

Estimating Beta of Vietnam Listed Construction Company Groups during the Financial Crisis 2007-2009

DINH TRAN NGOC HUY

*MBA, University of Economics and
Finance (UEF)– GSIM, International
University of Japan, Japan*

After the financial crisis 2007-2009, the Vietnam stock market, in general, has certain unexpected movements and the Vietnam construction industry, in detail, has to re-evaluate the risk level.

First, we use proper traditional model to estimate Equity beta and asset beta of three (3) groups of listed companies in Vietnam construction industry and found out that the values of beta during 2007-2009 acceptable, excluding a few cases.

Second, through comparison among three (3) different groups, we find out that there is not large disperse in beta values in these construction firms. Besides, beta values of firms in real estate industry tend to be higher than those in building material and construction industries.

Finally, this paper provides both internal and external investors with two risk parameters, Equity and asset beta, indicating investment parameters, as reference in their investment activities, because of a normal concept that riskier investment requiring better ROI. It also gives financial institutions, companies and government more evidence in managing their policies.

Keywords: *Equity beta, financial structure, financial crisis, risk, asset beta, construction industry*



Introduction

Although the issue of measuring beta as one main factor in the CAPM model has been done by lots of researchers, this paper emphasizes on analyzing a very short period in construction industry in one of emerging markets: Vietnam stock market during the financial crisis 2007-2009. Then, we compare the estimated results of listed Vietnam building material companies to those in its supply chain activities such as construction and real estate companies to make a comparative analysis and suggestion for using external financing after financial crisis impacts. No research, so far, has been done on the same topic.

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 gives analysis of risk. Lastly, session 9 will conclude

with some policy suggestions. This paper also provides readers with references, exhibits and relevant web sources.

Research Issues

During the financial crisis, we pay attention to a few issues on the estimating of beta for listed construction companies in Vietnam stock exchange as following:

Hypothesis/Issue 1: Among the construction group including cement companies, construction companies and real estate companies, under the financial crisis impact and high inflation, the beta or risk level of listed companies in cement and building material industries will relatively higher than those in the rest two industries.

Hypothesis/Issue 2: Because Vietnam is an emerging and immature financial market and the stock market still in the starting stage, there will be a large disperse distribution in beta values estimated in the construction industries.

Hypothesis/Issue 3: With the above reasons, the mean of Equity and asset beta values of these listed

construction companies tend to impose a high risk level or beta should higher than ($>$) 1.

Literature review

Aswath, Damoradan., (2008) pointed several factors which affect beta estimation. They are: firstly, different time periods generating different beta values, and therefore, different returns. Secondly, different return interval such as daily, weekly, monthly can also affect beta estimation.

Regarding to researches on financial crisis, risk and cost of capital, Herring and Watchter (2003) found that many financial crises are results from bubbles in real estate industry. And Allen, Franklin., Babus, Ana., and Carletti, Elena., (2009) pointed during crisis the borrowing amount against various collateral types can vary significantly.

Bebczuk, Ricardo., and Galindo, Arturo J. (2010) found that the financial crisis does not have a large impact on listed firms in Latin America. Fama, Eugene F., and French, Kenneth R., (2004) said in CAPM, we should measure the risk of a stock relative to the market portfolio including not only financial assets but also real estate and human capital. But not many researches so far have been done for groups of construction companies during crisis period 2007-2009.

Conceptual theories

Determinants of Equity and Asset Beta

Though not much researches or theories mention it, Beta's determinants include some parameters such as financial leverage by which the company's total asset is financed, movements

(up and down) of the company's stock and market index, the expected return from the market and other macroeconomics factors such as inflation and interest rates.

Besides, beta can be used as a variable to estimate WACC and used in CAPM model to either select between two projects or determine Net Present Value or IRR as measurements of financial effectiveness. Most of us know that, "market beta" is one of the famous concepts in which it measures the exposure of a stock to returns on the stock market as a whole. Besides, a stock with a market beta of 1.0 appreciates by 1 percentage point, on average, when the market return is one percentage point. Additionally, market betas above 1.0, of stocks, show relatively high market risk exposure.

Beta, in CAPM model, measures market risk. Aswath, Damoradan., (2008) stated different beta estimating methods used in different models such as APM, CAPM, and multi-factor models. And beta has two (2) features: a) measuring the risk added on to a diversified portfolio; and b) measuring relative risk of an asset with value around one (1). Besides, beta can indicate different risk levels in different market stages, according to different economic conditions. And it is a determinant of Equity risk premium as well.

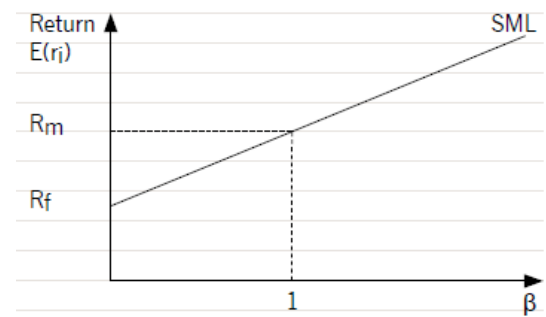
The Security Market Line (SML) is constructed by beta variables and required returns. In the below chart, it shows different risk levels will be taken into account of different ROI.

Methodology

We use the input data from the

live stock exchange market in Vietnam during the two years of financial crisis 2007-2009 to estimate results. We do research in this period because of as shown in Exhibit., most stock markets including Vietnam stock market has the same declining trend and this is the time highlighting financial crisis impacts.

Firstly, the Vietnam Stock Index, VNI Index are used to measure the market return changing during this period. Secondly, we use the market



companies in Vietnam. Finally, we use the results to suggest policy for both these enterprises, financial institutions and relevant organizations.

The below table gives us the number of construction companies used in the research of estimating beta:

Market	Listed Cement and construction material companies (1)	Listed Construction companies (2)	Listed Real estate companies (3)	Note (4)
Vietnam	9	40	10	Estimating by traditional method
	5	6	33	Estimating by comparative method
Total	14	46	43	Total firms in group: 103

(Note: The above data is at the December 12th, 2010, excluding steel industry data in column 1)

stock price of 103 listed companies in the cement and building materials, construction and real estate industries in Vietnam stock exchange market to calculate the variability in monthly stock price in the same period; thirdly, we estimate the Equity beta for these listed groups of companies and make a cross-group comparison as well. Fourth, from the Equity beta data of these listed companies, we perform a comparative analysis between Equity and asset beta values of groups of construction

General Data Analysis

Equity beta max value in 103 listed construction firms is 1,543 and min value is 0,149 which indicate that the ranges of beta values are acceptable, in term of market risk during the crisis. The mean value estimated at 0,848 lower than (<) 1 is a good number, combined with sample variance at 0,1089, which together supporting that.

Next, Asset beta max value is 1,239 and min value is 0,041 which show us that though beta

of debt is assumed to be zero (0), the company's financial leverage contributes to a decrease in the market risk level. Asset beta's mean value at 0,537 and sample variance at 0,0964, together are good risk numbers for companies in the industry. We can see the small difference between Equity and asset beta variance values is just 0,01 or 1%, so, there is not big effect from financial leverage on the gap between company's beta values and industry mean value.

Besides, it is noted that there is large gap in asset beta values from 0,041 to 1,239 and in Equity beta values from 0,149 to 1,543.

housing and leasing in a developing country, Vietnam, with total population of 87,71 million and population growth rate of 1,5% during 2007-2009, and advantages in real estate policy recently which satisfies housing buying and leasing demand of Vietnamese foreigners or Vietnamese who is living overseas or left Vietnam before 1975. It is also necessary to keep updated information on impacts from the crisis because the duration of impacts from crisis probably comes in longer years, especially when we take into account of the high continuous inflation of the year 2010 as 11,75% and other

2. Construction listed companies group

In the Table B below, we can see the Equity and asset beta mean of 46 listed construction companies equals to 0,864 and 0,450, accordingly. This result, which means the risk is controllable and acceptable, enhances the confidence of business operation of the whole industry when the level of market risk is lower than those in real estate group. Besides, there still has a large distribution of beta value among these firms, from 0,175 to 1,537 and from 0,041 to 1,027, for Equity and asset beta, accordingly.

Please refer to Exhibit 6 for more information.

3. Construction material listed companies group

Different from firms in the construction and real estate industries, 14 listed building material firms has higher min Equity and asset beta values, estimated at 0,3 and 0,075, but lower max beta values, estimated at 1,111 and 0,745. This indicates a more concentrated in level of market risks among firms in this industry. The Equity and asset beta mean values are 0,660 and 0,439 and max values are 1,111 and 0,745 shows a safer business environment than the real estate and construction industries.

Please refer to Exhibit 7 for more information.

Comparison among 3 groups of construction companies

Here in the below chart, we can see the beta value mean of listed firms in the real estate industry is relatively higher than those of listed construction and building materials firms. It rejects our 1st

Table A.0 – Estimating beta results for Three (3) Vietnam Listed Construction Companies Groups (as of Dec 2010)

Statistic results	Equity beta	Asset beta (assume debt beta = 0)
MAX	1,543	1,239
MIN	0,149	0,041
MEAN	0,848	0,537
VAR	0,1089	0,0964
Note: Sample size : 103 firms		

Source: Vietnam Stock Exchange data

Empirical Research Findings

1. Real Estate listed companies group

As we can see from the Table A.1 below, from data of 43 real estate industry companies during 2007-2009 crisis periods, the variance of Equity beta of sample group of real estate companies equals to 0,0936 which determines small difference from the sample Equity beta mean 0,891. The beta mean is lower than ($<$) 1, which indicates the low risk level for real estate companies. Among reasons are the high demand of accommodation,

unfavorable market conditions including higher interest rate. This threatens the cost of capital of real estate companies as well. Besides, the estimated asset beta mean is 0,663 and sample variance is 0,1163, which is not supporting our 2nd research hypothesis or issue that there would be a large disperse distribution in beta values estimated in the construction industries as well as our 3rd research hypothesis or issue that the mean of Equity and asset beta values of these listed construction companies tend to impose a high risk level or beta should higher than ($>$) 1.

Table A.1 – Estimating beta results for Vietnam Listed Real Estate Companies (as of Dec 2010)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note
1	API	1,196	1,196	PVL as comparable (line 63)
2	ASM	0,661	0,322	SC5 as comparable (line 63)
3	BCI	0,771	0,594	IJC as comparable (line 63)
4	CCI	1,163	1,072	HDC as comparable (line 63)
5	CLG	0,279	0,052	SC5 as comparable (line 63)
6	D2D	1,092	1,002	SC5 as comparable (line 63)
7	DIG	0,906	0,713	PDR as comparable (line 63)
8	DLG	0,149	0,081	VCR as comparable (line 63)
9	DXG	0,912	0,546	NTL as comparable (line 63)
10	HAG	0,601	0,303	ITA as comparable (line 63)
11	HDC	1,234	0,517	
12	HDG	0,728	0,658	IDJ as comparable (line 63)
13	IDG	0,783	0,783	NBB as comparable (line 63)
14	IDV	1,019	1,019	NHA as comparable (line 63)
15	IJC	0,936	0,676	PVL as comparable (line 63)
16	ITA	1,028	0,853	
17	KBC	0,888	0,548	
18	KDH	1,151	1,082	TDH as comparable (line 63)
19	LCG	0,659	0,445	KBC as comparable (line 63)
20	LGL	0,819	0,510	UIC as comparable (line 63)
21	LHG	0,804	0,703	KBC as comparable (line 63)
22	NBB	0,783	0,390	NTL as comparable (line 63)
23	NHA	1,019	0,901	RCL as comparable (line 63)
24	NTL	1,352	1,144	
25	NVN	0,616	0,276	SC5 as comparable (line 63)
26	OGC	0,698	0,584	VIC as comparable (line 63)
27	PDR	1,082	0,680	SJS as comparable (line 63)
28	PPI	0,871	0,596	SC5 as comparable (line 63)
29	PVL	1,196	1,185	TDH as comparable (line 63)
30	QCG	0,824	0,532	KDH as comparable (line 63)
31	RCL	1,115	0,944	
32	SC5	1,162	0,442	
33	SDU	1,139	1,109	SC5 as comparable (line 63)
34	SJS	1,543	1,239	
35	SZL	1,162	1,162	SC5 as comparable (line 63)
36	TDH	1,203	1,089	
37	TIX	0,918	0,671	SC5 as comparable (line 63)
38	UDC	0,850	0,570	KDH as comparable (line 63)
39	UIC	1,175	0,599	
40	VCR	0,238	0,238	VPH as comparable (line 63)
41	VIC	0,796	0,171	
42	VPH	0,238	0,069	LCG as comparable (line 63)
43	VRC	0,564	0,225	UIC as comparable (line 63)

Note: Raw data, not adjusted

hypothesis or research issue that the beta values in the cement and building material industry would be higher than those in the rest two. The difficult market conditions and high rates in the economy is not favor of real estate business. In term of variance difference, the chart also show that the Equity beta variance in construction industry is higher than those in the rest two, which means the bigger gap between mean and companies' Equity beta in the construction industry than others.

Risk analysis

Generally, during the financial crisis 2007-2009, the construction material has burdened by unexpected increasing price in the materials (such as: cement). It is inflated by the high inflation (see Exhibit 3). In the year 2008, high inflation more than 23% put a pressure on input and material price in this industry.

Besides, under a high inflation rate in the Vietnam economy, it is followed by a high borrowing rate in the lending and banking market. All the construction material, construction and real estate see that their loan contracts with commercial banks tend to be re-negotiated with an increasing rate about 4-5% higher than the previous borrowing rates. Therefore, all these companies have to think of different ways to lower the interest rates. These can be short listed as market risks which these corporations face.

In the mean time, these listed companies have to encounter another usual risk: operational risk, including changes in their internal structure, system and corporate governance. The financial crisis

Table A.2: Statistical results for Vietnam listed Real estate companies

Statistic results	Equity beta	Asset beta (assume debt beta = 0)
MAX	1,543	1,239
MIN	0,149	0,052
MEAN	0,891	0,663
VAR	0,0936	0,1163
Note: Sample size : 43 companies		

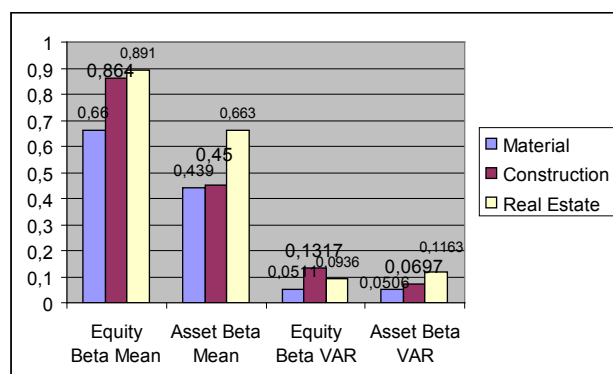
Table B: Statistical results for Vietnam listed Construction companies

Statistic results	Equity beta	Asset beta (assume debt beta = 0)
MAX	1,537	1,027
MIN	0,175	0,041
MEAN	0,864	0,450
VAR	0,1317	0,0697
Note: Sample size : 46 firms		

Table C: Statistical results for Vietnam listed Construction material companies

Statistic results	Equity beta	Asset beta (assume debt beta = 0)
MAX	1,111	0,745
MIN	0,300	0,075
MEAN	0,660	0,439
VAR	0,0511	0,0506
Note: Sample size : 14 firms		

Figure 1: Statistical results of three (3) groups of 103 listed construction firms during crisis period 2007-2009



has negative impact on their business operation on the aspect that it threatens their business operating cash flow in near future. So, the Board of Directors of those corporations has to flexibly restructure their business operation and human resources.

On the other side, we have evidence on the stock market showing that the VNI-Index (see Exhibit 5 and 8) and most of listed construction companies' stock price in Vietnam during 2007-2009 spend a long waiting time that it decreases significantly and slightly move up and down. It shows an un-attractive or slow IPO price for these new construction companies needing to enter the stock market for new Equity capital source as well as current listed companies needing to issue more shares through stock market channel. It puts a new type of risk, capital risk, on the shoulder of the board of these construction companies.

Last but not least, corporate governance structure and mechanisms are still on the path to enhance and need a lot of improvements which becomes another risk issue. Because an imperfect corporate governance structure tends to negatively affect the company's cost of capital. This taking place during the financial crisis will give new challenges to the corporation's top management team such as how to operate and organize business activities better and more effective.

Conclusion and Policy suggestion

Real estate industry

As we see from Exhibit 5, the VNI-Index during the crisis has the same decreasing trend as mostly other indexes such as S&P 500, Taiwan Stock Index, Kospi, etc., which reflect impacts from the crisis originating from US and Europe and not much profits for short-term investors' expectation. However, as our research states that the beta value or level of risk in the listed real estate companies are at acceptable level, we can expect good signals from this industry for investors when the crisis storm passed.

Regarding to policy suggestion, though it still depends on current market conditions, we highly value the role of government and central bank and other relevant fiscal organizations in continuous providing proper actions to control the high inflation and unexpected price fluctuations in the foreign exchange, by which it can control the value of VND at acceptable level and motivate internal investors.

Construction industry

During the financial crisis impact, because of high inflation and borrowing interest rates, these firms tend to decrease their loans and lending contracts, by that decreasing their financial leverage even though our results show that their market risk levels are at acceptable levels, except for a few companies. Reasons might be including internal effective management and loan contract re-negotiation of the Board of Directors and external effective supportive financial policy in the recognized efforts of the government. However, because risks still exist in the current market conditions and the crisis might have longer impacts, they are new challenges for construction companies, financial institutions and government in planning and using effective resources.

Construction materials industry

Even though the beta results in building material industry are somewhat lower than those in the two others, it is noted that the these three (3) industries are related to each other, and high risk taking place in the real estate market can affect the high expected return in that market and in the material industry.

Generally, our empirical findings state that they are not in favor of our 1st and 2nd and 3rd hypotheses or research issues. In summary, though Vietnam is an emerging market with imperfect financial system, the beta values estimated are at acceptable level with just a few companies' beta values are risky (see relevant result tables). Additionally, it indicates the higher Equity and asset beta mean in real estate and construction

firms than that in the material firms, which tends to note the crisis has a rotation effect. It originated from US real estate industry within financial institutions' policies and now has a impact on relatively higher beta value of Vietnam real estate firms.

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

Author note: Thank you Dr. Yea-Mow Chen, Dr. Yu Hai-Chin, and Dr. Shy-Wei Chen, Chung Yuan Christian University for class lectures.

REFERENCES

- ADB and Vietnam Fact Sheet, 2010
 Ang, A., Chen, J., (2007), "CAPM over the Long Run: 1926-2001", *Journal of Empirical Finance*
 Basu, Devraj., Streme, Alexander., (2007), *CAPM and Time-Varying Beta: The Cross-Section of Expected Returns*, SSRN Working paper series
 Benninga, Simon., (2008), *Financial Modeling*, The MIT Press
 Camara, Antonio., Nejadmadlayeri, Ali., (2009), *Asset Liquidity, Business Risk and Beta*, SSRN Working paper series
 DeGennaro, Ramon P., Kim, Sangphill., (2003), *The CAPM and Beta in an Imperfect Market*, SSRN Working paper series
 Fernandez, Pablo., (2008), *Levered and Unlevered Beta*, SSRN Working paper series
 Galagedera, Don (Tissa) U.A., (2005), *Relationship between Downside Beta and*



CAPM Beta, SSRN Working paper series
 Galagedera, D.U.A. (2007), "An Alternative Perspective on the Relationship between Downside Beta and CAPM Beta", *Emerging Markets Review*.

Hai, Bui Xuan (2006), "Vietnamese Company Law: The Development and Corporate Governance Issues", *Bond Law Review*

Rogers, Pablo., Securato, Jose Roberto. (2007), *Comparative Study of CAPM, Fama and French Model and Reward Beta Approach in the Brazilian Market*, SSRN Working paper series

Websites:
<http://www.ifc.org/ifcext/mekongpsdf.nsf/Content/PSDP22>

<http://www.construction-int.com/article/vietnam-construction-market.html>

<http://fia.mpi.gov.vn/Default.aspx?ctl=Article&MenuID=170&aID=185&PageSize=10&Page=0>

http://kientruc.vn/tin_trong_nuoc/nganh-bat-dong-san-rui-ro-va-co-hoi/4881.html

http://www.bbc.co.uk/vietnamese/vietnam/story/2008/12/081226_vietnam_gdp_down.shtml

<http://www.mofa.gov.vn/vi/>
<http://www.hsx.vn/hsx/>

Exhibit

Exhibit 1: Interest rates in banking industry during crisis			
Year	Borrowing Interest rates	Deposit Rates	Note
2012	14%-16%	10%-12%	Lending rate 15% since 8/ May, target 10% deposit rate end of 2012
2011	18%-22%	13%-14%	Approximately (2007: requyred reserves ratio at SBV is changed from 5% to 10%) (2009: special supporting interest rate is 4%)
2010	19%-20%	13%-14%	
2009	9%-12%	9%-10%	
2008	19%-21%	15%-16,5%	
2007	12%-15%	9%-11%	

Source: Vietnam commercial banks

Exhibit 2: Basic interest rate changes in Vietnam		
Year	Basic rate	Note
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 Vietnam and Vietnam economy

Exhibit 3: Inflation, GDP growth and macroeconomics factors			
Year	Inflation	GDP	USD/ VND rate
2012	Target 8%-9%	Target 6%	20.828
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: Vietnam commercial banks and economic statistical bureau

Exhibit 4: GDP growth rate during the period 2000-2005



Source: <http://fia.mpi.gov.vn/>

Exhibit 5: VNI Index and other stock market index during crisis 2006-2010

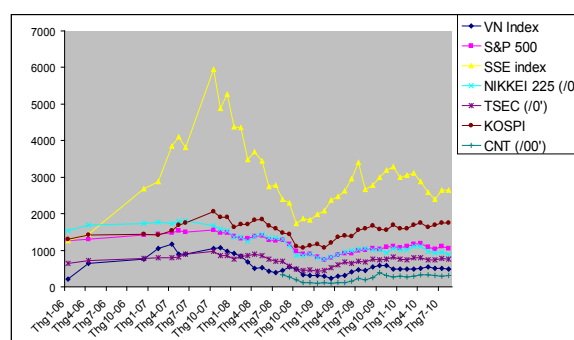




Exhibit 6 – Estimating beta results for Vietnam Listed Construction Companies (as of Dec 2010)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note
1	CNT	1,005	0,190		23	VE9	0,460	0,228	
2	DCC	1,073	1,027		24	SNG	0,921	0,394	
3	DCI	0,794	0,510		25	SSS	0,879	0,495	
4	FPC	0,184	0,158		26	STL	1,413	0,160	
5	HBC	1,060	0,703		27	SJM	0,537	0,320	
6	L10	0,184	0,087		28	SJE	1,128	0,541	
7	MCG	0,578	0,578		29	SJC	1,006	0,401	
8	VNE	0,175	0,041	SDH as comparable (line 85)	30	SIC	1,394	0,412	
9	L62	0,653	0,316		31	SDT	1,259	0,865	
10	L43	0,535	0,400		32	SDS	0,554	0,057	
11	B82	0,765	0,438		33	SDJ	1,225	0,474	
12	C92	0,956	0,331		34	SDH	0,592	0,402	DCT as comparable
13	CID	0,993	0,991		35	SD9	1,233	0,417	
14	HUT	0,821	0,197		36	SD8	0,470	0,123	VE1 as comparable
15	L18	0,875	0,209		37	SD7	1,275	0,927	
16	LUT	0,506	0,357		38	SD6	1,537	0,804	
17	MCO	0,604	0,232		39	SD5	1,214	0,368	
18	PHC	0,246	0,074	L62 as comparable	40	SD4	0,966	0,234	
19	QTC	0,537	0,537	SJM as comparable	41	SD3	1,073	0,732	
20	TV2	0,577	0,542	MCO as comparable	42	SD2	1,195	0,535	
21	TV4	0,521	0,438		43	S99	1,038	0,675	
22	VE1	1,423	0,985		44	S96	1,415	0,810	
					45	S91	0,990	0,373	
					46	S64	0,899	0,630	

Source: Vietnam stock exchange data

Exhibit 7 – Estimating beta results for Vietnam Listed Construction Material Companies (as of Dec 2010)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note
1	DIC	0,721	0,267	
2	LBM	1,111	0,745	
3	NAV	0,786	0,554	
4	DXV	0,867	0,254	
5	HT1	0,391	0,075	
6	CVT	0,300	0,124	MCO as comparable (line 63)
7	DC4	0,655	0,432	S64 as comparable
8	HPS	0,847	0,677	
9	KBT	0,818	0,742	SSS as comparable
10	PPG	0,461	0,280	
11	SDN	0,471	0,315	
12	SKS	0,778	0,660	SSS is comparable
13	VXB	0,458	0,454	PPG as comparable
14	DHA	0,578	0,568	

Source: Vietnam stock exchange data

Exhibit 8 – VN Index ('000), Inflation, Base Interest and GDP growth 2006-2010

