

The quantified analysis of causes of market risk fluctuations in the group of construction, real estate and construction material companies in Vietnam during and after the global crisis 2007-2011

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Abstract: - This research analyzes the fluctuations on market risk for the listed firms in the Vietnam real estate, construction and construction material industries as it becomes necessary, esp. after the financial crisis 2007-2011. It also provides us with a model to identify key causes of these above risk fluctuations. Firstly, by using quantitative and analytical methods to estimate asset and equity beta of the total 205 listed companies in Vietnam's real estate, construction and construction material industry with a proper traditional model, we found that in the viewpoint of asset beta used as market risk measurement, the construction industry has the lowest risk, next is the construction material industry and real estate one has the highest risk. Secondly, we recognized that in the real estate, construction and construction material industry, the main factors affecting market risk are GDP growth, lending rate, and inflation. Thirdly, by using a proper quantitative analysis method, the study realized that in the viewpoint of asset beta, construction industry has the lowest market risk because of GDP growth decreasing, inflation increasing and average income increasing. On the contrary, real estate industry has the highest market risk because GDP growth decreases and lending rate increases. Finally, this paper provides some outcomes that could provide companies and government with more evidence in establishing their policies in governance and in monitoring these industries.

Key-Words: - construction industry, real estate, exchange rate, lending rate, market risk, policy

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1 Introduction

Vietnam economy experienced high interest rates in 2008, which decreased in 2009 and went up again in 2011 while GDP growth rate reduced in 2009 but recovered in 2010. During the period 2009-2011, the number of real estate transactions in Vietnam declined with huge inventory and real estate price bubble in 2007-2008 has been one of three price bubbles since 1991. In the real estate industry, some companies have investment over their capacity which leads to in-progress projects. In the construction and construction

material industry, during difficult economic time, some cement and steel companies reported losses due to lots of inventories, declining purchasing power. And in all three industries, there is pressure of repaying debt and interests and of high production costs.

This paper is organized as follows. The research issues and literature review will be covered in the next sections (2 and 3), for a short summary. Then, methodology and conceptual theories are introduced in sections 4 and 5. Section 6 describes the data in

empirical analysis. Section 7 presents empirical results and findings. Next, section 8 covers the analytical results. Then, section 9 presents the analysis of risk. Lastly, sections 10 and 11 will present discussion and conclude with some policy suggestions. This paper also supports readers with references, exhibits and relevant web sources. Another point of this paper’s usefulness is that it indicates the higher exchange rate and lending rate, the higher market risk. Hence, it contributes to a suitable macro policies for banks and foreign exchange.

2 Problem Formulation

2.1. Research issues

This study focuses on several issues in the construction company group as followed:

Issue 1: Summarizing market risk fluctuations in the three industries : construction, real estate and construction material

Issue 2: Analyzing the impact of financial leverage (FL) changes on the market risk of three above industries

Issue 3: Identifying causes of the above analysis and giving out some suggestions or solutions.

2.2. Literature review

Probably, the most successful models to account for the time-dependent volatility in financial time series are GARCH processes [7].

Findings 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 [13]. Research stated today, the assumption of efficient capital markets is very controversial, especially in these times of crisis, and is challenged by research showing that the pricing was distorted by detection of long memory [4].

Study 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 [3]. Research mentions that equity volatility increases proportionally with the level of financial leverage, the variation of which is dictated by managerial decisions on a company’s capital structure based on economic conditions. And for a company with a fixed amount of debt, its financial leverage increases when the market price of its stock declines [1]. Then, as research result

pointed, the task of estimating cost of equity in emerging markets is more difficult because of problems such as collecting data in short periods [10]. And study revealed that in different industries in Sri Lanka, the degree of financial leverage has a significant positive correlation with financial risk [6]. Finally, financial leverage can be considered as one among many factors that affect business risk of wholesale and retail firms.

2.5 Methodology

In order to estimate systemic risk results and leverage impact, in this study, we use the live data during the crisis period 2007-2011 from the stock exchange market in Vietnam (HOSE and HNX and UPCOM).

In this research, analytical research methods, philosophical methods and specially, leverage scenario analysis methods are used. Analytical data is obtained from the situation of listed wholesale and retail firms in VN stock exchange and the current tax rate is 25%.

In addition to, quantitative analysis method is used to analyze economic data and identify causes of the empirical findings.

Data is from the stock exchange as followed:

Table 0 – The number of Vietnam listed firms in the three above industries

Market	Listed Real Estate companies (1)	Listed Construction companies (2)	Listed Construction Material companies (3)	Note (4)
Viet Nam	23	77	45	Estimating by traditional method
	22	27	12	Estimating by comparative method
Total	44	104	57	Total firms in groups: 205

(Note: The above data is at the December 12th, 2012, from Viet Nam stock exchange)

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

3 Problem Solution

The study analyzes data of a total of 205 listed firms in the above three industries on VN stock exchange (HOSE and HNX mainly).

In this part, the current level of financial leverage is kept as in the 2011 financial statements which is used to calculate market risk (beta). Then, quantitative

analysis with the support of Eview is used to identify causes of the findings.

Market risk (beta) under the impact of the financial leverage, includes: 1) equity beta; and 2) asset beta.

Table 1 – Market risk level in three industries: real estate, construction and construction material

Equity beta	No. of firms	Financial leverage (average)	Ratio
< 0	0	0,0%	0,0%
0 < beta < 1	95	62,0%	46,1%
Beta > 1	110	63,6%	53,9%
Total	205	63,2%	100,0%

Asset beta	No. of firms	Financial leverage (average)	Ratio
< 0	0	0,0%	0,0%
0 < beta < 1	196	33,5%	95,6%
Beta > 1	9	130,4%	4,4%
Total	205	63,2%	100,0%

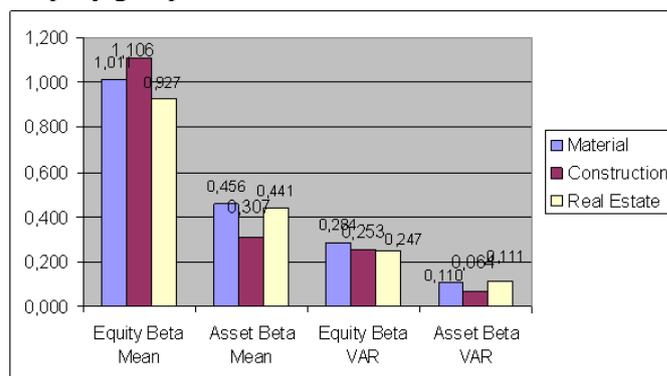
Table 2 – Market risk level statistic results in real estate, construction and construction material company group 2007-2011

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	1,777	1,586	0,190
MIN	0,070	0,019	0,052
MEAN	0,927	0,441	0,487
VAR	0,2468	0,1111	0,136
Note: Sample size : 44 (real estate industry)			
Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	2,884	1,458	1,427
MIN	0,115	0,008	0,107
MEAN	1,106	0,307	0,799
VAR	0,2527	0,0640	0,189
Note: Sample size : 104 firms (construction)			
Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	3,693	1,807	1,885
MIN	0,129	0,041	0,088
MEAN	1,011	0,456	0,554
VAR	0,2839	0,1101	0,174
Note: Sample size : 57 firms (material)			

The above table 1 and 2 give us some results: the construction industry has the lowest beta volatility with the gap of 1.45 (between asset beta max and min) while the real estate industry has the second lowest beta volatility (the gap is 1.57), and the construction material has the largest beta volatility (the gap is 1.77).

Furthermore, the construction industry experienced the largest gap between equity and asset beta (0.799), next is the construction material industry (0.554) and the last is the real estate one (0.487). Hence, FL has the most effective impact on the construction industry, next is the construction material industry and the last is the real estate one. It is the construction industry that has the biggest fluctuation between equity and asset beta var, next is the construction material industry and the last is the real estate one.

Chart 1 – Equity and asset beta of construction company group 2007-2011



The above chart 1 generates some results: Equity beta in the construction industry is the highest, and the lowest is in the real estate industry. Asset beta in the construction material industry is the highest, the lowest is in the construction industry. Then, equity beta volatility in the construction material industry is the highest, the lowest is in the real estate one. Asset beta volatility in the real estate industry is the highest, the lowest is in the construction industry. Therefore, in the viewpoint of asset beta used as market risk measurement, the construction industry has the lowest risk, next is the construction material industry and real estate one has the highest risk.

The analysis of causes:

The key reasons of the above findings will be presented in the following section under a quantitative analysis.

Table 3 – Real estate (asset beta), Equation estimation with Eview 2007-2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.456655	0.051204	8.918367	0.0711
SER02	2.651269	0.101478	26.12657	0.0244
SER03	-0.000289	3.47E-05	-8.308811	0.0763
SER04	-2.035526	0.065618	-31.02065	0.0205
SER05	1.98E-05	3.14E-06	6.303296	0.1002
SER06	-7.724202	0.227420	-33.96454	0.0187
SER07	-0.012419	0.001496	-8.299780	0.0763
R-squared	0.999910	Mean dependent var	0.253500	
Adjusted R-squared	0.999367	S.D. dependent var	0.062658	
S.E. of regression	0.001576	Akaike info criterion	-10.39685	
Sum squared resid	2.48E-06	Schwarz criterion	-10.32734	
Log likelihood	48.58739	F-statistic	1843.110	
Durbin-Watson stat	2.469846	Prob(F-statistic)	0.017828	

Table 4 – Real estate industry 2007-2011, Descriptive statistics

	SER01	SER02	SER03	SER04	SER05	SER06	SER07
Mean	0.253500	0.169375	430.0750	0.131663	16499.63	0.057438	14.65850
Median	0.278000	0.180000	446.4500	0.125200	18370.00	0.060250	14.36600
Maximum	0.303000	0.220000	507.1000	0.220000	20670.00	0.065000	17.96200
Minimum	0.122000	0.105000	316.3000	0.047000	16534.00	0.039000	11.94200
Std. Dev.	0.062658	0.042798	70.32276	0.059859	1676.728	0.008702	2.871613
Skewness	-1.385901	-0.359590	-0.475181	0.047405	0.181885	-1.246708	0.087718
Kurtosis	3.409080	1.657373	1.806648	1.803570	1.442013	3.526955	1.118795
Jarque-Bera	2.616742	0.773289	0.775758	0.480144	0.853218	2.164936	1.189903
Probability	0.270260	0.679333	0.678494	0.786571	0.652719	0.338758	0.551589
Sum	2.028000	1.355000	3440.600	1.053300	147997.0	0.459500	117.2680
Sum Sq. Dev.	0.027482	0.012822	34617.03	0.025082	19679924	0.000530	57.72314
Observations	8	8	8	8	8	8	8

The above table 3 and 4 show that mean of asset beta is 0.253 and the median is 0.278 (low).

With SER01 = asset beta, SER02=Lending rate, SER03=VNIndex, SER04=inflation, SER05=exchange rate, SER06=GDP growth rate, SER07= average income per capita, the regression result with Eview gives us:

$$\text{SER01} = 0.46 + 2.65\text{lendingrate} - 0.0003\text{VnIndex} - 2.04\text{inflation} + (1.98\text{E}-05)\text{exchangerate} - 7.72\text{GDPgrowth} - 0.01\text{averageincome} \text{ (equation 1)}$$

Hence, market risk level or asset beta has the positive relationship with lending rate (strongly, 2.65) and exchange rate. The higher lending rate, the higher market risk.

On the contrary, market risk level or asset beta has the negative relationship with GDP growth (strongly, -

7.72), next is inflation (-2.04), average income (-0.01), and VN index (-0.0003). The higher GDP growth and inflation, the bigger market risk. The higher average income and VN index, the bigger market risk.

The main factors are GDP growth (-), lending rate (+) and inflation (-).

Table 5 – Construction industry (asset beta), Equation estimation with Eview 2007-2011

	SER01	SER02	SER03	SER04	SER05	SER06	SER07
Mean	0.257750	0.169375	430.0750	0.131663	16499.63	0.057438	14.65850
Median	0.261000	0.180000	446.4500	0.125200	18370.00	0.060250	14.36600
Maximum	0.309000	0.220000	507.1000	0.220000	20670.00	0.065000	17.96200
Minimum	0.207000	0.105000	316.3000	0.047000	16534.00	0.039000	11.94200
Std. Dev.	0.028952	0.042798	70.32276	0.059859	1676.728	0.008702	2.871613
Skewness	-0.042474	-0.359590	-0.475181	0.047405	0.181885	-1.246708	0.087718
Kurtosis	3.208923	1.657373	1.806648	1.803570	1.442013	3.526955	1.118795
Jarque-Bera	0.016955	0.773289	0.775758	0.480144	0.853218	2.164936	1.189903
Probability	0.991558	0.679333	0.678494	0.786571	0.652719	0.338758	0.551589
Sum	2.062000	1.355000	3440.600	1.053300	147997.0	0.459500	117.2680
Sum Sq. Dev.	0.005868	0.012822	34617.03	0.025082	19679924	0.000530	57.72314
Observations	8	8	8	8	8	8	8

Table 6 – Construction industry, 2007-2011, Descriptive statistics

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.404421	0.836241	-0.483618	0.7132
SER02	0.242636	1.657294	0.146405	0.9075
SER03	-0.000294	0.000567	-0.518997	0.6952
SER04	-0.887249	1.071652	-0.827926	0.5598
SER05	7.95E-05	5.12E-05	1.551849	0.3644
SER06	1.798566	3.714119	0.484251	0.7129
SER07	-0.048349	0.024437	-1.978497	0.2979
R-squared	0.887044	Mean dependent var	0.257750	
Adjusted R-squared	0.209308	S.D. dependent var	0.028952	
S.E. of regression	0.025744	Akaike info criterion	-4.810648	
Sum squared resid	0.000663	Schwarz criterion	-4.741136	
Log likelihood	26.24259	F-statistic	1.308834	
Durbin-Watson stat	2.469846	Prob(F-statistic)	0.584321	

The above table 5 and 6 show that mean of asset beta is 0.257 and the median is 0.261 (lower than that of real estate industry).

The regression result with Eview gives us:

$$\text{SER01} = -0.4 + 0.24\text{lendingrate} - 0.0003\text{VNIndex} - 0.89\text{inflation} + 7.95\text{Exchangerate} + 1.8\text{GDPgrowth} - 0.05\text{averageincome} \text{ (equation 2)}$$

Hence, market risk level or asset beta has the positive relationship with GDP growth rate (1.8, differ from

real estate), lending rate (0.24) and exchange rate. The higher GDP growth and lending rate, the higher market risk. On the contrary, market risk level or asset beta has the negative relationship with inflation (-0.89), next is average income per capita (-0.05), and VN index (-0.0003). The lower inflation and VNIndex and average income, the bigger market risk. The higher average income and VN index, the bigger market risk. The main factors are GDP growth (+, differ from real estate and construction material), inflation (-) and lending rate (+).

Table 7 – Construction material industry, (asset beta), Equation estimation with Eview 2007-2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.028193	0.751824	-0.037500	0.9761
SER02	0.669226	1.489995	0.449147	0.7313
SER03	-0.000232	0.000510	-0.455674	0.7278
SER04	-0.768368	0.963472	-0.797499	0.5714
SER05	3.91E-05	4.60E-05	0.848633	0.5520
SER06	-1.319138	3.339190	-0.395047	0.7605
SER07	-0.025274	0.021971	-1.150365	0.4556
R-squared	0.830040	Mean dependent var	0.160500	
Adjusted R-squared	-0.189720	S.D. dependent var	0.021220	
S.E. of regression	0.023145	Akaike info criterion	-5.023475	
Sum squared resid	0.000536	Schwarz criterion	-4.953963	
Log likelihood	27.09390	F-statistic	0.813956	
Durbin-Watson stat	2.469846	Prob(F-statistic)	0.689872	

Table 8 – Construction material industry, 2007-2011, Descriptive statistics

	SER01	SER02	SER03	SER04	SER05	SER06	SER07
Mean	0.160500	0.169375	0.300750	0.131663	18499.63	0.057438	14.65850
Median	0.163500	0.180000	446.4500	0.125200	18370.00	0.060250	14.36500
Maximum	0.186000	0.220000	507.1000	0.220000	20670.00	0.065000	17.96200
Minimum	0.112000	0.105000	316.3000	0.047000	16634.00	0.039000	11.94200
Std. Dev.	0.021220	0.042798	70.32276	0.059859	1676.728	0.008702	2.871613
Skewness	-1.540867	-0.359590	-0.475181	0.047405	0.181885	-1.246708	0.087718
Kurtosis	4.802755	1.657373	1.806648	1.803570	1.442013	3.526955	1.118795
Jarque-Bera	4.249004	0.773289	0.775758	0.480144	0.853218	2.164936	1.189903
Probability	0.119492	0.679333	0.678494	0.786571	0.652719	0.338758	0.551589
Sum	1.284000	1.355000	3440.600	1.053300	147997.0	0.459500	117.2680
Sum Sq. Dev.	0.003152	0.012822	34617.03	0.025082	19679924	0.000530	57.72314
Observations	8	8	8	8	8	8	8

The above table 7 and 8 show that mean of asset beta is 0.161 and the median is 0.164 (lower than those of real estate and construction industry). The regression result with Eview gives us:

$$\text{SER01} = -0.03 + 0.7\text{lendingrate} - 0.0002\text{VNIndex} - 0.77\text{inflation} + 3.91\text{E}*\text{exchangerate} - 1.32\text{GDPgrowth} - 0.03\text{averageincome} \quad (\text{equation 3})$$

Hence, market risk level or asset beta has the positive relationship with lending rate (0.7) and exchange rate. The higher exchange rate and lending rate, the higher market risk. On the contrary, market risk level or asset beta has the negative relationship with GDP growth (-1.32), inflation (-0.77), next is average income per capita (-0.03), and VN index (-0.0002). The lower inflation, GDP growth, and VNIndex and average income, the bigger market risk. The higher average income and VN index, the bigger market risk.

The main factors are GDP growth (-, differ from construction), inflation (-) and lending rate (+).

Table 9 – Real estate (equity beta), Equation estimation with Eview 2007-2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.868159	0.984466	1.897638	0.3088
SER02	6.381899	1.951052	3.271004	0.1889
SER03	-0.000407	0.000668	-0.609178	0.6517
SER04	-4.228464	1.261604	-3.351656	0.1846
SER05	-2.54E-05	6.03E-05	-0.420827	0.7464
SER06	-20.56714	4.372454	-4.703798	0.1334
SER07	0.015349	0.028769	0.533540	0.6880
R-squared	0.994292	Mean dependent var	0.791875	
Adjusted R-squared	0.960043	S.D. dependent var	0.151618	
S.E. of regression	0.030308	Akaike info criterion	-4.484282	
Sum squared resid	0.000919	Schwarz criterion	-4.414771	
Log likelihood	24.93713	F-statistic	29.03106	
Durbin-Watson stat	2.469846	Prob(F-statistic)	0.141123	

Table 10 – Real estate 2007-2011, Descriptive statistics

	SER01	SER02	SER03	SER04	SER05	SER06	SER07
Mean	0.791875	0.169375	0.300750	0.131663	18499.63	0.057438	14.65850
Median	0.855500	0.180000	446.4500	0.125200	18370.00	0.060250	14.36500
Maximum	0.917000	0.220000	507.1000	0.220000	20670.00	0.065000	17.96200
Minimum	0.512000	0.105000	316.3000	0.047000	16634.00	0.039000	11.94200
Std. Dev.	0.151618	0.042798	70.32276	0.059859	1676.728	0.008702	2.871613
Skewness	-1.138417	-0.359590	-0.475181	0.047405	0.181885	-1.246708	0.087718
Kurtosis	2.527434	1.657373	1.806648	1.803570	1.442013	3.526955	1.118795
Jarque-Bera	1.802430	0.773289	0.775758	0.480144	0.853218	2.164936	1.189903
Probability	0.406076	0.679333	0.678494	0.786571	0.652719	0.338758	0.551589
Sum	6.335000	1.355000	3440.600	1.053300	147997.0	0.459500	117.2680
Sum Sq. Dev.	0.160917	0.012822	34617.03	0.025082	19679924	0.000530	57.72314
Observations	8	8	8	8	8	8	8

The above table 9 and 10 show that mean of equity beta is 0.792 and the median is 0.855 (lower than 1).

The regression result with Eview gives us:

$$\text{SER01} = 1.87 + 6.38\text{lendingrate} - 0.0004\text{VNIndex} - 4.23\text{inflation} - 2.54\text{E*exchangerate} - 20.57\text{GDPgrowth} + 0.02\text{averageincome} \quad (\text{equation 4})$$

Hence, market risk level or equity beta has the positive relationship with lending rate (strongly, 6.38) and average income (0.02). The higher average income and lending rate, the higher market risk.

On the contrary, market risk level or asset beta has the negative relationship with GDP growth (strongly, -20.57), inflation (-4.23), next is VN index (-0.0004) and exchange rate (2.54E). The lower inflation, GDP growth, and VNIndex and exchange rate, the bigger market risk.

The main factors are GDP growth (-), inflation (-) and lending rate (+).

Table 11 – Construction (equity beta), Equation estimation with Eview 2007-2011

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.262587	4.449480	-0.508506	0.7005
SER02	1.389702	8.818151	0.157596	0.9005
SER03	-0.001475	0.003017	-0.488850	0.7105
SER04	-4.785794	5.702062	-0.839309	0.5555
SER05	0.000429	0.000272	1.575600	0.3600
SER06	9.190803	19.76214	0.465071	0.7229
SER07	-0.260902	0.130027	-2.006524	0.2943
R-squared	0.888117	Mean dependent var	1.352500	
Adjusted R-squared	0.216818	S.D. dependent var	0.154785	
S.E. of regression	0.136981	Akaike info criterion	-1.467395	
Sum squared resid	0.018764	Schwarz criterion	-1.397884	
Log likelihood	12.86958	F-statistic	1.322982	
Durbin-Watson stat	2.469846	Prob(F-statistic)	0.581958	

Table 12 – Construction industry 2007-2011, Descriptive statistics

	SER01	SER02	SER03	SER04	SER05	SER06	SER07
Mean	1.352500	0.169375	430.0750	0.131663	18499.63	0.057438	14.65850
Median	1.375000	0.180000	446.4500	0.125200	18370.00	0.060250	14.36500
Maximum	1.616000	0.220000	507.1000	0.220000	20670.00	0.065000	17.96200
Minimum	1.071000	0.105000	316.3000	0.047000	16634.00	0.039000	11.94200
Std. Dev.	0.154785	0.042798	70.32276	0.059859	1676.728	0.008702	2.871613
Skewness	-0.220446	-0.359590	-0.475181	0.047405	0.181885	-1.246708	0.087718
Kurtosis	3.212854	1.657373	1.806648	1.803570	1.442013	3.526955	1.118795
Jarque-Bera	0.079898	0.773289	0.775758	0.480144	0.853218	2.164936	1.189903
Probability	0.960839	0.679333	0.678494	0.786571	0.652719	0.338758	0.551589
Sum	10.82000	1.355000	3440.600	1.053300	147997.0	0.459500	117.2680
Sum Sq. Dev.	0.167708	0.012822	34617.03	0.025082	19679924	0.000530	57.72314
Observations	8	8	8	8	8	8	8

The above table 11 and 12 show that mean of equity beta is 1.352 and the median is 1.375 (higher than 1 and than that of real estate).

The regression result with Eview gives us:

$$\text{SER01} = -2.26 + 1.39\text{lendingrate} - 0.002\text{VNIndex} - 4.79\text{inflation} + 0.0004\text{exchangerate} + 9.19\text{GDPgrowth} - 0.26\text{averageincome} \quad (\text{equation 5})$$

Hence, market risk level or equity beta has the positive relationship with GDP growth (strongly, 9.19), lending rate (1.39) and exchange rate (0.0004). The higher GDP growth, exchange rate and lending rate, the higher market risk. On the contrary, market risk level or asset beta has the negative relationship with inflation (-4.79), next is average income (-0.26) and VNIndex (-0.002). The lower inflation, average income, and VNIndex and exchange rate, the bigger market risk.

The main factors are GDP growth (+), differ from real estate), inflation (-) and lending rate (+).

Table 13 – Construction material (equity beta), Equation estimation with Eview 2007-2011

Dependent Variable: SER01				
Method: Least Squares				
Date: 10/18/15 Time: 20:57				
Sample: 1 8				
Included observations: 8				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.198506	3.814997	-0.052033	0.9669
SER02	3.287835	7.560708	0.434858	0.7389
SER03	-0.001140	0.002587	-0.440699	0.7357
SER04	-3.775774	4.888964	-0.772306	0.5813
SER05	0.000201	0.000234	0.860885	0.5475
SER06	-6.314386	16.94411	-0.372660	0.7729
SER07	-0.129616	0.111485	-1.162631	0.4522
R-squared	0.827324	Mean dependent var		0.828250
Adjusted R-squared	-0.208731	S.D. dependent var		0.106827
S.E. of regression	0.117448	Akaike info criterion		-1.775090
Sum squared resid	0.013794	Schwarz criterion		-1.705579
Log likelihood	14.10036	F-statistic		0.798533
Durbin-Watson stat	2.469846	Prob(F-statistic)		0.694096

Table 14 – Construction material 2007-2011, Descriptive statistics

	SER01	SER02	SER03	SER04	SER05	SER06	SER07
Mean	0.828250	0.169375	430.0750	0.131663	18499.63	0.057438	14.65850
Median	0.843500	0.180000	446.4500	0.125200	18370.00	0.060250	14.36500
Maximum	0.963000	0.220000	507.1000	0.220000	20670.00	0.065000	17.96200
Minimum	0.587000	0.105000	316.3000	0.047000	16534.00	0.039000	11.94200
Std. Dev.	0.106827	0.042798	70.32276	0.059869	1676.728	0.008702	2.871613
Skewness	-1.436915	-0.369690	-0.475181	0.047405	0.181885	-1.246708	0.087718
Kurtosis	4.665795	1.657373	1.806648	1.803570	1.442013	3.526955	1.118795
Jarque-Bera	3.677924	0.773289	0.775758	0.480144	0.853218	2.164936	1.189903
Probability	0.158982	0.679333	0.678494	0.786571	0.652719	0.336758	0.551569
Sum	6.626000	1.355000	3440.600	1.053300	147997.0	0.459500	117.2680
Sum Sq. Dev.	0.079884	0.012822	34617.03	0.025062	19679924	0.000530	57.72314
Observations	8	8	8	8	8	8	8

The above table 13 and 14 show that mean of equity beta is 0.828 and the median is 0.843 (lower than 1 and than those of construction and real estate).

The regression result with Eview gives us:

$$SER01 = -0.2 + 3.29lendingrate - 0.001VNIndex - 3.78inflation + 0.0002exchangerate - 6.31GDPgrowth - 0.13averageincome \text{ (equation 6)}$$

Hence, market risk level or equity beta has the positive relationship with lending rate (3.29) and exchange rate (0.0002). The higher exchange rate and lending rate, the higher market risk.

On the contrary, market risk level or asset beta has the negative relationship with GDP growth (-6.31), inflation (-3.78), next is average income (-0.13) and VNIndex (-0.001). The lower inflation, average income, and VNIndex and GDP growth rate, the bigger market risk.

The main factors are GDP growth (-, differ from construction), inflation (-) and lending rate (+).

Analysis of causes:

Comparing three (3) industries (+: positive, -:negative), market risk measured by equity beta depends mainly on GDP growth, with the highest level in real estate industry (-20.57), next is construction (+9.19) and the last is construction material (-6.31). Next, market risk measured by equity beta depends on inflation, with the highest level in construction industry (-4.79), next is real estate (-4.23) and the last is construction material (-3.78). The next factor is lending rate, with the highest level in real estate industry (+6.38), next is construction material (+3.29) and the last is construction (+1.39).

And market risk measured by equity beta depends little on average income, with the highest level in construction industry (-0.26), next is construction material (-0.13) and the last is real estate (+0.02).

Looking at exhibit 1,2,3,4,5, showing that:

First, GDP growth rate trend decreasing over years 2007-2011 (exhibit 1) makes:

- Real estate industry: equity beta increases, asset beta increases
- Construction industry: equity beta decreases, asset beta decreases
- Construction material industry: equity beta increases, asset beta increases

Second, lending interest rate trend increasing over years 2007-2011 (exhibit 2) makes:

- Real estate industry: equity beta increases, asset beta increases
- Construction industry: equity beta increases, asset beta increases
- Construction material industry: equity beta increases, asset beta increases

Third, inflation trend slightly increasing over years 2007-11 (exhibit 3) makes:

- Real estate industry: equity beta decreases, asset beta decreases
- Construction industry: equity beta decreases, asset beta decreases
- Construction material industry: equity beta decreases, asset beta decreases

Average income per capita trend increasing over years 2007-11 (exhibit 4) makes:

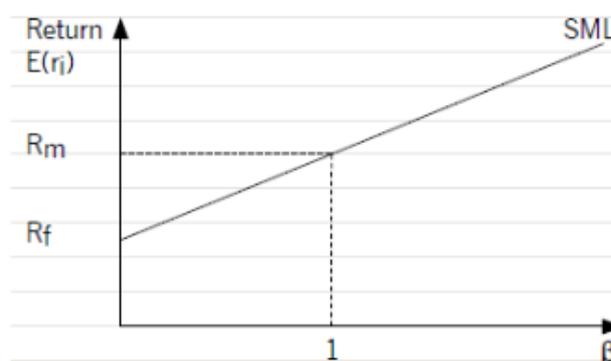
- Real estate industry: equity beta increases, asset beta decreases
- Construction industry: equity beta decreases, asset beta decreases
- Construction material industry: equity beta decreases, asset beta decreases

From the above analysis, it is noted that equity beta in the construction industry is the highest because of increasing lending rate trend. Equity beta in the real estate industry is the lowest due to increasing inflation trend. And in the viewpoint of asset beta, construction industry has the lowest market risk because GDP growth decreases, inflation increases and average income increases. On the contrary, real estate industry has the highest market risk because GDP growth decreases and lending rate increases.

4. Discussion

Real estate industry has the highest market risk measured by asset beta. Other special reasons are: the number of real estate transactions decreasing, limited real estate loans with high rates. Other reasons include: a tightening monetary policy performed in 2008, global economic crisis impact and companies' high stock pricing. The impact of high market risk in the real estate industry is that investors might expect a higher ROI, as we can see in the below SML chart showing the relationship between beta and expected return:

Chart 2 – Security market line (SML)



Next, a high beta in real estate industry can lead to a high cost of equity and high cost of capital. Hence, NPV of these firms' projects or firms' value will decrease.

5 Conclusion and Policy suggestion

Real estate industry: considering target inflation policy with proper controlled growth rate in order to reduce market risk, other policies including supporting GDP growth and reducing lending interest rates. Construction industry: suggesting reasonable salary and wage increasing policy stage-by-stage and creating more jobs in order to reduce market risk. Construction material industry: encouraging GDP growth policy, lending rate reducing plans and target inflation policy with proper controlled growth rate in order to reduce market risk. Last but not least, the government has to consider the impact on the mobility of capital in the markets when it changes its macroeconomic policies whilst continuing to increase the effectiveness of building the legal system and regulation supporting the plan of developing the real estate, construction material and construction market. Impacts of this paper in financial engineering: real estate market need to receive more financial products to recover after economic recession, esp. during this stage. Applications of this paper in banking industry: because lending rate has positive correlation with market risk, banks are in favor of decreasing lending rates will help to reduce market risk.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/ or publication of this article.

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Exhibit

Exhibit 1- VNI Index in VN 2007-2011 (declining)

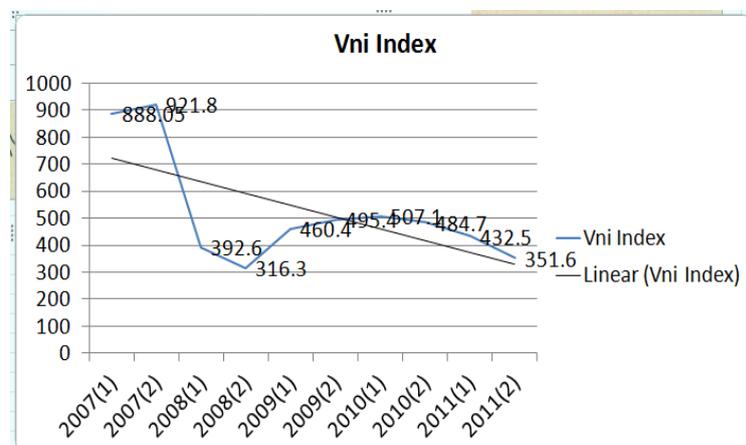


Exhibit 2- USD Exchange rate in VN 2007-2011 (increasing)

