

Full Length Research Paper

The risk level of Viet Nam electric power industry under financial leverage during and after the global crisis 2007-2011

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This paper evaluates the impacts of external financing on market risk for the listed firms in the Viet Nam Electric Power Industry (VNEPI) as it becomes necessary, especially after the financial crisis 2007-2009. Generally speaking, quantitative method is mainly used in this study with a note that risk measure asset beta is mainly derive from equity beta and financial leverage.

First, by using quantitative and analytical methods to estimate asset and equity beta of total 20 listed companies in VNEPI with a proper traditional model, we found out that the beta values, in general, for many institutions are acceptable. The purpose of this study, therefore, to find out how much market risk for this industry in changing contexts of financial leverage.

Second, under 3 different scenarios of changing leverage (in 2011 financial reports, 30% up and 20% down), we recognized that the risk level, measured by equity and asset beta mean, decreases when leverage increases to 30% and it increases if leverage decreases down to 20%.

Third, by changing leverage in 3 scenarios, we recognized the dispersion of risk level, measured by equity beta var, increases if the leverage increases to 30%.

Finally, this paper provides some outcomes that could provide companies and government more evidence in establishing their policies in governance.

KEYWORDS : equity beta, financial structure, financial crisis, risk, external financing, electric power industry

INTRODUCTION

Financial leverage (FL) has certain effects on the risk level of listed companies on stock exchange. Flifel (2012) 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. Gabrijelcic et al. (2013) find a significant negative effect of leverage on firm performance. And firms that had some foreign debt financing performed better than their counterparts.

Measuring beta is a popular method used in many models such as the famous CAPM model. The Viet Nam Electric Power Industry (VNEPI) is selected for the research because until now there is no research published with the same scope and because VNEPI is considered as one of active economic sectors in local

financial markets, which has some positive effects for the economy.

Research Issues

We mention some issues on the estimating of impacts of external financing on beta for listed electric power industry companies in Viet Nam (VN) stock exchange as following:

Issue 1: Whether the risk level of electric power industry firms under the different changing scenarios of leverage increase or decrease so much.

Issue 2: Whether the disperse distribution of beta values become large in the different changing scenarios of leverage estimated in the electric power industry.

Literature Review

Eugene et al. (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.

Needham (2002) mentioned that although debt financing in other contexts usually minimizes the aggregate tax burden of the parties as a whole by conveying an interest deduction, it is often inefficient in the fund context for several reasons, including lack of tax capacity at the portfolio company level, the adverse tax treatment of contingent debt, and the special tax advantages of equity financing afforded some classes of fund investors.

Then, Maria (2012) stated the main determinants of firms' capital structures are related to firms' sensitivities to these systematic sources of risk and they affect asymmetrically low and high leverage firms. And temporary shocks are relatively more important for low leverage firms, and that financial distress risk seems to be captured by the sensitivity of firms' cash flow innovations to market discount rate news. Minnis (2011) found that audited firms, privately-held US firms, have a significantly lower cost of debt and that lenders place more weight on audited financial information in setting the interest rate.

Next, 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 al. (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.

Flifel (2012) stated, 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. Gabrijelcic et al. (2013) find a significant negative effect of leverage on firm performance. And firms that had some foreign debt financing performed better than their counterparts.

Finally, FL can be considered as one among many factors that affect business risk of consumer good firms.

Conceptual Theories

The impact of FL on the economy

A sound and effective financial system has positive effect on the development and growth of the economy.

Financial institutions and markets can enable corporations to solve liquidity needs and enhance long-term investments. This system include many channels for a firm who wants to use FL, which refers to debt or to the borrowing of funds to finance a company's assets.

In a specific industry such as electric power industry, on the one hand, using leverage with a decrease or increase in certain periods could affect tax obligations, revenues, profit after tax and technology innovation and compensation and jobs of the industry.

During and after financial crises such as the 2007-2009 crisis, there raises concerns about the role of FL of many countries, in both developed and developing markets. On the one hand, lending programs and packages might support the business sectors. While it might create more risks for the business and economy.

METHODOLOGY

For estimating systemic risk results and leverage impacts, in this study, we use the live data during the crisis period 2007-2011 from the stock exchange market in VN (HOSE and HNX and UPCOM).

In this research, analytical research method is used, philosophical method is used and specially, leverage scenario analysis method is used. Analytical data is from the situation of listed electric power industry firms in VN stock exchange and current tax rate is 25%.

We select a sample size of 20 listed firms in the electric power industry to estimate statistical parameters such as mean and variance of risk.

General Data Analysis

Firstly, we estimate equity beta values of these firms and use FL to estimate asset beta values of them. Secondly, we change the leverage from what reported in financial statements (F.S) 2011 to increasing 30% and reducing 20% to see the sensitivity of beta values. We found out that in 3 cases, asset beta mean values are estimated at 0,471; 0,389 and 0,539 which are negatively correlated with the leverage. Also in 3 scenarios, we find out equity beta mean values (0,602, 0,512 and 0,664) are also negatively correlated with the leverage. Leverage degree changes definitely has certain effects on asset and equity beta values.

Empirical Research Findings And Discussion

In the below section, data used are from total 20 listed electric power industry companies on VN stock exchange (HOSE and HNX mainly). In the scenario 1, current FL degree is kept as in the 2011 financial statements which is used to calculate market risk (beta). Then, two (2) FL scenarios are changed up to 30% and down to 20%, compared to the current FL degree.

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Table 1: Market risk of listed companies on VNEPI market

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage (F.S reports)
1	BTP	0,840	0,357		57,5%
2	CHP	0,407	0,168	BTP as comparable	58,7%
3	DNC	-0,865	-0,270		68,8%
4	DRL	0,473	0,388	NLC as comparable	17,9%
5	DTV	0,527	0,499	NLC as comparable	5,4%
6	GHC	0,359	0,117	NBP as comparable	67,3%
7	HJS	0,699	0,200		71,3%
8	KHP	0,615	0,308		50,0%
9	NBP	0,914	0,604		33,9%
10	ND2	0,180	0,043	TBC as comparable	76,2%
11	NLC	0,550	0,510		7,2%
12	NT2	0,639	0,137		78,6%
13	PPC	0,811	0,232		71,3%
14	RHC	0,361	0,200		44,7%
15	SBA	0,177	0,062	SJD as comparable	64,8%
16	SEB	0,427	0,194		54,5%
17	SHP	0,485	0,245	BTP as comparable	49,4%
18	SJD	0,420	0,221		47,4%
19	TBC	0,612	0,568		7,3%
20	TIC	0,351	0,343		2,2%
				Average	46,72%

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

Scenario 1: current FL as in financial reports 2011

In this case, all beta values of 20 listed firms on VNEPI market as shown in table 1.

Scenario 2: financial leverage increases up to 30%

If leverage increases up to 30%, all beta values of total 20 listed firms on VNEPI market as shown in table 2 below.

Scenario 3: leverage decreases down to 20%

If leverage decreases down to 20%, all beta values of total 20 listed firms on the electric power industry market in VN as following in table 3 below.

Table 2: Market risks of listed electric power industry firms (case 2)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage (30% up)
1	BTP	0,840	0,212		74,8%
2	CHP	0,246	0,059	BTP as comparable	76,2%
3	DNC	-0,865	-0,092		89,4%
4	DRL	0,448	0,344	NLC as comparable	23,2%
5	DTV	0,520	0,484	NLC as comparable	7,0%
6	GHC	0,146	0,018	NBP as comparable	87,5%
7	HJS	0,699	0,051		92,7%
8	KHP	0,615	0,215		65,0%
9	NBP	0,914	0,511		44,0%
10	ND2	0,007	0,000	TBC as comparable	99,1%
11	NLC	0,550	0,498		9,4%
12	NT2	0,639	-0,014		102,2%
13	PPC	0,811	0,059		92,7%
14	RHC	0,361	0,151		58,1%
15	SBA	0,084	0,013	SJD as comparable	84,2%
16	SEB	0,427	0,124		70,9%
17	SHP	0,358	0,128	BTP as comparable	64,2%
18	SJD	0,420	0,161		61,6%
19	TBC	0,612	0,554		9,5%
20	TIC	0,351	0,341		2,9%
				Average	60,73%

Table 3: Market risk of listed electric power industry firms (case 3)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage (20% down)
1	BTP	0,840	0,453		46,0%
2	CHP	0,505	0,268	BTP as comparable	46,9%
3	DNC	-0,865	-0,389		55,0%
4	DRL	0,489	0,419	NLC as comparable	14,3%
5	DTV	0,532	0,509	NLC as comparable	4,3%
6	GHC	0,487	0,225	NBP as comparable	53,9%
7	HJS	0,699	0,300		57,1%
8	KHP	0,615	0,369		40,0%
9	NBP	0,914	0,666		27,1%
10	ND2	0,282	0,110	TBC as comparable	61,0%
11	NLC	0,550	0,518		5,8%
12	NT2	0,639	0,237		62,9%
13	PPC	0,811	0,348		57,1%
14	RHC	0,361	0,232		35,7%
15	SBA	0,233	0,112	SJD as comparable	51,8%
16	SEB	0,427	0,241		43,6%
17	SHP	0,563	0,341	BTP as comparable	39,5%
18	SJD	0,420	0,261		37,9%
19	TBC	0,612	0,577		5,8%
20	TIC	0,351	0,345		1,8%
				Average	37,37%

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All three above tables and data show that values of equity and asset beta in the case of increasing leverage up to 30% or decreasing leverage degree down to 20% have certain fluctuation.

Comparing statistical results in 3 scenarios of changing leverage:

Table 4: Statistical results (FL in case 1)

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	0,914	0,604	0,3094
MIN	-0,865	-0,270	-0,5946
MEAN	0,449	0,256	0,1927
VAR	0,1353	0,0417	0,0936
Note: Sample size : 20			

Table 5: Statistical results (FL in case 2)

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	0,914	0,554	0,3594
MIN	-0,865	-0,092	-0,7730
MEAN	0,409	0,191	0,2182
VAR	0,1500	0,0393	0,1107
Note: Sample size : 20			

Table 6: Statistical results (FL in case 3)

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	0,914	0,666	0,2475
MIN	-0,865	-0,389	-0,4757
MEAN	0,473	0,307	0,1661
VAR	0,1314	0,0482	0,0832

Based on the above results, we find out:

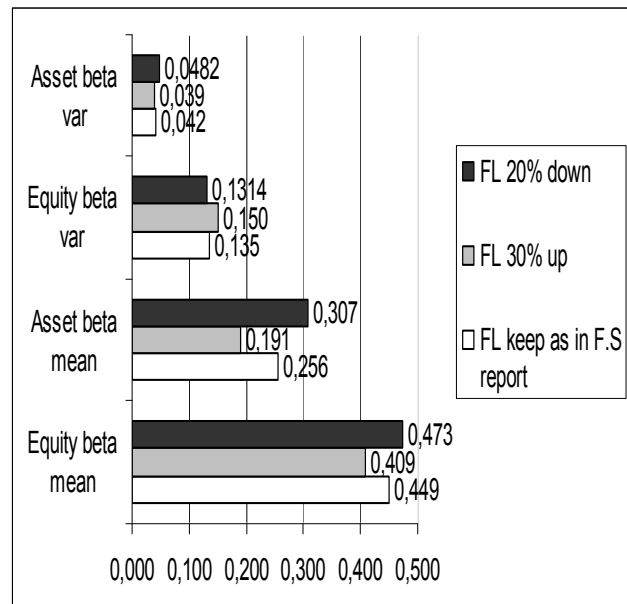
Equity beta mean values in all 3 scenarios are low (< 0.5) and asset beta mean values are also small (< 0.4) and max equity beta values are lower than (<) 1. In the case of reported leverage in 2011, equity beta value fluctuates in an acceptable range from -0,865 (min) up to 0,914 (max) and asset beta fluctuates from -0,270 (min) up to 0,604 (max). If leverage increases to 30%, equity beta moves in an unchanged range and asset beta moves from -0,092 (min) up to 0,554 (max). Hence, we note that there is an increase in asset beta min value if leverage increases. When leverage decreases down to 20%, equity beta value moves in an unchanged range

and asset beta changes from -0,389 (min) up to 0,666 (max). So, there is a small increase in equity beta min value and small decrease in asset beta min when leverage decreases in scenario 3.

Beside, Exhibit 5 informs us that in the case 30% leverage up, average equity beta value of 20 listed firms decreases down to 0,040 while average asset beta value of these 20 firms decreases little less to 0,065. Then, when leverage reduces to 20%, average equity beta value of 20 listed firms goes up to 0,024 and average asset beta value of 20 firms up to 0,051.

The below chart shows us : when leverage degree decreases down to 20%, average equity and asset beta values increase slightly (0,473 and 0,307) compared to those at the initial reported leverage (0,449 and 0,256). Then, when leverage degree increases up to 30%, average equity beta decreases little more and average asset beta value also decreases more (to 0,409 and 0,191). However, the fluctuation of equity beta value (0,150) in the case of 30% leverage up is higher than (>) the results in the rest 2 leverage cases. And we could note that the using of leverage in the case of 30% leverage up causes a decrease in asset beta var down to 0,039.

Figure 1: Comparing statistical results of three (3) scenarios of changing FL



Risk analysis

In short, the using of FL could have both negatively or positively impacts on the financial results or return on equity of a company. The more debt the firm uses, the more risk it takes. Beside, the increasing interest on loans might drive the earning per share (EPS) lower.

On the other hand, in the case of increasing leverage, the company will expect to get more returns. The FL becomes worthwhile if the cost of additional FL is lower than the additional earnings before taxes and interests (EBIT). Considering risk versus return, FL becomes a decisional variable for managers.

DISCUSSION

Looking at exhibit 7, we can see asset beta mean and equity beta mean in case leverage up 30% (0,191 and 0,409) are lower than those of consumer good industry (0,222 and 0,630). This relatively shows us that FL does affect asset beta values.

CONCLUSION AND POLICY SUGGESTION

In general, the government has to consider the impacts on the mobility of capital in the markets when it changes the macro policies. Beside, it continues to increase the effectiveness of building the legal system and regulation supporting the plan of developing electric power market. We also suggest that the Ministry of Finance continues to increase the effectiveness of fiscal policies and tax policies which are needed to combine with other macro policies at the same time. And the State Bank of VN continues to increase the effectiveness of capital providing channels for electric power companies as we could note that in this study when leverage is going to increase up to 30%, the risk level decreases much as well as the asset beta var, compared to the case it is going to decrease down to 20%.

Finally, this paper suggests implications for further research and policy suggestion for the VN government and relevant organizations, economists and investors from current market conditions.

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EXHIBITS

Exhibit 1: Interest rates in banking industry during crisis
(source: Viet Nam commercial banks)

Year	Borrowing Interest rates	Deposit Rates
2011	18%-22%	13%-14%
2010	19%-20%	13%-14%
2009	9%-12%	9%-10%
2008	19%-21%	15%-16,5%
2007	12%-15%	9%-11%

Note : Approximately (2007: required reserves ratio at SBV is changed from 5% to 10%)
(2009: special supporting interest rate is 4%)

Exhibit 2: Basic interest rate changes in Viet Nam
(source: State Bank of Viet Nam and Viet Nam economy)

Year	Basic rate	Note
2011	9%	
2010	8%	
2009	7%	
2008	8,75%-14%	Approximately, fluctuated
2007	8,25%	
2006	8,25%	
2005	7,8%	
2004	7,5%	
2003	7,5%	
2002	7,44%	
2001	7,2%-8,7%	Approximately, fluctuated
2000	9%	

Exhibit 3: Inflation, GDP growth and macroeconomics factors
(source: Viet Nam commercial banks and economic statistical bureau)

Year	Inflation	GDP	USD/VND rate
2011	18%	5,89%	20.670
2010	11,75%	6,5%	19.495
	(Estimated at Dec 2010)	(expected)	
2009	6,88%	5,2%	17.000
2008	22%	6,23%	17.700
2007	12,63%	8,44%	16.132
2006	6,6%	8,17%	
2005	8,4%		
Note		approximately	

Exhibit 4: GDP growth Việt Nam 2006-2010 (source: Bureau Statistic)

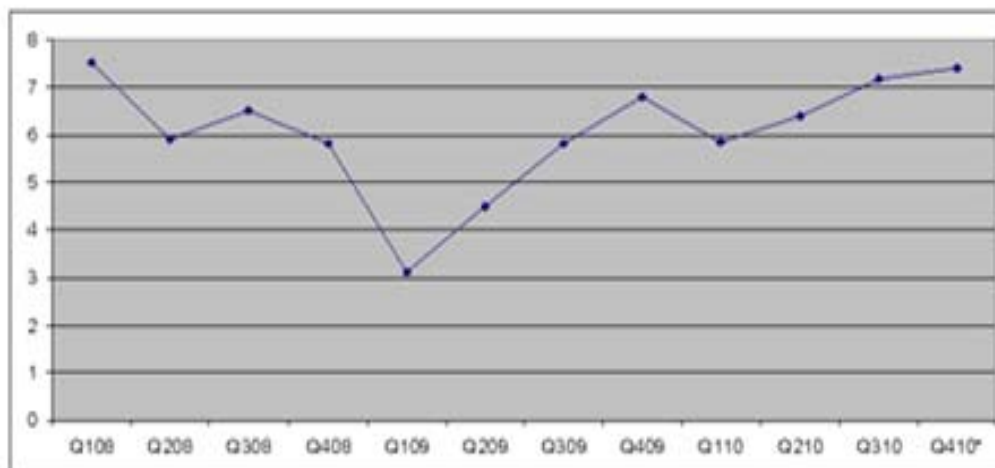


Exhibit 5: Increase/decrease risk level of listed electric power industry firms under changing scenarios of leverage : in 2011 F.S reports, 30% up, 20% down in the period 2007 - 2011

Order No.	Company stock code	FL keep as in F.S report		FL 30% up		FL 20% down	
		Equity beta	Asset beta	Increase /Decrease (equity beta)	Increase /Decrease (asset beta)	Increase /Decrease (equity beta)	Increase /Decrease (asset beta)
1	BTP	0,840	0,357	0,000	-0,145	0,000	0,097
2	CHP	0,407	0,168	-0,160	-0,110	0,098	0,100
3	DNC	-0,865	-0,270	0,000	0,178	0,000	-0,119
4	DRL	0,473	0,388	-0,025	-0,044	0,016	0,031
5	DTV	0,527	0,499	-0,007	-0,015	0,005	0,010
6	GHC	0,359	0,117	-0,213	-0,099	0,128	0,107
7	HJS	0,699	0,200	0,000	-0,150	0,000	0,100
8	KHP	0,615	0,308	0,000	-0,092	0,000	0,062
9	NBP	0,914	0,604	0,000	-0,093	0,000	0,062
10	ND2	0,180	0,043	-0,173	-0,043	0,102	0,067
11	NLC	0,550	0,510	0,000	-0,012	0,000	0,008
12	NT2	0,639	0,137	0,000	-0,151	0,000	0,100
13	PPC	0,811	0,232	0,000	-0,174	0,000	0,116
14	RHC	0,361	0,200	0,000	-0,048	0,000	0,032
15	SBA	0,177	0,062	-0,092	-0,049	0,056	0,050
16	SEB	0,427	0,194	0,000	-0,070	0,000	0,047
17	SHP	0,485	0,245	-0,127	-0,117	0,079	0,096
18	SJD	0,420	0,221	0,000	-0,060	0,000	0,040
19	TBC	0,612	0,568	0,000	-0,013	0,000	0,009
20	TIC	0,351	0,343	0,000	-0,002	0,000	0,002
			Average	-0,040	-0,065	0,024	0,051

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Exhibit 6: VNI Index and other stock market index during crisis 2006-2010

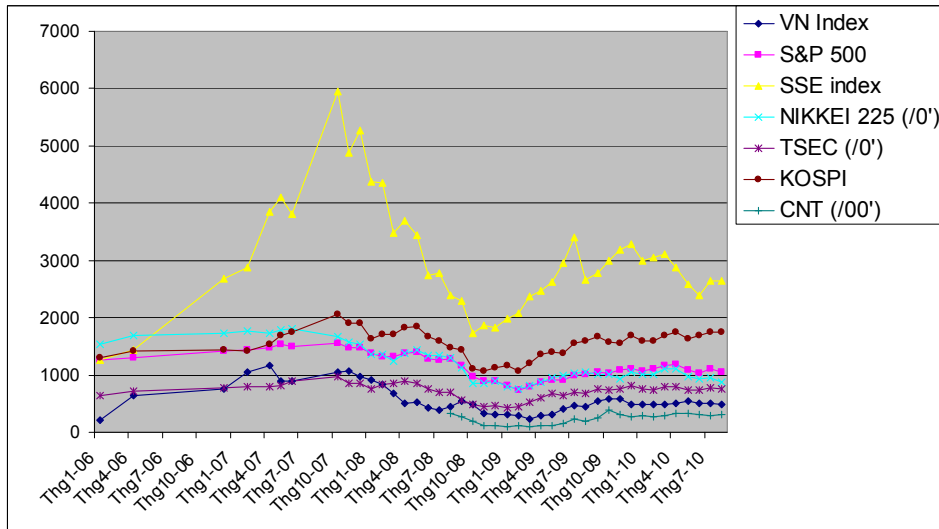


Exhibit 7: Comparing statistical results of three (3) scenarios of changing FL of 121 listed firms in the consumer good industry

