

# The determinants of Capital Structure of Construction Firms Listed on Vietnamese Stock Exchange

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## **Abstract**

This paper investigates the factors affecting on the capital structure of Construction firms listed on the Vietnamese Stock Exchange. Data used in the paper were collected from the 78 firms listed on Ho Chi Minh and Ha Noi Stock Exchange during time 2014-2016. By using the descriptive statistics and linear regression model, Fixed Effect Regression Model (FEM) and Random Effects Regression Model (REM), the findings shows that the capital structure of construction firms are significantly affected by the firm size, asset structure, operational efficiency, liquidity ratio, uniqueness and state ownership rate. Following are possible implications for the study.

**Key words:** Capital structure, Performance, Costruction firms, Vietnam

## **I. INTRODUCTION**

The capital structure is referred as the combination of debt and equity used to finance a firm's investment opportunities. Such combination can be a mix of debt and equity. Equity may be generated from the internally equity and new issue equity. However, what the best combination is still a debatable question for many researchers and practioners mind?

Pratheepkanth (2011) suggested that the relationship between captial structure and financial performance are one that established significant attention in the finance literature. In addition, the capital structure is a complex set of decision making choice for any firm (Myers, 1984) which is a significant tool where the firms have to maintain the control of its profit and loss through the possible combination of debt and equity of capital structure (Derayat, 2012). Firm's performance is another important issue which are concerned by the shareholders and creditors of the firms, particularly in the purpose of financial decision making leads to increase the value of shareholders of the firms (Bradley et al., 1984).

It is widely accepted that it is difficult for the firms to define the proportion of the equity and the debt in the optimal capital structure to maximize the profit, minimize the risk and the weight of cost of capital. It is significant that the optimal combination of equity and debt capital play a crucial role in obtaining goals of investors of the firm, and it has become meaningful for the firms to measure the effect of capital structure on performance which affects their capital structure decision making to achieve the firm objectives. As a result, capital structure and firms performance studies and tests are attracting the researchers and scholars on the world in general and in Vietnam in particular. Therefore, this study also aims at investigating the impact of capital structure on the performance of 78 construction firms listed on the Vienamese Stock Exchange from 2014 to 2016.

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This paper is constructed into 5 parts. First part is the introduction. Second part illustrates the literature reviews on the capital structure studies. Methodology is presented in the third part. Fourth part shows the findings. Conclusion and recommendations regarding to the capital structure and other factors affecting on the performance of firms will be on the last part.

## **II. LITERATURE REVIEW**

### **2.1. Capital structure theories**

#### **2.1.1. Market timings theory**

The market timings theory suggests that the firms issue new stock as the stock price is overvalued and buy back their shares in times of undervaluation. Therefore, the stock prices can influence the firm's capital structure. It is widely accepted that the capital structure dynamics can be driven by two versions of equity market timings. Firstly, it considers the economics agents to be rational. Normally, the firms issue equity directly over positive information this reduces the asymmetry conflict between the management and stockholders. As decrease in information asymmetry coincides with an increase in stock price the firms generate their own opportunities. Secondly, it assumes economic agents to be irrational (Baker and Wurgler, 2002). Base on this theory, a time-varying mispricing of stock of the company arises due to the irrational behavior. The presence of an irrationally low cost results managers to issue equity and on the other hand the presence of irrationally high costs leads to repurchase of equity.

#### **2.1.2. Trade off theory**

This theory stated that a company chooses its capital structure by balancing the costs and benefits of equity and debt. Traditionally, Kraus and Litzenbeger (1973) suggested that there should be a balance between the dead weighted cost of bankruptcy and the tax saving benefits of the debt. Agency cost can also be considered as a part of it. The theory also illustrates the fact that there is an advantage of using debt as source of financing in the form of tax benefit and there is a cost of financing capital structure with debt, there is the cost of financial distress in the form of bankruptcy cost of debt and non-bankruptcy costs. As debt increases the marginal cost of debt increases while the marginal benefits of debt declines, therefore the firm, which is optimizing its overall value, should concern this trade-off when choosing between debt and equity as a source of finance.

#### **2.1.3. Pecking order theory**

This theory was proposed by Donaldson in 1961 and was modified by Meyers and Nicolas in 1984. This theory suggested that a company should prioritize its source of financing first from internal financing and then moving on the equity, considering the cost of financing raising money from equity should be company's last option. Therefore, internal funds should be used first and when it is not sufficient the debt should be issued. After issuing the debt if a company needs more fund and if its not a sensible to issue more debt the equity should be issued. Managers have known very well about the company prospects, its risk and value than its investors. This leads to the asymmetric information problem, affecting the choice between internal and external source of financing. This validates the existence of pecking order theory while choosing the source of financing. As a company issues debt over equity it implies that board is confident that the investment project is profitable and this will impact favorably on its share price. Nevertheless, issuing equity presents that the board is not confident enough for the project and it can affect negatively on the current stock price of the company. As a result, the investors think that managers want to take the advantage of the overvaluation of their shares, hence placing a lower value for the new shares. However, this theory has some exceptions, for instance, it does not apply to high technology industries where the board prefers to issue equity because of the high cost of debt.

### **2.2. Literature Reviews**

There are a number of previous studies of capital structure and profitability. Among others, Derayat (2012) investigated the relationship between capital structure and profitability of 135 companies listed in Tehran Stock Exchange for a period from 2006 to 2010. The findings stated that there is a positively significant relationship between capital structure and profitability of the companies. Moreover, Nimalathasan and Brabete (2010) studied the impact of capital structure in profitability in randomly selected thirteen listed Manufacturing companies in CSE of Sri Lanka for period of 05 years from 2003 to 2007. He found that capital structure measured by debt to equity is positively and strongly associated with profitability in terms of gross profit margin, operating profit margin and not profit margin. In contrast to above study, Prahalathan and Ranjani (2011) examined the impact of capital structure on firm's performance in Sri Lanka. Data were collected from 65 list Sri Lanka companies listed on CSE for the period from 2003 to 2007. The findings showed that capital structure found to have significant negative influence gross profit margin. Similarly, Pratheepkanth (2011) suggested that the relationship between capital structure and financial performance is negative. Contradicting to Derayat (2012), Olufunso et al (2010) revealed that the usage of debt in small and medium enterprises of manufacturing industry in the Buffalo City Municipality of South Africa has a significantly negative effect on their profitability when he investigated the impact of usage of debt on the profitability of 45 small and medium enterprises (SMEs) in the given location and the data were collected over the period from 2005 to 2006. Gill, et al., (2011) sought to extend Abor's (2005) findings regarding the effect of capital structure on profitability by examining the effect of capital structure on profitability of the American service and manufacturing firms. The empirical results of the study show a positive relationship between short-term debt to total assets and profitability and between total debt to total assets and profitability in the service industry. Furthermore, Makunyi (2011) did a study on the relationship between working capital investment policy and profitability of manufacturing firms in Kenya and concluded that no relationship exists between the working capital investment policy and profitability. Another study of Mose (2011) on the relationship between capital structure and financial performance of microfinance institutions in Kenya found that outreach and portfolio size had a positive effect on financial performance of MFIs in Kenya. In addition, Kweri (2011) investigated the relationship between working capital management and profitability of manufacturing firms listed at the Nairobi Stock Exchange and concluded that working capital management affects profitability of the company and if the firm can effectively manage its working capital, it can lead to increasing profitability. In the same year 2011, Caffaso in her study on the relationship between working capital management financing policy and profitability among manufacturing firms in Kenya concluded that there was negative relationship between ROA and financing working capital policy. Previously, Zulqar & Mustafa (2007) examine the relation between capital structure and performance of firm. Result shows that there is a relationship between capital structure and firm performance. Furthermore, Tapanjeh (2006) examined the relationship between firm's structure and profitability by using data from 48 Jordanian listed industrial companies at Amman Stock Exchange for a period of one decade, from 1995-2004. His findings showed that total debt to asset ratio proxy for capital structure has a positive significant relation with return on equity whereas firm size illustrated significant negative relation with ROE thus stated that capital structure is a useful issue affecting on firm performance.

FakherBuferna, KenbataBangassa and Lynn Hodgkinson (2005) investigated the determinants of capital structure of the firms Evidence from Lybia and provided empirical evidence for theories of capital structure. Independent variables which can explain for the capital structure were financial leverage report and explanatory variables were firm size, firm growth opportunities, and debt ratio of firm assets and profitability of the firm. The sample of this

research was based on 5 years by treating the data from 1995 to 1999 for 55 companies. Selection of sample companies included in the framework of public and private companies. The sample included 32 public companies and 22 private companies. To test the relationship between debt level explanatory variables to those used econometric methods to the amount of small squares. Results showed that private companies have tended to rate the highest average growth and more assets than public companies. Otherwise, the findings indicated that private companies have higher levels of short-term debt than public companies, which means that private companies had the highest rate debt than the average public company.

### III. METHODOLOGY

This paper investigates the impact of capital structure on the performance of construction firms listed on the Vietnamese Stock Exchange. Data were collected by 78 firms listed on the Ho Chi Minh Stock Exchange and Ha Noi Stock Exchange of Vietnam from 2014-2016, classified as small and medium firms according to law in force that defines the activity of firms in the real sector of economy. The significant data, which are used in this paper, are the financial report provided by the respective firms. The methodology used in the paper is built on the basis of the methodology that the small amount of squares, using data to cross. This method enables that through multivariable regression analysis, to analyze the effects of different variables that influence business decision, on the basis that capital and firm performance. So main purpose of the methodology that small amount of squares to be applied through regression analysis that multivariable change is forecast to average dependent variables (performance), as a result of unit change in explanatory variables.

To obtain given objective, following function was considered:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \varepsilon$$

Where:

Y is dependent variable of the model;  $\beta_0$  is the constants.

$\beta_1, \beta_2, \dots, \beta_n$  : are the parameter of the independent variables.

$X_1, X_2, \dots, X_n$  : are the independent variables.

$\varepsilon$ : is the error of the model.

The Fixed Regression and Random Effect Models are shortly considered as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_n X_{nit} + \varepsilon_{it}$$

$Y_{it}$  is dependent variable of the firm i at the time t;  $\beta_0$  is the constants.

$\beta_1, \beta_2, \dots, \beta_n$  : are the parameter of the independent variables.

$X_{1it}, X_{2it}, \dots, X_{nit}$  : are the independent variables of the firm I at the time t.

$\varepsilon_{it}$ : is the error of the model.

### IV. FINDINGS AND DISCUSSIONS

For our quantitative analysis, the paper used the correlation between variables and regression analysis. Correlation between variables will help us to measure the association between explanatory variables and the association with dependent variable. Correlation is calculated for all explanatory variables. Regression analysis is used to accurately measure the individual effect of explanatory variables in the relation between variable and their dependent one.

#### 4.1. Descriptive statistics

The current capital structure of the construction firms listed on the Vietnamese Stock Exchange is illustrated in the table 1.

**Table 1. Debt ratio of the construction firms listed on the Vietnamese Stock Exchange**

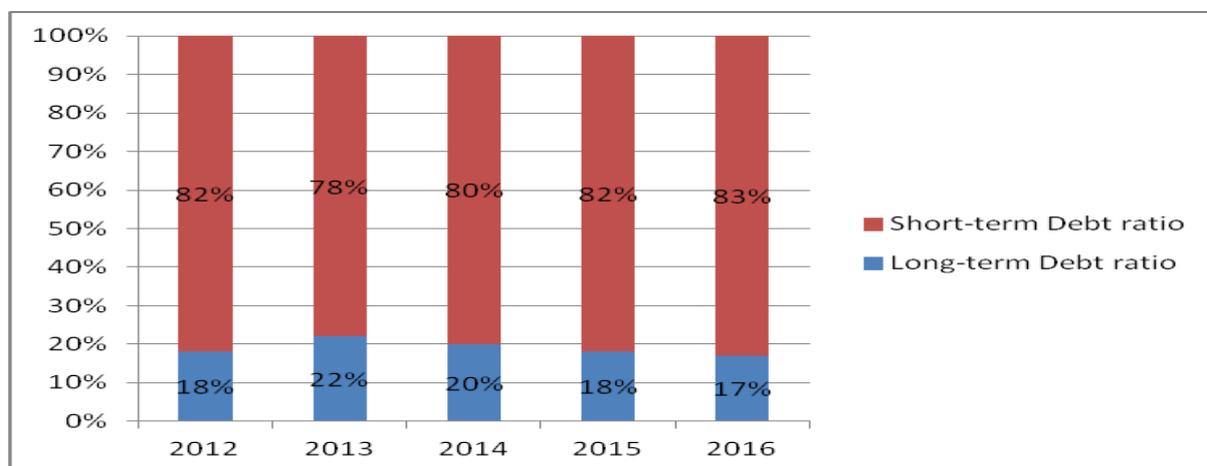
Statistics	2012	2013	2014	2015	2016
<i>Min</i>	0,03	0,28	0,15	0,14	0,14
<i>Max</i>	0,92	0,93	0,90	0,91	0,97
<i>Mean</i>	0,68	0,68	0,68	0,70	0,71
<i>Standard Deviation</i>	0,19	0,16	0,16	0,16	0,16

(Source: The outcome of descriptive statistics by Stata)

The table 1 reflects that the average of debt ratio of construction firms accounts for 0.7 meaning that about 2/3 of total assets of the given firms is built up by the debt. This implies that, most of construction firms in the study are facing the risky capital structure with higher debt ratio. The debt ratio of the firms is higher than these of construction firms in the study of Le Thi My Phuong (2012) which listed on the Ha Noi Stock Exchange. The debt ratio of the firms are mostly similar during the period of 2012-2016 due to the difficulties facing by the real estate and construction firms which are resulted of economic crisis and financial policies of developed and developing countries.

Debt to equity ratio is the most significant ratio for the investor and funders. This ratio of the construction firms during 2012-2016 accounts for 230percent meaning that the total assets of given firms are mostly come from the Debts. Specially, these ratios of Head of Export and Import & Construction Corporation of Vietnam (stock code: VCG) and the Head of Oil and Gas Build of Vietnam (stock code: PVX) are above 250percent which are the firms with big size and early established companies. Given figures said that the self-serve on financial issues of the firms is very low, operating mostly based on the Debt with higher risk rates.

Figure 1 shows that the short-term debt ratio is mostly higher than the long-term one. While the short-term debt is about 80percent the long-term one accounts for 20percent meaning that the former is four times of the latter. The debt ratio structure of them is mostly stable during times considered. This reflects that most of construction firms conduct their business mostly by the short-term debt while the constructional sectors have an issue of long-term contract which leads their capital being occupied.



**Figure 1: The Debt ratio structure**

The summary statistics of the construction firms are represented in the table 2.

**Table 2: The statistical analysis of the used variables in the model.**

Variable	Code	Mean	SD	Min	Max
Firm size	X1	13.531	1.226	10.070	17.221
Asset structure	X2	0.210	0.198	0.010	0.906
Operational efficiency	X3	0.016	0.045	-0.197	0.199
Firm growth Rate	X4	0.085	0.230	-0.387	1.725
Special issues of asset	X5	0.868	0.291	0.156	4.854
Liquidity ratio	X6	1.324	0.509	0.233	4.326
Operational times	X7	24.744	14.074	3.000	57.000
Form of ownership	X8	0.335	0.231	0.000	0.879
Debt ratio	Y1	0.695	0.162	0.136	0.966
Short-term debt ratio	Y2	0.562	0.182	0.021	0.878
Long-term debt ratio	Y3	0.133	0.154	0.000	0.652

Source: Calculation by the Authors from 2012-2016

Table 2 depicts the statistical analysis of the variables in the model. Asset structure of the construction firms contributes 21 percent with the standard deviation of 19.8 percent, in which the biggest one is 90.6 percent and the smallest one is 1 percent. The significant variable considered by the CEO of the firm is operational efficiency which is average of 1.6 percent. During the research times, the economics of the world in general and of Vietnam in particular, has been fluctuated. The constructional sector has faced the difficulties of crude material price changed, the decrease of project volume, and the internal competition of firms within the sector. In addition, the firm growth rate is considered as target objective for the firms' CEO. It is an average of 8.5 percent within a period of 2014-2016 with the biggest one of 172.5 percent and the smallest one of minus 38.7 percent. Moreover, the liquidity ratio of construction firms has been considered. On the average, this ratio is more than 1 meaning that with one unit of short-term debt the construction firms have more than one unit of the short-term assets to secure the debt. Other variables have been discussed in previous part such as short-term and long-term debt ratios.

#### 4.2. The determinants of capital structure of construction firms listed on the Vietnamese Stock Exchange

Table 3 depicts the main results of factors affecting on the capital structure of construction firms listed on the Vietnam Stock Exchange by the FEM model.

**Table 3: Determinants of capital structures of construction firms studied**

Variables	Coefficient parameter of Debt-to-Total assets	Coefficient parameter of Short debt-to-Total assets	Coefficient parameter of Long debt-to-Total assets
Constant	-0.3566 (0.2921)	0.6660 (0.4247)	<b>-1.0226**</b> <b>(0.4395)</b>
Firm size	<b>0.1024***</b> <b>(0.0221)</b>	0.0140 (0.0110)	<b>0.0883***</b> <b>(0.0332)</b>
Fixed asset to Total asset	<b>-0.2368***</b> <b>(0.0373)</b>	<b>-0.4646***</b> <b>(0.0543)</b>	<b>0.2278***</b> <b>(0.0562)</b>
Operational efficiency (ROA)	<b>-0.3781***</b> <b>(0.1037)</b>	0.0603 (0.1508)	<b>-0.4385***</b> <b>(0.1561)</b>
Firm growth rate	<b>0.0321**</b> <b>(0.0141)</b>	0.0146 (0.0205)	0.0174 (0.0212)

Special issues of Asset	<b>0.0247<sup>***</sup></b> (0.0112)	<b>0.0296<sup>*</sup></b> (0.0162)	-0.0048 (0.0260)
Liquidity Ratio	<b>-0.0920<sup>***</sup></b> (0.0140)	<b>-0.1823<sup>***</sup></b> (0.0189)	<b>0.0904<sup>***</sup></b> (0.0196)
Operational times	-0.0022 (0.0031)	0.0040 (0.0044)	-0.0062 (0.0046)
Form of Ownership	<b>-0.3768<sup>***</sup></b> (0.0260)	<b>-0.2463<sup>*</sup></b> (0.1259)	-0.1304 (0.1303)
Number of observations	234	234	234
R <sup>2</sup>	0.6058	0.5591	0.2116

Source: Estimation the model by using stata software

Notes: \*, \*\*, \*\*\*: statistical significant at 10%, 5% and 1%.

A linear regression model to determine the factors influencing on the capital structure of construction firms listed on the Vietnamese Stock Exchange, including the Debt-to-total assets (D/A), long term debt/total assets (LTD), short term debt to total assets (STD) defined intended and interpreted as in table 3.

The findings showed that five variables taken into the model are statistically meaningful through the level of significance from 1 to 10 percent. These are firm size, asset structure, operational efficiency, liquidity ratio and firm ownership. The other variables are not significant influence on the capital structure of the firms. The R-squared coefficient (R Square) is from 0.2116 to 0.6058 meaning that the capital structure of the construction firms can be explained by the variables included in the model from 21.16 to 60.58 percent.

The factors affect on the capital structure of the construction firms listed on Vietnames Stock Exchange as follows:

*Firstly*, the firm size is positively significant effects on all three debt ratios but it is not significant impact on the short term debt ratio. This finding confirm for the Trade off theory proposed by DeAngelo and Masulis (1980), meaning that a big firm size is likely easy to access to the loan sources and use more debt comparison to a small one. The finding is similar to the results by Antoniou et.al (2002) for the European Firms, Truong Dong Loc and Vo Kieu Trang (2008) for the firms listed on Vietnamese Stock Exchange.

*Secondly*, the fixed asset to total assets is positively significant impact on the long-term debt but negative effect on the short term debt and total assets. The findings illustrate that the firms with high fixed asset to total asset tend to use more long term loan. The result contributes to the relationship between the loan duration and the assets issues. The investment action more on the fixed assets may lead to the lower of liquidity possibility of the firms. The construction firms are normally using the short term debts which may result the firm in the trouble in liquidity risk. Huang and Song (2002) in the study of Chinese firms shown that the capital structure was positive impact on the long term debt but negative effect on the short term debt. In addition, the findings confirm for the study of Nguyen Thanh Cuong (2008).

*Thirdly*, the ROA is a negatively effect on the D/A, long term debt ratio, and positively impact on the short term debt ratio but not statistical significant. These findings are familiar with the Pecking Order Theory of Myers and Majluf (1984) in financing companies meaning that the firms with higher profit tend to keep more money to continuous to invest for the future income generating activities. Therefore, the construction firms will use less debt. The studies of Fraser et. al (2006) for the Malaysian firms and Truong Dong Loc and Vo Kieu Trang (2008) for the Vietnamese firms.

The firm growth rate is positive impact on all three given debt ratios but only significant effect on the D/A model at 5 percent. This reflects that the construction firms having a higher growth rate in total assets tend to use higher debt. The findings confirm for the reality, the

firms with higher demand for construction investment project have to find out the capital to exploit the possible business opportunities. The findings confirm for the studies of Huang and Song (2002), Nguyen Thanh Cuong (2008) and familiar to the Pecking Order Theory of Myers and Majluf (1984).

*Fourthly*, the special issues of construction firms (capital wholesale price/total revenue) is positively insignificant effects on the D/A, and short term debt ratio, but negatively insignificant impact on the long term debt ratio. The findings confirm for the studies by Titman and Wessels (1988) at United State of America and Le Thi Kim Thu (2012) on the Vietnamese real estate firms. The results imply that the construction firms with higher capital wholesale price/total revenue tend to use less long term debt and use more short term one.

*Fifth*, the liquidity ratio is negative effects on the D/A, and short term debt but positive effects on the long term debt. In general, the construction firms with higher liquidity ratios will use less debt due to the flexibility of liquid assets being used to invest in the firms activities. The findings are familiar with the Pecking Order Theory of Myers and Majluf (1984) and the experimental studies by Tran Hung Son (2008) and Le Thi My Phuong (2012).

*Sixth*, the operational times of construction firms is positively significant effects on the short term debt and negatively effects on D/A, and long term debt. The construction firms existing long times may have more opportunities in access to financial market thanks to the firms high prestige. In particular, in the period of economic crisis, the old firms may have more comparable opportunities to the new firms. The findings are likely to those discussed in Pecking Order Theory of Myers and Majluf (1984) but not confirm for the study of Frank and Goyal (2009).

*Last*, the firms onwored by the State are negatively significant impact on the D/A, and short term debt ratio but insignificant influence on the long term. The construction firms with higher capital contribution by State Owners tend to ease to access to the capital especially for the long term debt. However, during the research time duration, there is a complicate fluctuate of the economic, thus the firms are facing difficulties in access to external capital. In addition, Vietnamese Government are in progress of restructuring the State Enterprises thus the construction firms are limited in using debt. These findings confirm for the studies of Fraser et.al (2006) and Tran Hung Son (20080).

## **V. CONCLUSIONS AND APPLICATIONS**

### **5.1 Conclusions**

This paper investigates the factors affecting on the capital structure of Construction firms listed on the Vietnamese Stock Exchange. Data used in the paper were collected from the 78 firms listed on Ho Chi Minh and Ha Noi Stock Exchange during time 2014-2016. By using the descriptive statistics and linear regression model, Fixed Effect Regression Model (FEM) and Random Effects Regression Model (REM), the findings shows that the capital structure of construction firms are significantly affected by the firm size, asset structure, operational efficiency, liquidity ratio, uniqueness and state ownership rate. Following are possible implications for the study.

### **5.2. Applications**

Besides, the macroeconomics factors also highly affect on the capital structure planning of the construction firms listed on the Vietnamese Stock Exchange. Following are possible implications to mitigate the macro effects.

*First*, it is significant For the Vietnamese government to focus on the management to secure the macroeconomics policy in order to attract the national and international investors to invest in the economic development such as Enhance the relationship between monetary and financing policies; Stable development within macroeconomics flourist, control inflation, secure the national financial issues; finalized the taxation and fees policies.

*Second*, it is widely accepted on the improvement of capital market. The limitation of capital market results of the restructuring firms of Viet Nam. In reality, bank credit can be best choice for the construction firms and issues the enterprises bond or rent the financial tools are less preferred by the construction firms. Therefore, the capital market should be developed by the modern ways with ideally structure including the stock market, bond market, derivatives market.

*Third*, it is significant to improve the the trading activities, merger and acquisition firms in order to restructuring the capital structure. To solve that, two for issues need to be considered such as finalize the legal to provoke the international investors for example limit the foreign ownership, stock price transparency, stock exchange times, the currencies. Moreover, improvement the trading skills, merger and acquisition knowledge for the CEO by the short training courses, seminars as well as establishment the consulting groups, brokers on merger and acquisitions.

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