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Full length Research paper

The measurement of the volatility of market risk of Viet Nam medicine industry after the low inflation period 2015-2017

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The Vietnam economy has gained lots of achievements after the financial crisis 2007-2011, until it reached a low inflation rate of 0.6% in 2015. This paper measures the volatility of market risk in Viet Nam medicine industry after this period (2015-2017). The main reason is the vital role of the medicine system in Vietnam in the economic development and growth in recent years always go with risk potential and risk control policies. This research paper aims to figure out how much increase or decrease in the market risk of Vietnam medicine firms during the post-low inflation period 2015-2017. First, by using quantitative combined with comparative data analysis method, we find out the risk level measured by equity beta mean in the medicine industry is acceptable, i.e it is little lower than (<) 1. Then, one of its major findings is the comparison between risk level of medicine industry during the financial crisis 2007-2009 compared to those in the post-low inflation time 2015-2017. In fact, the research findings show us market risk fluctuation, measured by equity beta var, during the post-low inflation time has decreased considerably despite of higher asset beta max and asset beta var. Finally, this paper provides some ideas that could provide companies and government more evidence in establishing their policies in governance. This is the complex task but the research results shows us warning that the market risk volatility might be higher during the post-low inflation period 2015-2017. And our conclusion part will recommend some policies and plans to deal with it.

Keywords: Risk management, asset beta, beta CAPM, financial crisis, medicine industry, macro policy
JEL classification numbers: G00, G390, C83.

INTRODUCTION

Throughout many recent years, Viet Nam medicine market is evaluated as one of active markets, which has certain positive effect for the economy.

Generally speaking, central banks aim to maintain inflation around 2% to 3%. Increases in inflation significantly beyond this range can lead to possible hyperinflation, a devastating scenario in which inflation rises rapidly out of control. Looking at exhibit 1, we can see the Vietnam economy has controlled inflation well. High inflation might lead to higher lending rate and harm the medicine, healthcare industry.

This study will calculate and figure out whether the market risk level during the post-low inflation time (2015-17) has increased or decreased, compared to those statistics in the financial crisis time (2007-2009).

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.

Body of manuscript

Research Issues

The scope of this study are: ssue 1:Whether the risk level

of medicine firms under the different changing scenarios in post-low inflation period 2015-2017 increase
or decrease so much, compared to in financial crisis 2007 -2009 and?
Issue 2: Because Viet Nam is an emerging and immature financial market and the stock market still in the starting stage, whether the dispersed distribution of beta values become large in the different changing periods in the medicine industry.
This paper also tests three (3) below hypotheses:
Hypothesis 1: Comparing two (2) periods, during the financial crisis impact, the beta or risk level of listed companies in medicine industry will relatively higher than those in the post-low inflation environment.
Hypothesis 2: Because Viet Nam is an emerging and immature financial market and the stock market still in the recovering stage, there will be a large disperse distribution in beta values estimated in the medicine industry.
Hypothesis3: With the above reasons, the mean of equity and asset beta values of these listed medicine firms tend to impose a high risk level, i.e., beta should higher than (>) 1. This hypothesis is based on the context of emerging markets including Viet Nam where there lacks of sufficient information and data disclosure although it might have high growth rate.

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 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. 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 all (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 all (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.

Park et all (2019) found that sentiment caused by investors’ inattentiveness mainly drives the underlying potent relationship between investor sentiment and aggregate stock returns. The results accord with the notion that investor attention generally improves market efficiency.

Conceptual theories

Positive sides of low inflation: Low (not negative) inflation reduces the potential of economic recession by enabling the labor market to adjust more quickly in a downturn, and reduces the risk that a liquidity trap prevents monetary policy from stabilizing the economy. This is explaining why many economists nowadays prefer a low and stable rate of inflation.

It will help investment, encourage exports and prevent boom economy.

Negative side of low inflation: it leads to low aggregate demand and economic growth, recession potential and high unemployment. Production becomes less vibrant. Low inflation makes real wages higher. Workers can thus reduce the supply of labor and increase rest time. On the other hand, low product prices reduce production motivation.
The central bank can use monetary policies, for instance, increasing interest rates to reduce lending, control money supply or the Ministry of finance and the government can use tight fiscal policy (high tax) to achieve low inflation.

Financial and credit risk in the bank system can increase when the financial market becomes more active and bigger, esp. with more international linkage influence. This affects risk increasing in medicine sector.

Hence, central banks, commercial banks, medicine firms and the government need to organize data to analyze and control these risks, including market risk.

METHODOLOGY

We use the data from the stock exchange market in Viet Nam (HOSE and HNX) during the financial crisis 2007-2009 period and the post – low (L) inflation time 2015-2017 to estimate systemic risk results. We perform both fundamental data analysis and financial techniques to calculate equity and asset beta 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 medicine firms in VN stock exchange.

Specifically, stock price data is from live data on HOSE stock exchange during 3 years 2015-2017, which presents the low inflation environment. Then, we use both analytical and summary method to generate analytical results from data calculated.

Stock price data is used to calculate Beta CAPM, i.e, equity beta. Then, we estimate equity beta in both periods: financial crisis and post-L inflation time.

Finally, we use the results to suggest policy for both these enterprises, relevant organizations and government.

Results

General Data Analysis

We get some analytical results form the research sample with10 listed firms in the medicine market with the live date from the stock exchange.

In general, market risk level has decreased, because equity and asset beta mean values are smaller in psot- L inflation environment. But asset beta max and asset beta var are higher than those in the crisis 2007-2009. It means that these listed medicine companies still need to pay attention to risk management policies to reduce more risk.

Empirical Research Findings and Discussion

In the below section, data used are from total 10 listed medicine industry companies on VN stock exchange (HOSE and HNX mainly). Different scenarios are created by comparing the calculation risk data between 2 periods: the post – low inflation period 2015-2017 and the financial crisis 2007-2009.

Market risk (beta) under the impact of tax rate, includes: 1) equity beta; and 2) asset beta. We model our data analysis as in the below figure:

Based on the above calculation result table, we analyze data as follows:

Firstly, we see in the table 1 that more medicine firms (5 over 10 companies) have equity beta values lower (<) than 1, which means risk level acceptable. There are no firms with equity beta > 1. And 3 firms with negative beta values.

And table 2 provides evidence for us to see that equity beta mean of the sample is 0.036, just little lower than (<) 1. It is acceptable.

Then, looking at the table 3, we recognize that there are 2firms with 0 <equity beta values < 1in the crisis , which turn into negative beta, 1 during the post-low inflation period 2015-17. And table 4 shows that there are 3 firms with positive equity beta gap (higher risk in post-L inflation period) and 5 firms with negative equity beta gap (lower risk in post-L inflation period).

Next, table 5 shows that equity beta var in the post-low inflation period are lower (>) than those in the financial crisis 2007-2009. Furthermore, table 5 tells us equity beta max in the post-inflation period 2015-2017 as well as equity beta mean are smaller (>) than those in the financial crisis 2007-2009.

In addition to, looking at the below chart 1, we can find out:

Values of asset and equity beta mean and equity beta var in the post-low inflation 2015-2017 are significantly lower (<) than those in the crisis 2007-2009 while asset beta max and asset beta var are just little higher (>) than those in the financial crisis 2007-2009. It means that the level of risk in the post – low inflation period 2015-17 is lower in general and in average. Although the fluctuation in risk level measured by asset beta var is little higher during the post-low inflation time.

Discussion for further researches

We can continue to analyze risk factors behind the risk scene (risk fluctuation increasing, shown by equity beta var as above analysis) in order to recommend suitable policies and plans to control market risk better.

Conclusion and Policy suggestion

In general, medicine system in Vietnam, a key sector in healthcare industry, has been contributing significantly to the economic development and GDP growth rate of more than 6-7% in recent years. The above analysis show us that despite of market risk decreasing, risk volatility (equity beta var)also decreasing during the post-low inflation period, asset beta max became higher, so medicine firms in Vietnam need to continue increase their corporate governance system, structure and mechanisms, as well as their competitive advantage to control risk better. Also, they need to reduce risk of quality of medical and healthcare venues and reputation risk of medicine companies.

This research paper provides evidence that the market risk potential might be lower in 2015-2017 post-low inflation period (looking again chart 1 – equity beta mean values), while the Exhibit 3 also suggests that the

	Risk level (equity beta)	Risk level (asset beta)	Other measures	Gap
Post – low inflation period	Scenario …	Scenario ..	Scenario ..	Analysis
Financial crisis time				

Figure 1: Analyzing market risk under two (2) scenarios: post – low inflation period 2015-2017 compared to the financial crisis 2007-2009

Table 1 – The Volatility of Market Risk (beta) of Medicine Industry in the post- low inflation period 2015-2017

		2015-2017 (post - low inflation)			
Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Financial leverage	Note
1	AMV	-0.556	-0.285	48.7%	
2	APC				
3	DBM	0.481	0.234	51.3%	
4	DBT				assume debt beta = 0; debt ratio as in F.S 2015; FL calculated as total debt/total capital
5	DCL	-0.266	-0.193	27.3%	
6	DDN	-0.180	-0.020	89.1%	
7	DHG	0.790	0.592	25.0%	
8	DHT	0.011	0.004	61.0%	
9	BCP	0.004	0.001	71.4%	
10	CGP	0.000180	0.000002	98.7%	

Table 2: The Statistics of Volatility of Market Risk (beta) of Medicine Industry in the post-low inflation period 2015-2017

	2015-2017 (post - low inflation)	
Statistic results	Equity beta	Asset beta (assume debt beta = 0)
MAX	0.790	0.592
MIN	-0.556	-0.285
MEAN	0.036	0.042
VAR	0.1798	0.0730
Note: Sample size : 10		

credit growth rate increased in 2016 and slightly decrease in later years (2017-2018). It means that the local economy is trying to control credit growth reasonably, however we need to analyze risk factors more carefully to reduce more market risk.

Looking at the above chart 1, the result rejects the hypothesis 3 mentioning that the mean of equity and asset beta values of these listed medicine companies tend to impose a little high risk level, i.e., beta should higher than (>) 1. Because the equity beta mean is lower in the post-low (L) inflation period, it supports the hypothesis 1 saying that comparing two (2) periods, during the financial crisis impact, the beta or risk level of listed companies in medicine industry will relatively higher than those in the post-low inflation environment. Additionally, the above result rejects the hypothesis 2 stating that because Viet Nam is an emerging and immature financial market and the stock market still in the recovering stage,there will be a large disperse distribution in beta values estimated in the medicine industry. Last

Table 3 : The Comparison of Volatility of Market Risk (beta) of Medicine Industry in the post- low inflation period 2015-2017 and the financial crisis 2007-2009

		2007-2009 (financial crisis)		2015-2017 (post - low inflation)		
Order No.	**Company stock code**	**Equity beta**	**Asset beta (assume debt beta = 0)**	**Equity beta**	**Asset beta (assume debt beta = 0)**	**Note**
1	AMV	0.248	0.232	-0.556	-0.285	
2	APC	0.617	0.535	0.000	0.000	
3	DBM	0.268	0.089	0.481	0.234	
4	DBT	0.661	0.180	0.000	0.000	
5	DCL	0.838	0.393	-0.266	-0.193	assume debt beta = 0; debt ratio as in F.S 2015 and 2008
6	DDN	-1.575	-0.286	-0.180	-0.020	
7	DHG	0.618	0.262	0.790	0.592	
8	DHT	0.491	0.175	0.011	0.004	
9	BCP	n/a	n/a	0.004	0.001	
10	CGP	n/a	n/a	0.000	0.000	

Table 4 : The Difference between Volatility of Market Risk (beta) of Medicine Industry in the post- low inflation period 2015-2017 and the financial crisis 2007-2009

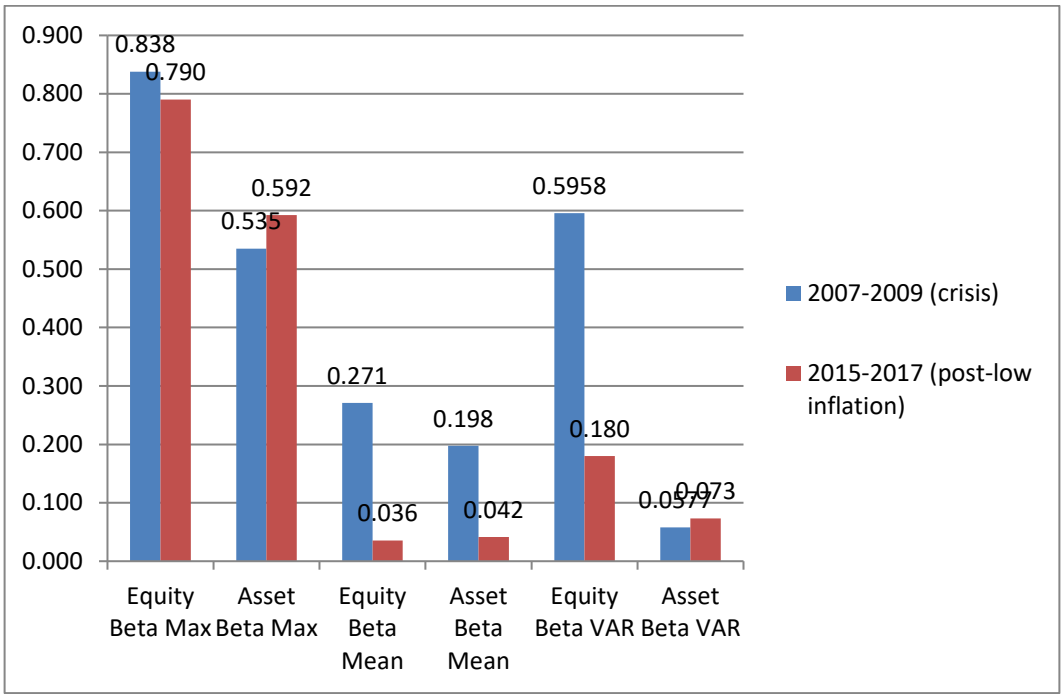
		GAP (+/-) 2015-17 compared to 2007-09		
Order No.	**Company stock code**	**Equity beta**	**Asset beta (assume debt beta = 0)**	**Note**
1	AMV	-0.804	-0.517	
2	APC	-0.617	-0.535	
3	DBM	0.213	0.145	
4	DBT	-0.661	-0.180	
5	DCL	-1.104	-0.586	values (2015-17) minus (-) 2007-09
6	DDN	1.395	0.266	
7	DHG	0.172	0.330	
8	DHT	-0.480	-0.171	
9	BCP			
10	CGP			

Table 5 : Statistics of Volatility of Market Risk (beta) of Medicine Industry in the post- low inflation period 2015-2017 compared to those in the financial crisis 2007-2009

	2007-2009 (crisis)		2015-2017 (post - low inflation)		GAP (+/-) 2015-17 compared to 2007-09	
Statistic results	**Equity beta**	**Asset beta (assume debt beta = 0)**	**Equity beta**	**Asset beta (assume debt beta = 0)**	**Equity beta**	**Asset beta (assume debt beta = 0)**
MAX	0.838	0.535	0.790	0.592	-0.048	0.057
MIN	-1.575	-0.286	-0.556	-0.285	1.019	0.001
MEAN	0.271	0.198	0.036	0.042	-0.235	-0.156
VAR	0.5958	0.0577	0.180	0.073	-0.416	0.015

Note: Sample size : 10

Chart 1 : Statistics of Market risk (beta) in VN Medicine industry in the post – low inflation period 2015-2017 compared to the financial crisis 2007-2009



but not least, as it generates the warning that the risk fluctuation might be higher in the financial crisis and declines during post-low (L) inflation period, esp. under negative impacts from China-Trump commerce war at present, and asset beta max higher in the post-L inflation time, the government and relevant bodies such as Ministry of Finance and State Bank of Vietnam need to consider proper policies (including a combination of fiscal, monetary, exchange rate and price control policies) aiming to reduce the risk volatility and hence, help the real estate system as well as the whole economy become more stable in next development stage. The Ministry of Finance continue to increase the effectiveness of fiscal policies and tax policies which are needed to combine with other macro policies at the same time.

The State Bank of Viet Nam continues to increase the effectiveness of capital providing channels for medicine companies as we could note that in this study,debt leverage has certain impacts on reducing risk level.

Finally, this study opens some new directions for further researches in risk control policies in medicine system as well as in the whole economy. We need to avoid risks for public from bad quality medicine in VN Pharmacy case and manage better medicine inventory as well as financial risk management.

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Exhibit

Exhibit 1 – Inflation, CPI over past 10 years (2007-2017) in Vietnam

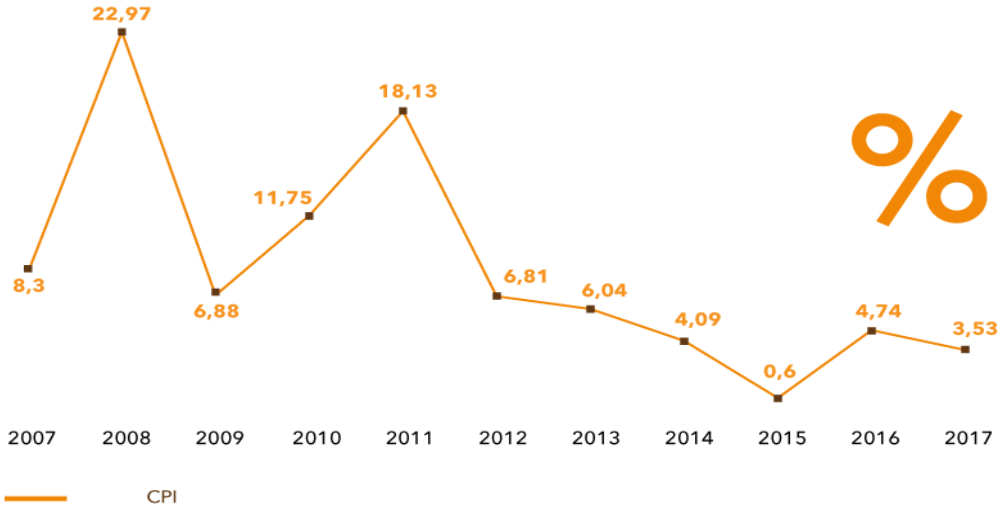

Exhibit 2: GDP growth rate past 10 years (2007-2018) in Vietnam

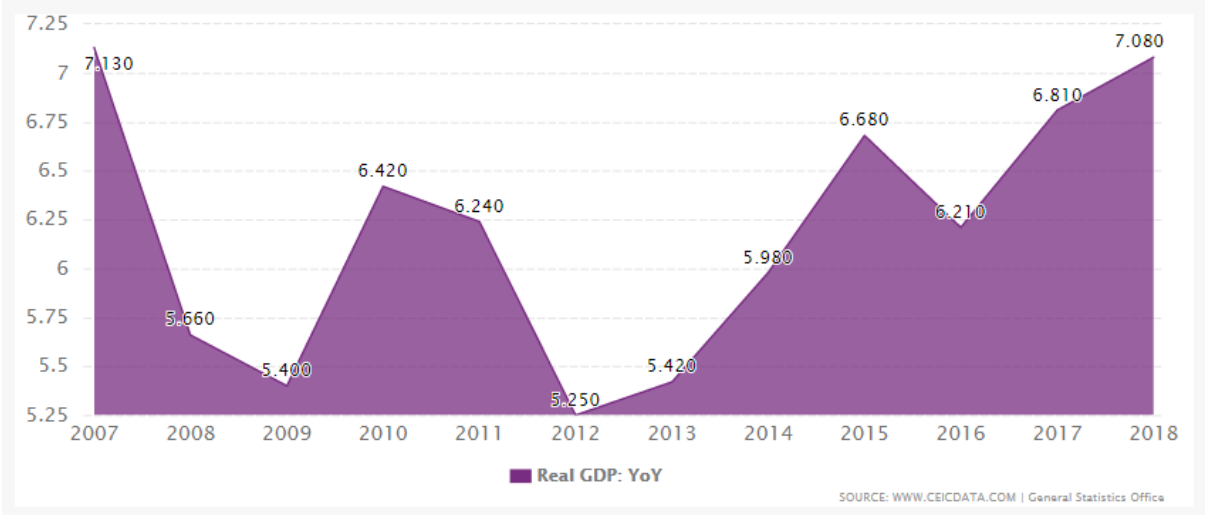

Exhibit 3: Loan/Credit growth rate in the past years (2012-2018) in Vietnam