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Tax rates effects on the risk level of listed Viet Nam electric power firms during global economic crisis 2007-2009

Dinh Tran Ngoc Huy

MBA, PhD candidate, Banking Universisty HCMC, Viet Nam – GSIM International University of Japan, Japan.

Abstract
The emerging stock market in Viet Nam has been developed since 2006 and affected by the financial crisis 2007-2009. This study analyzes the impacts of tax policy on market risk for the listed firms in the electric power industry as it becomes necessary.
First, by using quantitative and analytical methods to estimate asset and equity beta of total 20 listed companies in Viet Nam electric power industry with a proper traditional model, we found out that the beta values, in general, for many institutions are acceptable.
Second, under 3 different scenarios of changing tax rates (20%, 25% and 28%), we recognized that there is not large disperse in equity beta values, estimated at 0,486, 0,489 and 0,491.
Third, by changing tax rates in 3 scenarios (25%, 20% and 28%), we recognized equity beta mean values have positive relationship with the increasing levels of tax rate.
Finally, this paper provides some outcomes that could provide companies and government more evidence in establishing their policies in governance.

Keywords: Beta, capital structure, economic crisis, risk, tax rate, electric power industry

1. Introduction
Together with the development of the whole economy and the growth of FDI, throughout many recent years, Viet Nam electric power industry is considered as one of active economic sectors, which has some positive effects for the economy.
This paper is organized as follow. The research issues and literature review will be covered in next sessions 2 and 3, for a short summary. Then, methodology and conceptual theories are introduced in session 4 and 5. Session 6 describes the data in empirical analysis. Session 7 presents empirical results and findings. Next, session 8 covers the analytical results. Then, session 9 presents analysis of risk. Lastly, session 10 will conclude with some policy suggestions. This paper also supports readers with references, exhibits and relevant web sources.

2. Research Issues
We mention some issues on the estimating of impacts of tax rates on beta for listed electric power companies in Viet Nam stock exchange as following:
Issue 1: Whether the risk level of electric power firms under the different changing scenarios of tax rates increase or decrease so much.
Issue 2: Whether the disperse distribution of beta values become large in the different changing scenarios of tax rates estimated in the electric power industry.
Beside, we also propose some hypotheses for the above issues:
Hypothesis 1: because tax may strongly affect business returns, changing tax scenarios could strongly affect firm risk.
Hypothesis 2: as tax policy is vital for the business development, there will be large disperse in beta or risk values estimated.

3. Literature review
Smith (2004) mentions in Chicago, properties located in a designated TIF (tax increment financing) district will exhibit higher rates of appreciation after the area is designated a qualifying TIF district when compared to those properties selling outside TIF districts, and when compared to properties that sell within TIF district boundaries prior to designation.
David (2009) stated the U.S states can increase the likelihood of using tax rate adjustments to cope with fiscal volatility rather than (more harmful) spending fluctuations. Robert et all (2011) recognized a significant positive relation between changes in intercorporate investment and changes in corporate marginal tax rates on ordinary income.
George and Jot Yau (2012) found that there is a positive relationship between transaction cost and price volatility, suggesting that the imposition of a transaction tax could increase financial market fragility, increasing the likelihood of a financial crisis rather than reducing it. Mark (2012) found in some European countries during the crisis raising taxe rates and tax burdens, the trend in which overall revenue levels were broadly stable while marginal rates in corporate and top personal income declined has stopped. Then, Filip (2012) believed low levels of taxation, esp. low levels of taxation on the income or wealth of the so-called productive segments of society are beneficial for economic growth.
Finally, tax rate can be considered as one among many factors that affect business risk of electric power firms.

4. Conceptual theories
The impact of fiscal policy on the economy
Tax policy is one among major fiscal policies. When the government decides to change the tax policy or tax rates, the mobility of capital in the markets will be affected.

In a specific industry such as electric power industry, on the one hand, using tax policy with a decrease or increase in tax rate could affect tax revenues, profit after tax and financial results and compensation and jobs of the industry. And it also shows the purpose of fiscal policy: following either contractionary or expansionary directions.

During and after financial crises such as the 2007-2009 crisis, there raises concerns about fiscal policies or public policies of many countries, in both developed and developing markets. The government might choose either lowering the tax rates or cutting the public expenditures while increasing demand stimulating programs to resolve difficulties from the crisis.

5. Methodology

In this study, we use the live data during the crisis period 2007-2011 from the stock exchange market in Viet Nam (HOSE and HNX) to estimate systemic risk results and tax impacts.

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

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

6. General Data Analysis

The research sample has total 20 listed firms in the electric power market with the live data from the stock exchange.

Firstly, we estimate equity beta values of these firms and use financial leverage to estimate asset beta values of them. Secondly, we change the tax rate from 25% to 28% and 20% to see the sensitivity of beta values. We found out that in 3 cases (rate = 20%, 25%, and 28%), asset beta mean is estimated at 0,304, 0,305 and 0,306 which are almost the same. Also in 3 scenarios, we find out var of asset beta estimated at 0,094, 0,094 and 0,093 (almost the same) which shows small risk dispersion. Tax rate changes almost has no effect on asset beta var under financial leverage.

7. Empirical Research Findings and Discussion

In the below section, data used are from total 20 listed electric power companies on VN stock exchange (HOSE and HNX mainly). In the scenario 1, current tax rate is 25% which is used to calculate market risk (beta). Then, two (2) tax rate scenarios are changed up to 28% and down to 20%, compared to the current corporate tax rate.

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

7.1 Scenario 1: current tax rate is 25%

In the case of tax rate of 25%, all beta values of 20 listed firms on VN electric power market as following:

Table 1: Market risk of listed companies on VN electric power market (t = 25%)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage
1	BTP	0,720	0,306		57,5%
2	CHP	0,349	0,144	BTP as comparable	58,7%
3	DNC	-0,052	-0,016		68,8%
4	DRL	0,458	0,376	NLC as comparable	17,9%
5	DTV	0,511	0,483	NLC as comparable	5,4%
6	GHC	0,496	0,162	NBP as comparable	67,3%
7	HJS	0,407	0,117		71,3%
8	KHP	0,967	0,484		50,0%
9	NBP	1,262	0,835		33,9%
10	ND2	0,165	0,039	TBC as comparable	76,2%
11	NLC	0,532	0,494		7,2%
12	NT2	-0,138	-0,029		78,6%
13	PPC	0,792	0,227		71,3%
14	RHC	0,270	0,149		44,7%
15	SBA	0,146	0,052	SJD as comparable	64,8%
16	SEB	0,331	0,151		54,5%
17	SHP	0,415	0,210	BTP as comparable	49,4%
18	SJD	0,348	0,183		47,4%
19	TBC	0,563	0,522		7,3%
20	TIC	1,247	1,220		2,2%

7.2. Scenario 2: tax rate increases up to 28%

If corporate tax rates increases up to 28%, all beta values of total 20 listed firms on VN electric power market as below:

Table 2: Market risks of listed electric power firms (t = 28%)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage
1	BTP	0,720	0,306		57,5%
2	CHP	0,356	0,147	BTP as comparable	58,7%
3	DNC	-0,052	-0,016		68,8%
4	DRL	0,460	0,378	NLC as comparable	17,9%
5	DTV	0,511	0,484	NLC as comparable	5,4%
6	GHC	0,508	0,166	NBP as comparable	67,3%
7	HJS	0,407	0,117		71,3%
8	KHP	0,967	0,484		50,0%
9	NBP	1,262	0,835		33,9%
10	ND2	0,170	0,040	TBC as comparable	76,2%
11	NLC	0,532	0,494		7,2%
12	NT2	-0,138	-0,029		78,6%
13	PPC	0,792	0,227		71,3%
14	RHC	0,270	0,149		44,7%
15	SBA	0,150	0,053	SJD as comparable	64,8%
16	SEB	0,331	0,151		54,5%
17	SHP	0,423	0,214	BTP as comparable	49,4%
18	SJD	0,348	0,183		47,4%
19	TBC	0,563	0,522		7,3%
20	TIC	1,247	1,220		2,2%

7.3. Scenario 3: tax rate decreases down to 20%

If corporate tax rate decreases down to 20%, all beta values of total 9 listed firms on the banking market in VN as following:

Table 3: Market risk of listed banking firms (t = 20%)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage
1	BTP	0,720	0,306		57,5%
2	CHP	0,337	0,139	BTP as comparable	58,7%
3	DNC	-0,052	-0,016		68,8%
4	DRL	0,453	0,372	NLC as comparable	17,9%
5	DTV	0,509	0,482	NLC as comparable	5,4%
6	GHC	0,476	0,156	NBP as comparable	67,3%
7	HJS	0,407	0,117		71,3%
8	KHP	0,967	0,484		50,0%
9	NBP	1,262	0,835		33,9%
10	ND2	0,158	0,038	TBC as comparable	76,2%
11	NLC	0,532	0,494		7,2%
12	NT2	-0,138	-0,029		78,6%
13	PPC	0,792	0,227		71,3%
14	RHC	0,270	0,149		44,7%
15	SBA	0,141	0,050	SJD as comparable	64,8%
16	SEB	0,331	0,151		54,5%
17	SHP	0,404	0,204	BTP as comparable	49,4%
18	SJD	0,348	0,183		47,4%
19	TBC	0,563	0,522		7,3%
20	TIC	1,247	1,220		2,2%

All three above tables and data show that values of equity and asset beta in the case of increasing tax rate up to 28% or decreasing rate down to 20% have small fluctuation.

8. Comparing statistical results in 3 scenarios of changing tax rate

Table 4: Statistical results (tax rate = 25%)

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	1,262	1,220	0,0425
MIN	-0,138	-0,029	-0,1084
MEAN	0,489	0,305	0,1841
VAR	0,1362	0,0936	0,0426

Note: Sample size : 20

Table 5: Statistical results (tax rate = 28%)

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	1,262	1,220	0,0425
MIN	-0,138	-0,029	-0,1084
MEAN	0,491	0,306	0,1853
VAR	0,1358	0,0934	0,0423

Note: Sample size : 20

Table 6: Statistical results (tax rate = 20%)

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	1,262	1,220	0,0425
MIN	-0,138	-0,029	-0,1084
MEAN	0,486	0,304	0,1824
VAR	0,1369	0,0939	0,0431

Note: Sample size : 20

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) although max equity beta values in some cases might be higher than (>) 1. In the case of current tax rate of 25%, equity beta value fluctuates in an acceptable range from -0,138 (min) up to 1,262 (max) and asset beta fluctuates from -0,029 (min) up to 1, 22 (max). If corporate tax rate increases to 28%, equity beta and asset beta move in an unchanged range. Likewise, when tax rate decreases down to 20%, equity beta value and asset beta vary in an unchanged range.
Beside, Exhibit 6 informs us that in the case 28% tax rate, average equity beta value of 20 listed firms increases up to 0,002 while average asset beta value of these 20 firms increase less slightly up to 0,001. Then, when tax rate reduces to 20%, average equity beta value of 20 listed firms reduce to -0,003 and average asset beta value of 20 firms down to -0,001.
The below chart 1 shows us : when tax rate decreases down to 20%, average equity and asset beta values decrease slightly (0,486 and 0,304) compared to those at the initial rate of 25% (0,489 and 0,305). At the same time, when tax rate increases up to 28%, average equity beta increases slightly whereas average asset beta value remains unchanged (to 0,491 and 0,306). However, the fluctuation of equity beta value (0,137) in the case of 20% tax rate is higher than (>) the results in the rest 2 tax rate cases.

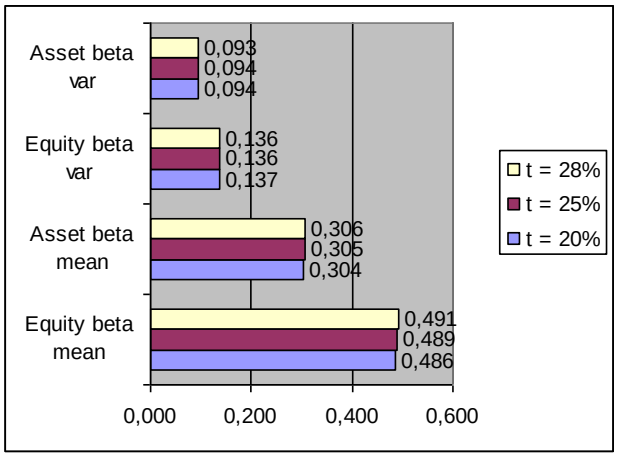

Chart 1: Comparing statistical results of three (3) scenarios of changing tax rate (2007-2009)

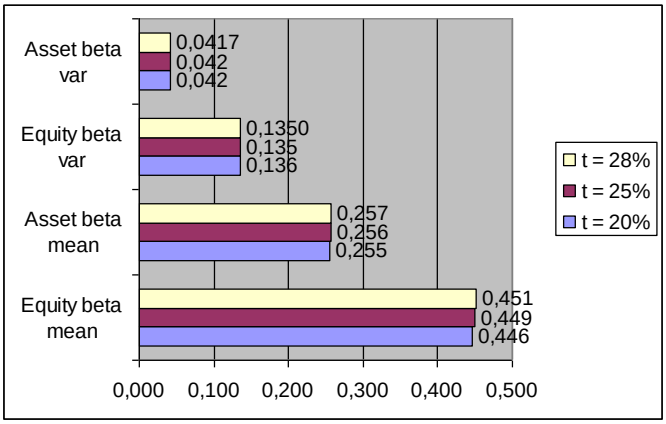

Chart 2: Comparing statistical results of three (3) scenarios of changing tax rate (2007-2011)

9. Risk analysis

On the one hand, in the case of decreasing tax rate, (20%), the market and companies can receive more benefits such as generating more jobs, output and compensation, but the government budget can have deficit and the government has to cut expenditures. Hence, changes in tax rates can have both positive and negative impacts on the local market.
On the other hand, in the case of increasing tax rate (28%), the government will have budget to finance public expenditures but the income tax burden could reduce both demand and supply, as well as the output, jobs and compensation.

Exhibit

Exhibit 1: Interest rates in banking industry during crisis

Year	Borrowing Interest rates	Deposit Rates	Note
2011	18%-22%	13%-14%	
2010	19%-20%	13%-14%	Approximately (2007: required reserves ratio at SBV is changed from 5% to 10%) (2009: special supporting interest rate is 4%)
2009	9%-12%	9%-10%	
2008	19%-21%	15%-16,5%	
2007	12%-15%	9%-11%	

(**Source:** Viet Nam commercial banks)

Exhibit 2: Basic interest rate changes in Viet Nam

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%	

(**Source:** State Bank of Viet Nam and Viet Nam economy)

Exhibit 3: Inflation, GDP growth and macroeconomics factors

Year	Inflation	GDP	USD/VND rate
2011	18%	5,89%	20.670
2010	11,75% (Estimated at Dec 2010)	6,5% (expected)	19.495
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		

(**Source:** Viet Nam commercial banks and economic statistical bureau)

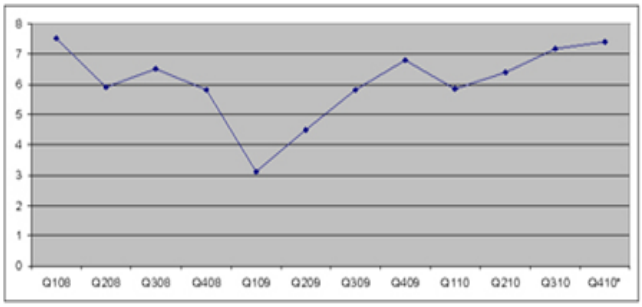

Exhibit 4: GDP growth Việt Nam 2006-2010 (*source: Bureau Statistic*)

Exhibit 5: Risk and financial leverage of 9 listed banking firms on VN stock exchange period 2007-2011

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Financial leverage
1	ACB	0,7874	0,0378	95,2%
2	CTG	0,5540	0,0312	94,4%
3	EIB	0,3847	0,0365	90,5%
4	HBB	0,1335	0,0138	89,7%
5	MBB	0,0722	0,0054	92,5%
6	NVB	0,0211	0,0026	87,7%
7	SHB	1,0038	0,0824	91,8%
8	STB	0,7395	0,0721	90,3%
9	VCB	0,4083	0,0299	92,7%

Exhibit 6: Increase/decrease risk level of listed electric power firms under changing scenarios of tax rates: 25%, 28%, 20% period 2007 - 2009

Order No.	Company stock code	t = 25%		t = 28%		t = 20%	
		Equity beta	Asset beta	Increase /Decrease (equity beta)	Increase /Decrease (asset beta)	Increase /Decrease (equity beta)	Increase /Decrease (asset beta)
1	BTP	0,720	0,306	0,000	0,000	0,000	0,000
2	CHP	0,349	0,144	0,007	0,003	-0,012	-0,005
3	DNC	-0,052	-0,016	0,000	0,000	0,000	0,000
4	DRL	0,458	0,376	0,003	0,002	-0,004	-0,003
5	DTV	0,511	0,483	0,001	0,001	-0,001	-0,001
6	GHC	0,496	0,162	0,012	0,004	-0,019	-0,006
7	HJS	0,407	0,117	0,000	0,000	0,000	0,000
8	KHP	0,967	0,484	0,000	0,000	0,000	0,000
9	NBP	1,262	0,835	0,000	0,000	0,000	0,000
10	ND2	0,165	0,039	0,005	0,001	-0,007	-0,002
11	NLC	0,532	0,494	0,000	0,000	0,000	0,000
12	NT2	-0,138	-0,029	0,000	0,000	0,000	0,000
13	PPC	0,792	0,227	0,000	0,000	0,000	0,000
14	RHC	0,270	0,149	0,000	0,000	0,000	0,000
15	SBA	0,146	0,052	0,003	0,001	-0,005	-0,002
16	SEB	0,331	0,151	0,000	0,000	0,000	0,000
17	SHP	0,415	0,210	0,007	0,004	-0,011	-0,006
18	SJD	0,348	0,183	0,000	0,000	0,000	0,000
19	TBC	0,563	0,522	0,000	0,000	0,000	0,000
20	TIC	1,247	1,220	0,000	0,000	0,000	0,000
			Average	0,002	0,001	-0,003	-0,001

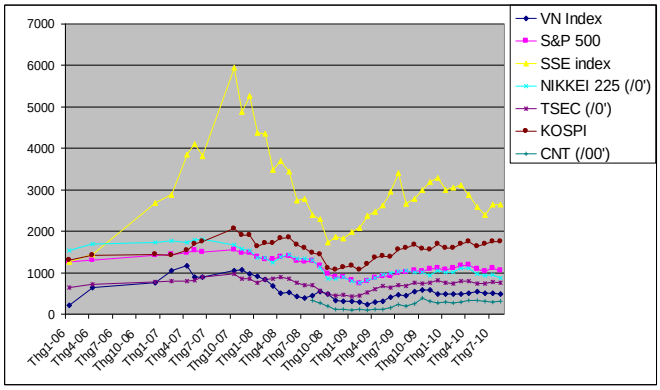

Exhibit 7- VNI Index and other stock market index during crisis 2006-2010

10. Conclusion and Policy suggestion

In summary, the government has to consider the impacts on the mobility of capital in the markets when it changes the tax policy or tax rates. Beside, it continues to increase the effectiveness of building the legal system and regulation and macro policies supporting the plan of developing the electric power market. 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, although we could note that in this study when tax rate is going to increase up to 28%, the risk level does not increase so much, compared ot the case it is going to decrease down to 20%. And the risk dispersion during 2007-2009 (asset beta var of 0,094) is higher than that during 2007-2011 (0,042) in case tax 25%.

The State Bank of Viet Nam continues to increase the effectiveness of capital providing channels for electric power companies. Furthermore, the entire efforts among many different government bodies need to be coordinated.

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

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