

Research article

# The Risk Level of Viet Nam Hardware Industry Under Financial Leverage During and After The Global Crisis 2007-2011

Dinh Tran Ngoc Huy <sup>1</sup>

E-mail: [dtanhuy2010@gmail.com](mailto:dtanhuy2010@gmail.com)

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## ABSTRACT

After the financial crisis 2007-2009, this paper evaluates the impacts of external financing on market risk for the listed firms in the Viet nam hardware industry. First, by using quantitative and analytical methods to estimate asset and equity beta of total 22 listed companies in Viet Nam hardware 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 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 and asset beta var, increases if the leverage increases to 30%. But the asset beta var value is quite small, showing leverage efficiency. 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, hardware industry

JEL CLASSIFICATION : G010, G100, G390

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## 1. Introduction

Financial system development has positive effect for the economic growth, throughout many recent years, and Viet Nam hardware industry is considered as one of active economic sectors in local financial markets, 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

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<sup>1</sup> *MBA, PhD candidate*, Banking University, HCMC – GSIM, International University of Japan, Japan, [dtanhuy2010@gmail.com](mailto:dtanhuy2010@gmail.com)

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

Issue 1: Whether the risk level of hardware 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 hardware industry.

### **3. Literature review**

Goldsmith (1969), Mc Kinnon (1973) and Shaw (1973) pointed a large and active theoretical and empirical literature has related financial development to the economic growth process.

Black (1976) proposes the leverage effect to explain the negative correlation between equity returns and return volatilities. Diamond and Dybvig (1983) said banks can also help reduce liquidity risk and therefore enable long-term investment.

Next, Brennan et al (1984) pointed that a firm's capital structure is dynamic. Aghion et al (1999) stated debt instruments can reduce the amount of free cash available to firms and thus managerial slack.

Peter and Liuren (2007) mentions 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. Then, Penman et al (2007) documented a negative association between leverage and future returns, after controlling for conventional risk proxies.

Reinhart and Rogoff (2009) pointed the history of finance is full of boom-and-bust cycles, bank failures, and systemic bank and currency crises. Adrian and Shin (2010) stated a company can also proactively vary its financial leverage based on variations on market conditions. Marco (2012) found out in Euro region, asset risk, measured as the annualized volatility of the market enterprise value, is the best predictor of observed leverage ratios. Thomas and Fredrik (2012) pointed asset specificity has a negative impact on leverage, but a positive impact on debt maturity.

Then, Ana and John (2013) Binomial Leverage – Volatility theorem provides a precise link between leverage and volatility. Chen et al (2013) supports 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.

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

### **4. Conceptual theories**

#### **The impact of financial leverage on the economy**

Financial development and economic growth are positively interrelated. The interaction between these two (2) fields can be considered as a circle, in which good financial development causes economic growth and vice versa. 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 financial leverage or FL, which refers to debt or to the borrowing of funds to finance a company's assets.

In a specific industry such as consumer good 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. Financing decisions relate to the growth of investments, which create tax effects for companies.

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

### **5. Methodology**

For calculating 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 Viet Nam (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 hardware industry firms in VN stock exchange and current 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 22 listed firms in the hardware industry 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 leverage from what reported in 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 0,441, 0,337 and 0,520 which are negatively correlated with the leverage. Also in 3 scenarios, we find out equity beta mean values (0,748, 0,691 and 0,793) are also negatively correlated with the leverage. Leverage degree changes definitely has certain effects on asset and equity beta values.

## 7. Empirical Research Findings and Discussion

In the below section, data used are from total 22 listed hardware industry companies on VN stock exchange (HOSE and HNX mainly). In the scenario 1, current financial leverage 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.

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

### 7.1 Scenario 1: current financial leverage (FL) as in financial reports 2011

In this case, all beta values of 22 listed firms on VN hardware industry market as following:

**Table 1:** Market risk of listed companies on VN hardware industry market

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage (F.S reports)
1	<a href="#">CMT</a>	0,665	0,326		51,1%
2	<a href="#">SVT</a>	0,860	0,651	TLC as comparable	24,2%
3	<a href="#">VIE</a>	0,283	0,054	UNI as comparable	81,0%
4	<a href="#">HPT</a>	0,238	0,063	TST as comparable	73,7%
5	<a href="#">NIS</a>	0,347	0,165	VTC as comparable	52,5%
6	<a href="#">TST</a>	0,739	0,236		68,1%
7	<a href="#">ST8</a>	0,891	0,682		23,5%
8	<a href="#">TAG</a>	0,632	0,411		35,0%
9	<a href="#">POT</a>	1,046	0,533		49,0%
10	<a href="#">CKV</a>	0,604	0,221		63,5%
11	<a href="#">ONE</a>	0,551	0,217	UNI as comparable	60,6%
12	<a href="#">PMT</a>	1,234	1,056		14,4%
13	<a href="#">SMT</a>	0,934	0,654	PMT as comparable	30,0%
14	<a href="#">UNI</a>	1,186	0,732		38,3%
15	<a href="#">TLC</a>	1,066	0,770		27,8%
16	<a href="#">KST</a>	0,679	0,386	TLC as comparable	43,1%
17	<a href="#">VAT</a>	1,028	0,485		52,8%
18	<a href="#">VTC</a>	0,635	0,431		32,2%

19	<a href="#">ELC</a>	0,200	0,100	ITD as comparable	50,0%
20	<a href="#">SAM</a>	1,191	1,069		10,2%
21	<a href="#">LTC</a>	1,102	0,329		70,2%
22	<a href="#">ITD</a>	0,351	0,132		62,5%
<b>Average</b>					46,1%

7.2. Scenario 2: financial leverage increases up to 30%

If leverage increases up to 30%, all beta values of total 22 listed firms on VN hardware industry market as below:

**Table 2:** Market risks of listed hardware industry firms (case 2)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage (30% up)
1	<a href="#">CMT</a>	0,665	0,224		66,4%
2	<a href="#">SVT</a>	0,792	0,543	TLC as comparable	31,5%
3	<a href="#">VIE</a>	-0,085	0,004	UNI as comparable	105,3%
4	<a href="#">HPT</a>	0,041	0,002	TST as comparable	95,8%
5	<a href="#">NIS</a>	0,243	0,077	VTC as comparable	68,3%
6	<a href="#">TST</a>	0,739	0,085		88,5%
7	<a href="#">ST8</a>	0,891	0,619		30,5%
8	<a href="#">TAG</a>	0,632	0,345		45,5%
9	<a href="#">POT</a>	1,046	0,379		63,7%
10	<a href="#">CKV</a>	0,604	0,106		82,5%
11	<a href="#">ONE</a>	0,314	0,067	UNI as comparable	78,8%
12	<a href="#">PMT</a>	1,234	1,003		18,8%
13	<a href="#">SMT</a>	0,835	0,509	PMT as comparable	39,0%
14	<a href="#">UNI</a>	1,186	0,596		49,7%
15	<a href="#">TLC</a>	1,066	0,681		36,1%
16	<a href="#">KST</a>	0,544	0,239	TLC as comparable	56,1%
17	<a href="#">VAT</a>	1,028	0,323		68,6%
18	<a href="#">VTC</a>	0,635	0,369		41,9%
19	<a href="#">ELC</a>	0,147	0,051	ITD as comparable	65,0%
20	<a href="#">SAM</a>	1,191	1,033		13,2%
21	<a href="#">LTC</a>	1,102	0,097		91,2%
22	<a href="#">ITD</a>	0,351	0,066		81,2%
<b>Average</b>					59,9%

7.3. Scenario 3: leverage decreases down to 20%

If leverage decreases down to 20%, all beta values of total 22 listed firms on the hardware industry market in VN as following:

**Table 3:** Market risk of listed hardware industry firms (case 3)

Order No.	Company	Equity beta	Asset beta (assume debt	Note	Financial leverage (20%
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	stock code		beta = 0)		down)
1	<a href="#">CMT</a>	0,665	0,394		40,9%
2	<a href="#">SVT</a>	0,903	0,728	TLC as comparable	19,4%
3	<a href="#">VIE</a>	0,498	0,176	UNI as comparable	64,8%
4	<a href="#">HPT</a>	0,356	0,146	TST as comparable	59,0%
5	<a href="#">NIS</a>	0,411	0,238	VTC as comparable	42,0%
6	<a href="#">TST</a>	0,739	0,337		54,5%
7	<a href="#">ST8</a>	0,891	0,724		18,8%
8	<a href="#">TAG</a>	0,632	0,455		28,0%
9	<a href="#">POT</a>	1,046	0,636		39,2%
10	<a href="#">CKV</a>	0,604	0,297		50,8%
11	<a href="#">ONE</a>	0,695	0,358	UNI as comparable	48,5%
12	<a href="#">PMT</a>	1,234	1,092		11,6%
13	<a href="#">SMT</a>	0,998	0,759	PMT as comparable	24,0%
14	<a href="#">UNI</a>	1,186	0,823		30,6%
15	<a href="#">TLC</a>	1,066	0,829		22,2%
16	<a href="#">KST</a>	0,764	0,500	TLC as comparable	34,5%
17	<a href="#">VAT</a>	1,028	0,594		42,2%
18	<a href="#">VTC</a>	0,635	0,471		25,8%
19	<a href="#">ELC</a>	0,234	0,140	ITD as comparable	40,0%
20	<a href="#">SAM</a>	1,191	1,094		8,2%
21	<a href="#">LTC</a>	1,102	0,483		56,1%
22	<a href="#">ITD</a>	0,351	0,175		50,0%
				<b>Average</b>	36,9%

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.

### 8. 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	1,234	1,069	-0,165
MIN	0,200	0,054	-0,147
MEAN	0,748	0,441	-0,307
VAR	0,1085	0,0893	-0,019
Note: Sample size : 22			

**Table 5:** Statistical results (FL in case 2)

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	1,234	1,033	-0,201
MIN	-0,085	0,002	0,087
MEAN	0,691	0,337	-0,354
VAR	0,1538	0,0945	-0,059
Note: Sample size : 22			

**Table 6:** Statistical results (FL in case 3)

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	1,234	1,094	-0,141
MIN	0,234	0,140	-0,094
MEAN	0,783	0,520	-0,263
VAR	0,0908	0,0828	-0,008

Note: Sample size : 22

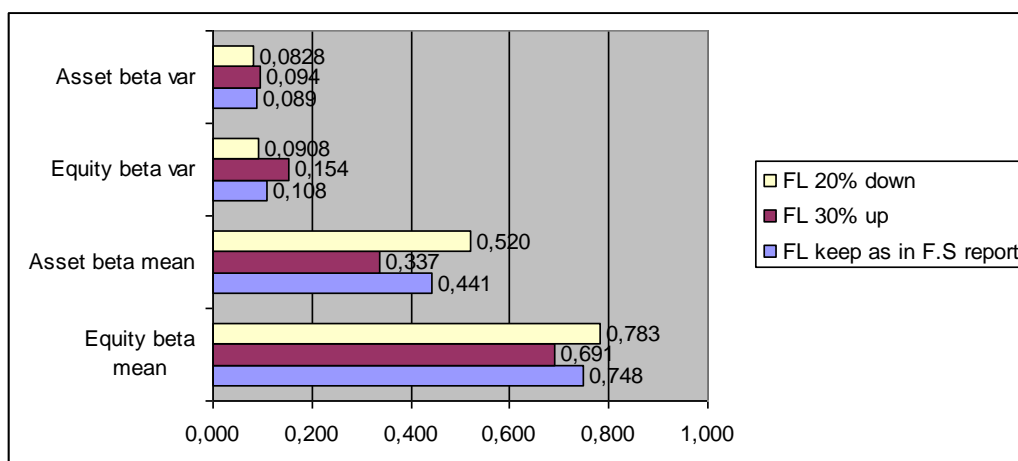
Based on the above results, we find out:

Equity beta mean values in all 3 scenarios are low ( $< 0,8$ ) and asset beta mean values are also small ( $< 0,6$ ) and max equity beta values in just a few cases are higher than ( $>$ ) 1. In the case of reported leverage in 2011, equity beta value fluctuates in an acceptable range from 0,200 (min) up to 1,234 (max) and asset beta fluctuates from 0,054 (min) up to 1,069 (max). If leverage increases to 30%, equity beta moves in a range from -0,085 to 1,234 (max unchanged) and asset beta moves from 0,002 (min) up to 1,033 (max). Hence, we note that there is a decrease in equity beta min value if leverage increases. When leverage decreases down to 20%, equity beta value moves in a range from 0,234 to 1,234 (max unchanged) and asset beta changes from 0,140 (min) up to 1,094 (max). So, there is a small increase in equity beta min value when leverage decreases in scenario 3.

Beside, Exhibit 5 informs us that in the case 30% leverage up, average equity beta value of 22 listed firms decreases down to 0,057 while average asset beta value of these 22 firms decreases little less to 0,104. Then, when leverage reduces to 20%, average equity beta value of 22 listed firms goes up to 0,035 and average asset beta value of 22 firms up to 0,079.

The below chart 1 shows us : when leverage degree decreases down to 20%, average equity and asset beta values increase slightly (0,783 and 0,520) compared to those at the initial reported leverage (0,748 and 0,441). Then, when leverage degree increases up to 30%, average equity beta decreases little more and average asset beta value also decreases more (0,691 and 0,337). However, the fluctuation of equity and asset beta value (0,154 and 0,094) in the case of 30% leverage up is higher than ( $>$ ) the results in the rest 2 leverage cases.

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



## 9. Risk analysis

In short, the using of financial leverage 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. And FL becomes a source of risk that need to be managed by finance managers.

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

And the maximum risk that a firm accepts will ask for the maximum financial leverage. Last but not least, FL becomes a vital factor in determining firms' capital structure.

## 10. 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. 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. The State Bank of Viet Nam continues to increase the effectiveness of capital providing channels for hardware industry as we could note that in this study when leverage is going to increase up to 30%, the risk level decreases much despite of the little high asset beta var, compared to the case it is going to decrease down to 20%.

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.

## REFERENCES

- [1] Abidin, Sazali., Reddy, Krishna., and Chen, Liehui., (2012), Determinants of Ownership Structure and Performance of Seasoned Equity Offerings : Evidence From Chinese Stock Market, *International Journal of Managerial Finance*
- [2] Birt, Jacqueline., Rankin, Michaela., and Song, Chen L., (2013), Derivatives Use and Financial Insutrument Disclosure in The Extractives Industry, *Acocunting & Finance*
- [3] Eugene, Fama F., and French, Kenneth R., (2004), The Capital Asset Pricing Model: Theory and Evidence, *Journal of Economic Perspectives*
- [4] Flifel, Kaouther., (2012), Financial Markets between Efficiency and Persistence : Empirical Evidence on Daily Data, *Asian Journal of Finance and Accounting*
- [5] Gupta, Kartick., Locke, Stuart., and Scrimgeour, Fraank., (2013), Profitability of Momentum Returns Under Alternative Approaches, *International Journal of Managerial Finance*
- [6] Hogan, Teresa., and Hutson, Elaine., (2005), Capital Structure in New Technology – Based Firms: Evidence From The Irish Software Sector, *Global Finance Journal*
- [7] Huy, Dinh T.N., (2012), Estimating Beta of Viet Nam listed construction companies groups during the crisis, *Journal of Integration and Development*
- [8] Kimberly, Clausing A., (2012), In Search of Corporate Tax Incidence, *Tax Law Review During the Financial Crisis*
- [9] Ling, Amy., (2013), Tax Issues Relating to Intangibles, *Asia-Pacific Tax Bulletin*
- [10] Lu, Wenling., and Whidbee, David A., (2013), Bank Structure and Failure, *Journal of Financial Econic Policy*
- [11] Maria, Ana POPA (2012)., The Impact of Social Factors on Economic Growth: Empirical Evidence for Romania and European Union Countries, *Romanian Journal of Fiscal Policy*
- [12] Szyszka, Adam., (2011), The Genesis of The Global Financial Crisis 2008 and The Challenges to The Neoclassical Paradigm of Finance, *Global Finance Journal*

## Research

[13] Ang, A., Chen, J., (2007), CAPM Over the Long Run: 1926-2001, Journal of Empirical Finance

[14] Baker, Kent H., Singleton, Clay J., and Veit, Theodore E., (2011), Survey Research in Corporate Finance: Bridging The Gap Between Theory and Practice, Oxford University Press

[15] ADB and Viet Nam Fact Sheet, 2010

### **Other web sources**

[16] <http://www.ifc.org/ifcext/mekongpsdf.nsf/Content/PSDP22>

[17] <http://www.mofa.gov.vn/vi/>

[18] <http://www.hsx.vn/hsx/>

[19] [www.tuoitre.com.vn](http://www.tuoitre.com.vn);

[20] [www.saigontimes.com.vn](http://www.saigontimes.com.vn);

[21] [www.mof.gov.vn](http://www.mof.gov.vn) ;

[22] [www.vneconomy.com.vn](http://www.vneconomy.com.vn) ;

[23] [www.sbv.gov.vn](http://www.sbv.gov.vn).



## Exhibit

### Exhibit 1: Interest rates in banking industry during crisis

(source: Viet Nam commercial banks)

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%	

### Exhibit 2: Basic interest rate changes in Viet Nam

(source: State Bank of Viet Nam and Viet Nam economy)

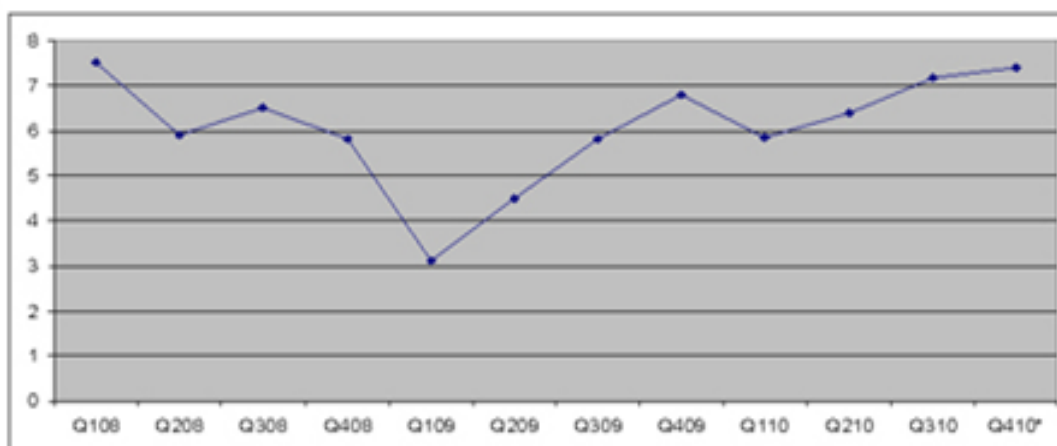
Year	Basic rate	Note
2011	9%	
2010	8%	
2009	7%	
2008	8,75%-14%	Approximately, fluctuated
2007	8,25%	
2006	8,25%	
2005	7,8%	
2004	7,5%	
2003	7,5%	
2002	7,44%	
2001	7,2%-8,7%	Approximately, fluctuated
2000	9%	

### 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		

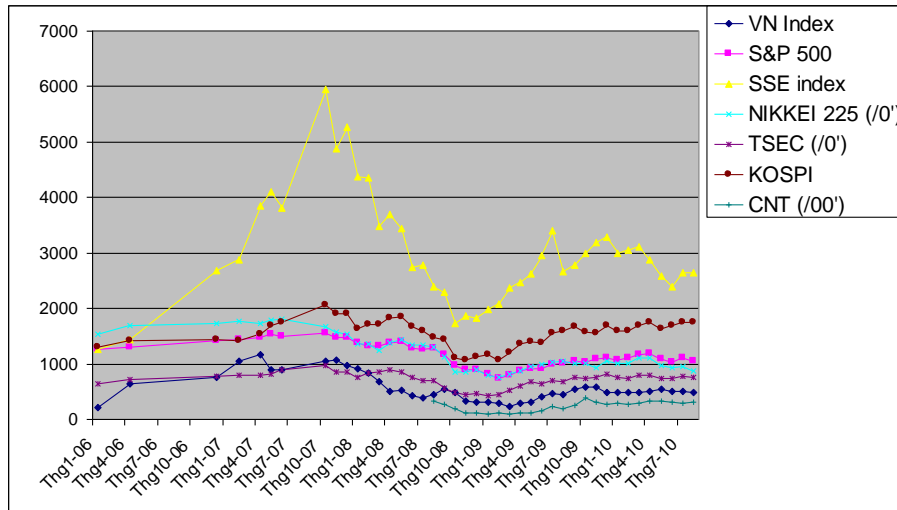
**Exhibit 4:** GDP growth Việt Nam 2006-2010 (source: Bureau Statistic)



**Exhibit 5:** Increase/decrease risk level of listed hardware 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	CMT	0,665	0,326	0,000	-0,102	0,000	0,068
2	SVT	0,860	0,651	-0,067	-0,109	0,043	0,077
3	VIE	0,283	0,054	-0,368	-0,049	0,216	0,122
4	HPT	0,238	0,063	-0,198	-0,061	0,118	0,083
5	NIS	0,347	0,165	-0,104	-0,088	0,064	0,074
6	TST	0,739	0,236	0,000	-0,151	0,000	0,101
7	ST8	0,891	0,682	0,000	-0,063	0,000	0,042
8	TAG	0,632	0,411	0,000	-0,066	0,000	0,044
9	POT	1,046	0,533	0,000	-0,154	0,000	0,103
10	CKV	0,604	0,221	0,000	-0,115	0,000	0,077
11	ONE	0,551	0,217	-0,237	-0,151	0,145	0,141
12	PMT	1,234	1,056	0,000	-0,053	0,000	0,036
13	SMT	0,934	0,654	-0,100	-0,145	0,064	0,105
14	UNI	1,186	0,732	0,000	-0,136	0,000	0,091
15	TLC	1,066	0,770	0,000	-0,089	0,000	0,059
16	KST	0,679	0,386	-0,135	-0,147	0,085	0,114
17	VAT	1,028	0,485	0,000	-0,163	0,000	0,109
18	VTC	0,635	0,431	0,000	-0,061	0,000	0,041
19	ELC	0,200	0,100	-0,054	-0,049	0,033	0,040
20	SAM	1,191	1,069	0,000	-0,036	0,000	0,024
21	LTC	1,102	0,329	0,000	-0,232	0,000	0,155
22	ITD	0,351	0,132	0,000	-0,066	0,000	0,044
			<b>Average</b>	-0,057	-0,104	0,035	0,079

**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

