPM Period 2015-2020 - Case EIB

Data	Internal effects		External effects	
	Co-efficient	R-squared, SER	Co-efficient	R-squared, SER
G	14.3			
CPI	-13.8			
R	19.1			
Rf	3.2			
VNIndex	0.002			
IM	0.006			
Ex rate			0.0002	
SP500			0.0002	
Trade balance			-0.0005	
		0.58; 0.54		0.06; 0.6

We recognize from the above table that internal macro factors such as G, R and Rf have positive correlation with market risk while CPI has negative correlation with beta. An increase in Rf might cause beta increase.

Fourth, For SHB

We recognize from the below table that external macro factors such as exchange rate and trade balance have negative correlation with market risk while SP500 has positive correlation with beta. An increase in exchange rate might cause beta decrease.

Table 4 - Internal vs. External Macro effects on Beta CAPM Period 2015-2020 - Case SHB

Data	Internal effects		External effects	
	Co-efficient	R-squared, SER	Co-efficient	R-squared, SER
G	27.6			
CPI	-0.2			
R	23.2			
Rf	-21.6			
VNIndex	1.59E			
IM	-0.009			
Ex rate			-0.0001	
SP500			0.0002	
Trade balance			-0.0001	
		0.38; 0.8		0.005; 0.8

We recognize from the above table that internal macro factors such as G and R have positive correlation with market risk while CPI and Rf has negative correlation with beta. An increase in Rf might cause beta decrease.

Fifth, For ACB

We recognize from the below table that external macro factors such as exchange rate and SP500 have positive correlation with market risk while trade balance has negative correlation with beta. An increase in exchange rate might cause beta increase.

Table 5 - Internal vs. External Macro effects on Beta CAPM period 2015-2020 - case ACB

Data	Internal effects		External effects	
	Co-efficient	R-squared, SER	Co-efficient	R-squared, SER
G	-6.1			
CPI	10.2			
R	1.1			
Rf	9.3			
VNIndex	0.0006			
IM	0.006			
Ex rate			6.86E	
SP500			0.0004	
Trade balance			-0.001	
		0.19; 1.04		0.06; 0.8

We recognize from the above table that internal macro factors such as industrial production and Rf have positive correlation with market risk while GDP growth has negative correlation with beta. An increase in Rf might cause beta increase.

## 5. Discussion

### During Post – Low (L) Inflation

In groups of banks (SOEs previously) VCB and CTG we find out: G and Risk free rate (Rf) have higher impacts on beta CAPM, for internal factors. While for external factors, trade balance have higher impacts on market risk. VNIndex has slightly negative relationship and impact on beta.

In groups of joint stock banks (private banks) SHB, ACB and EIB we figure out: exchange rate and SP500 have higher impacts on beta CAPM, for external factors. For internal factors, Rf, GDP growth and lending rate have higher impacts on market risk. That's happen during post –L inflation stage. Lending rate has positive impact in 3 cases.

## 6. Conclusion

Because GDP growth and Risk free rate have higher effects on market risks of banks, Ministry of Finance, State bank of Vietnam and relevant agencies need to control GDP growth as well as rates of Treasury bonds toward benefits for managing risk.

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.

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

Our model also shows that other macro factors such as VNIndex and exchange rate just have slight impact on Beta CAPM. And macro internal factors have much more effects on market risk of banks.

### **Limitation of Research**

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

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