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## APPLICATION OF BENEISH M-SCORE MODEL IN DETECTING FINANCIAL STATEMENT FRAUDS IN SOME COAL MINING JOINT-STOCK COMPANIES - VIET NAM NATIONAL COAL AND MINERAL INDUSTRIES HOLDING CORPORATION LIMITED

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**Abstract:** Financial statement fraud is the intentional or unintentional misstatement that omits material factors or misstated accounting data and leads to implausible decisions or assessments for individuals and organizations when using information in the financial statements. Beneish M-Score model is widely used in the world in predicting the financial statement fraud in enterprises. At present, in the organizational structure of Viet Nam National Coal and Mineral Industries Holding Corporation Limited (VINACOMIN), there are 09 coal mining joint-stock enterprises. The results of the application of Beneish M-Score model in the study show that 06/09 enterprises have signs of financial statement fraud in the period 2015 - 2017, this result will warn VINACOMIN as well as State management agencies in supervising, preventing fraud and information transparency in financial statements in coal mining enterprises - VINACOMIN.

**Keywords:** Beneish M-Score; Financial statement fraud; Coal mining joint-stock enterprises.

### 1. INTRODUCTION

In 2018, the Association of Certified Fraud Examiners (ACFE) - the world's largest anti-fraud organization and the premier provider of anti-fraud training based in the USA - reported the results of an analysis of 2,690 cases of occupational fraud from 125 countries around the world and 23 industries between January 2016 and October 2017. According to this report, the conspiracy to fraud was the least common (accounted for 10% of all cases) but the most significant losses amounted to an average of \$ 800,000 (ACFE, 2018). In recent years, studies on financial statement fraud have often used Beneish M-score model (Beneish, 1999, 2012), the fraud triangular model consisting of pressure, opportunity and attitude (Donald R. Cressey, 1973), the relationship between financial statements and stock prices (Panagiotis E. Dimitropoulos et al., 2009), data mining model (Zaki & Elabdoulidis, 2013).

In particular, Beneish M-Score model is widely used in the academic and specialized fields in countries due to the ability to accurately predict over 50% of financial statements showing material misstatement, signs of fraud (Nguyen Cong Phuong et al., 2014). The application of Beneish M-Score model in detecting financial statement fraud is also inevitably limited (Tarjo & Nurul Herawati, 2015), but the results from the calculation based on the Beneish M-Score model can also be considered as an early warning indicator of potential financial statements fraud in enterprises.

### 2. DETECTING FINANCIAL STATEMENT FRAUD

The behaviors of financial statement fraud can be perceived as (1) Financial statement information is not accurate for the successful issuance of bonds and stocks, in order to confirm good financial capacity for relevant



individuals and organizations; (2) Declaring fictitious revenues as creating counterfeit customers by making faked documents with unallocated goods and early next year will produce a returned sales entry or recognize revenue when unfinished delivery conditions, ownership and risk transfer of products and services sold; (3) Mispricing of assets by not declining inventories when the goods have been damaged, are no longer usable, or are not sufficient for the provision for devaluation of stocks, bad debts, short- or long-term investment. Assets are often mispriced such as assets acquired through business consolidation, fixed assets, not fully capitalized intangible assets, incorrect classification of assets; (4) Recognizing the wrong year represented by revenues or expenses that are not recognized as incurred. The revenues or cost of this period may be transferred to the next period or vice versa to increase or decrease the income as desired and (5) Failure to disclose sufficient information to limit the ability of the user to analyze the financial statements. Information is often not sufficiently disclosed in the notes such as contingent liabilities, events arising after the date of closing accounting books, information about related parties, changes in accounting policies (Trinh Viet Giang, 2018). Therefore, the detection of financial statement fraud is to detect the intentional or unintentional misstatement that omits essential factors or misstated accounting data and will cause consequences for individuals and organizations to make decisions by inaccurately evaluating the financial statements.

According to the guidance of Auditing Standard No. 240 issued with the Circular No. 214/2012/TT-BTC of Ministry of Finance dated December 6, 2012 on the auditor's responsibility related to fraud in the auditing process of financial statements, beside profit expectations, indirect investment portfolio pressures, it can be found that there are also incentives or pressures leading to fraudulent

financial statements such as the Board of Directors try to adjust the business results so that analysts misunderstand the enterprise performance and profitability to gain illicit or illegal profits. The Board of Directors is under pressure from outside or inside the enterprise to achieve practical and financial goals as planned and may be impractical in the case of Board of Director's failure to meet financial goals will suffer in enormous consequences. Due to the pressure to achieve market objectives or the desire to maximize wages and bonuses based on performance, the Board of Directors deliberately attempt to make fraudulent financial statements by creating material misstatements in financial statements. In some businesses, the Board of Directors may seek to report a reduction in profit margins to reduce the amount of tax payable or to report an increase in the to make bank lending easier.

Detecting financial statement fraud will contribute to improve the quality of financial reporting information in enterprises, ensure the principle of honesty, transparency and protect the rights and legitimate benefits of individuals and organizations involved in enterprises. The prevention and detection of fraud are first Board of Management and Director's responsibility of the enterprise. The Board of Directors, under the supervision of the Board of Management, must pay particular attention to prevent fraudulent financial statements to reduce opportunities for fraud and fraud detection through persuading individuals not to commit fraud because of the possibility of detection and punishment. This responsibility includes commitment to creating an honest, ethical and ethical behavior that can be emphasized by the Board of Management's monitoring. While executing its monitoring responsibilities, the Board of Management must consider the possibility of committing inappropriate behavior occurring in the preparing and presenting process of financial statements. Besides, the auditor has

responsibility to obtain sufficient evidence about whether the financial statements as a whole are a material misstatement caused by error or fraud. The auditor should be aware of the increased risk of fraud and detect several mistakes in the financial statements. The auditor should have been planned and implemented auditing standards. The auditor should be implemented transparent and well-organized transactions and falsifying documents, recording transactions, misrepresentation to auditors, more difficult to detect if the auditor implemented in fraudulent financial statements. The auditor's conclusion can make the auditor's auditing evidence is convincing. These are false shreds of evidence. These are reasonable assurance, the auditor should maintain a professional skepticism throughout the audit process. The Board of Director's ability to detect fraud through auditing procedures is not a guarantee of fraud detection or may not be sufficient. (Ministry of Finance, 2012)

There have been many studies on detecting financial statement fraud. The responsibility for detecting financial statement fraud (Herawati, 2015) as one of the responsibilities of auditors and users. The auditor's responsibility is to detect fraud through procedures related to the prevention and extent of fraud, as well as the auditor's response (Alleyne et al., 2015). The study results show that there are high expectations auditors perceive as the responsibility of management. Beasley argues that the prevention and detection is a management responsibility, which shows that the Board of Directors have a larger proportion of fraud have a larger proportion of Directors from outside the company (Beasley et al., 2005). On the other hand, the next study also argues that the Board of Directors should be responsible for



responsibility to obtain reasonable assurance about whether the financial statements as a whole are a material misstatement, whether caused by error or fraud. The auditor should be aware of the inevitable risk of failing to detect several mistakes that materially impact the financial statements, even if the audit has been planned and implemented following auditing standards. The false financial report can be implemented through sophisticated well-organized tricks to hide fraud, such as falsifying documents, intentionally non-recording transactions, or providing misrepresentation to auditors. Hiding may be difficult to detect if the collusion is implemented in fraudulent behavior. The collusion can make the auditor believe that the existing evidence is convincing while in fact, there are false shreds of evidence. To achieve reasonable assurance, the auditor must maintain a professional skepticism throughout the audit process, considering the level of Director's ability to control and be aware of auditing procedures for effective fraud detection or may not be effective fraud detection (Ministry of Finance, 2012).

There have been many studies on detecting financial statement fraud as well as the responsibility for detecting it. (Tarjo & Nurul Herawati, 2015) as exploring the perception of auditors and users about the auditor's responsibility is to detect fraud, the procedures related to the performance, nature, and extent of fraud, as well as the auditor's response (Alleyn et al., 2005). These study results show that there is a big gap in expectations auditors perceive fraud detection as the responsibility of management. Beasley argues that fraud prevention and detection is a management responsibility, which shows that companies that commit fraud have a larger proportion of members of Directors from outside than from inside the company (Beasley et al., 1996). On the other hand, the next study also agreed that auditors should be responsible for detecting

fraud (Owusu-Ansah et al., 2002), (Bishop et al., 2004), (Hutomo et al., 2012), (Mariana et al., 2014), (Gamar et al., 2015), and (Lisic et al., 2015). In addition, there are studies using financial indicators as well as building a model to alert financial statement frauds (Persons et al., 1999), (Spathis et al., 2002), (Kaminski et al., 2004), (Beneish, 1999, 2012), (Donald R. Cressey, 1973) and (Zaki & Theodoulidis., 2013).

### 3. RESEARCH METHODOLOGY

#### 3.1 Data

This study uses data from the audited financial statements for the period 2015 ÷ 2017 of 09 coal mining joint stock companies - VINACOMIN listed on the Hanoi Stock Exchange, including Ha Lam Coal Joint Stock Company (code: HLC), Mong Duong Coal Joint Stock Company (code: MDC), Nui Beo Coal Joint Stock Company (code: NBC), Coc Sau Coal Joint Stock Company (code: TC6), Cao Son Coal Joint Stock Company (code: TCS), Deo Nai Coal Joint Stock Company (code: TDN), Ha Tu Coal Joint Stock Company (THT), Tay Nam Da Mai Coal Joint Stock Company (code: TND), Vang Danh Coal Joint Stock Company (code: TVD).

#### 3.2 Beneish M-Score

Beneish M-Score is a model that can be used to detect companies with a tendency to fraud on financial statements (Beneish, 1999, 2012). Beneish M-Score is a probabilistic model, so one of the limitations is the detecting fraud ability is not 100% accuracy (Tarjo & Nurul Herawati, 2015), but calculation results based on Beneish M-Score model can also be considered as an early warning signal that financial statement frauds can be found in many enterprises. Beneish M-Score model discovered the financial statement frauds through the coefficient M-

Score, as follows (Beneish, 1999, 2012), (Roshchina Kristina, 2016):

$$M\text{-Score} = -4.840 + 0.920 \times DSRI + 0.528 \times GMI + 0.404 \times AQI + 0.892 \times SGI + 0.115 \times DEPI - 0.172 \times SGAI + 4.679 \times TATA - 0.327 \times LVGI, \text{ where:} \quad (1)$$

• DSRI (Days' Sales in Receivables Index)

$$DSRI = \frac{\text{Receivables}/\text{Sales}_t}{\text{Receivables}_{t-1}/\text{Sales}_{t-1}} \quad (2)$$

DSRI conveniently identifies whether, between Receivables and Sales in balance for two consecutive years, an increase in a mismatch between Receivables and Sales possibly occurs frauds to increase Sales. Increase in DSRI may be due to changes in business strategies, financial policies, corporate credit (Roshchina Kristina, 2016).

• Year t: the year considered for financial statement fraud.

• Year (t-1): the previous year considered for financial statement fraud.

• GMI (Gross Margin Index).

$$GMI = \frac{(\text{Sales}_{t-1} - \text{COGS}_{t-1})/\text{Sales}_{t-1}}{(\text{Sales}_t - \text{COGS}_t)/\text{Sales}_t} \quad (3)$$

COGS: Cost of goods sold.

GMI > 1 means gross profit decreases compared to the previous year, warning signs of potential fraudulent profits (Roshchina Kristina, 2016).

• AQI (Asset Quality Index)

$$AQI = \frac{[1 - (\text{Current Assets}_t + \text{PP\&E}_t)] / \text{Total Assets}_t}{[1 - (\text{Current Assets}_{t-1} + \text{PP\&E}_{t-1})] / \text{Total Assets}_{t-1}} \quad (4)$$

PP&E (Property, Plant & Equipment): remaining land, buildings, structures, and machinery.

When AQI > 1, the enterprise is likely to increase procedures to postpone costs, to shift costs for the next period. Increased risk of asset value, decreased asset quality, this may

be a sign of income fraud (Roshchina Kristina, 2016).

• SGI (Sales Growth Index)

$$SGI = \frac{\text{Sales}_t}{\text{Sales}_{t-1}}$$

SGI > 1 does not mean that is no fraud. Growing enterprises rely heavily on external capital which may put pressure on managers to implement financial statement fraud to achieve growth goals (Roshchina Kristina, 2016).

• DEPI (Depreciation Index)

$$DEPI = \frac{\text{Depreciation}_{t-1}}{[(\text{Depreciation}_{t-1} + \text{PP\&E}_{t-1}) / \text{Sales}_{t-1}]} \times \frac{\text{Depreciation}_t}{[(\text{Depreciation}_t + \text{PP\&E}_t) / \text{Sales}_t]}$$

DEPI > 1, this may indicate that the enterprise has reviewed the depreciation period or changed the depreciation method to increase income. (Roshchina Kristina, 2016).

• SGAI (Sales General and Administrative Expenses Index)

$$SGAI = \frac{[\text{Sales Expenses}_t + \text{General \& Administrative Expenses}_t] / \text{Sales}_t}{[\text{Sales Expenses}_{t-1} + \text{General \& Administrative Expenses}_{t-1}] / \text{Sales}_{t-1}}$$

SGAI > 1, this may indicate that the growth is not mismatched with sales, which is possible to have the financial statement fraud (Roshchina Kristina, 2016).

• TATA (Total Accrual to total assets)

$$TATA = \frac{\text{Net Income}_t - \text{Cash Flows from Operating Activities}_t}{\text{Total assets}_t}$$

TATA index indicates the degree of income from the cumulative income minus the income from the cash flow, and TATA positive and greater, more probability of financial statement fraud.



• LVGI (Leverage Index)

$$LVGI = \frac{(S\text{-term Lia.}_{t-1} + L\text{-term Lia.}_{t-1}) / \text{Total Assets}_{t-1}}{(S\text{-term Lia.}_{t-1} + L\text{-term Lia.}_{t-1}) / \text{Total Assets}_{t-1}} \quad (9)$$

S-term Lia...: Short-term liabilities,  
L-term Lia...: Long-term liabilities.

LVGI > 1 has the ability to fraud financial contracts, profit to improve leverage index.

Based on the value of M-Score divided business into 02 groups:

- If M-Score  $\geq$  -2.22, there is the possibility of financial statements fraud in the contract.

- If M-Score < -2.22, there is no possibility of financial fraud.

Beneish M-Score model is used both to identify potential frauds and reflect fraudulent motives. Eight variables in Beneish M-Score model is divided into two groups: a set of variables to detect fraud (DSRI, AQI, DEPI, TATA) and another set of variables to identify fraudulent motives (GMI, SGI, SGAI, LVGI).

#### 4. RESEARCH RESULT

Collected data to calculate M-Score based on Beneish M-Score model for 09 coal mining joint stock companies - VINACOMIN in the period 2015 ÷ 2017 as shown in Table 1.

Table 1. M-Score computed by Beneish M-Score model at 09 coal mining joint-stock enterprises - VINACOMIN

| Firmal numbers | Index | HLC          |               |               | MDC           |               |               | NBC           |               |               |
|----------------|-------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                |       | 2015         | 2016          | 2017          | 2015          | 2016          | 2017          | 2015          | 2016          | 2017          |
|                | DSRI  | 0.238        | 3.991         | 0.929         | 1.651         | 1.567         | 1.050         | 0.273         | 1.346         | 2.410         |
|                | GMI   | 1.134        | 0.879         | 0.953         | 1.106         | 0.870         | 0.996         | 0.970         | 0.987         | 0.758         |
|                | AQI   | 12.115       | -1.921        | 3.749         | 1.201         | 0.831         | 1.033         | 1.187         | 0.684         | 1.046         |
|                | SGI   | 1.234        | 1.071         | 1.132         | 0.913         | 1.015         | 0.908         | 0.750         | 0.890         | 1.226         |
|                | DEPI  | 1.136        | 0.836         | 0.999         | 1.099         | 0.815         | 1.500         | 1.210         | 4.399         | 0.525         |
|                | SGAI  | 0.936        | 0.969         | 0.865         | 1.160         | 0.997         | 0.953         | 1.320         | 1.037         | 0.861         |
|                | TATA  | -0.017       | 0.017         | -0.130        | -0.114        | 0.216         | 0.023         | -0.116        | 0.050         | 0.053         |
|                | LVGI  | 1.019        | 1.013         | 1.001         | 1.012         | 1.027         | 1.006         | 1.010         | 1.071         | 1.056         |
|                |       | <b>1.528</b> | <b>-0.848</b> | <b>-1.928</b> | <b>-2.374</b> | <b>-1.102</b> | <b>-2.335</b> | <b>-3.887</b> | <b>-1.797</b> | <b>-0.890</b> |

(continued)

| Firmal numbers | Index | TC6           |               |               | TCS           |               |               | TDN           |               |               |
|----------------|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                |       | 2015          | 2016          | 2017          | 2015          | 2016          | 2017          | 2015          | 2016          | 2017          |
|                | DSRI  | 0.511         | 1.335         | 2.813         | 0.645         | 0.381         | 0.895         | 0.524         | 1.046         | 2.105         |
|                | GMI   | 0.924         | 0.908         | 0.754         | 0.967         | 1.182         | 0.820         | 1.018         | 0.899         | 1.029         |
|                | AQI   | 1.111         | 0.948         | 1.134         | 1.586         | 1.381         | 0.688         | 0.868         | 0.841         | 0.470         |
|                | SGI   | 0.894         | 0.750         | 0.873         | 1.033         | 0.868         | 1.084         | 0.927         | 0.857         | 1.080         |
|                | DEPI  | 1.070         | 1.135         | 0.822         | 0.960         | 1.241         | 1.141         | 1.051         | 1.163         | 1.263         |
|                | SGAI  | 1.080         | 1.221         | 1.050         | 1.033         | 0.753         | 1.102         | 1.084         | 1.130         | 0.927         |
|                | TATA  | -0.150        | 0.048         | -0.153        | -0.380        | 0.106         | -0.126        | -0.082        | -0.024        | -0.044        |
|                | LVGI  | 0.983         | 1.024         | 1.032         | 1.015         | 1.009         | 0.985         | 0.973         | 0.960         | 0.989         |
|                |       | <b>-3.723</b> | <b>-2.271</b> | <b>-1.758</b> | <b>-4.352</b> | <b>-2.353</b> | <b>-3.309</b> | <b>-3.410</b> | <b>-2.786</b> | <b>-1.750</b> |

Table 1 (continued)

| Ordinal numbers | Index | THT           |               |               | TND           |               |               | TVD           |               |               |
|-----------------|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                 |       | 2015          | 2016          | 2017          | 2015          | 2016          | 2017          | 2015          | 2016          | 2017          |
| 1               | DSRI  | 0.651         | 0.400         | 0.674         | 0.659         | 0.624         | 0.242         | 0.956         | 1.418         | 0.783         |
| 2               | GMI   | 1.020         | 0.960         | 1.147         | 2.836         | 0.201         | 0.954         | 1.076         | 0.847         | 1.023         |
| 3               | AAI   | 0.843         | 1.034         | 2.008         | 1.017         | 0.604         | 0.479         | 0.933         | 0.583         | 0.931         |
| 4               | SGI   | 0.976         | 0.839         | 1.062         | 1.124         | 0.766         | 1.041         | 0.947         | 0.837         | 1.052         |
| 5               | DEPI  | 1.148         | 1.254         | 1.087         | 1.353         | 1.247         | 1.232         | 1.316         | 0.917         | 1.033         |
| 6               | SGAI  | 1.081         | 1.074         | 0.786         | 0.502         | 3.265         | 0.844         | 1.116         | 1.117         | 0.870         |
| 7               | TATA  | -0.390        | 0.164         | 0.018         | -0.336        | -0.202        | -0.092        | -0.134        | 0.008         | -0.055        |
| 8               | LVGI  | 0.971         | 0.942         | 0.963         | 1.016         | 0.987         | 0.912         | 0.994         | 1.058         | 1.031         |
| <b>M-Score</b>  |       | <b>-4.686</b> | <b>-2.378</b> | <b>-2.096</b> | <b>-3.160</b> | <b>-4.917</b> | <b>-3.724</b> | <b>-3.163</b> | <b>-2.503</b> | <b>-2.890</b> |

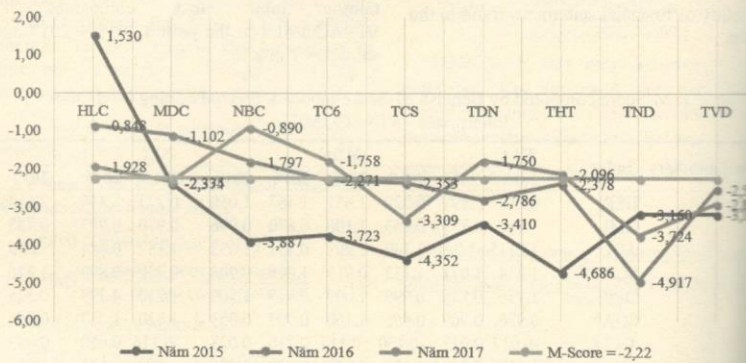


Fig.1. M-Score of 09 coal mining joint stock companies - VINACOMIN in the period 2015 ÷ 2017

Based on the calculated data in Table 1, M-Score criteria, in the period 2015 ÷ 2017, just only TVD, TND, TCS showed no signs of financial statement fraud, however, 06/09 remaining coal mining joint stock companies - VINACOMIN have signs of fraud, especially HLC had the scam in all years, there was only HLC and no other companies in 2015, with MDC, NBC in 2016, especially in 2017 besides HLC, many enterprises had signs of financial statement fraud such as NBC, TC6, TDN, THT.

Figure 1 indicates that, with the recognition threshold for financial statement fraud as M-Score of enterprises  $\geq -2.22$ , no signs of financial statement fraud are classified in the order of warning from high to low fraud in the period 2015 ÷ 2017 as follows: 2015: HLC; 2016: HLC, MDC and NBC; 2017: NBC, TC6, TDN, HLC and THT. Apparently, according to Beneish M-Score model, in the period 2015 ÷ 2017, the number of coal mining joint-stock companies - VINACOMIN tends to increase in financial statement fraud, especially is NBC, with

may be caused by... indirect investment... development plan... industry up to 2020... the total require... estimated at over... average of 17.934... the coal industry... NBC, it is current... project with nearly... investment, a 34-year... starting in 2011 with... period of 06 years... December 31, 2017... ratio was 4.6 times... publish a financial... information to attract... well as to create... individuals and organ... pressures on Board of... fraudulent financial...

#### CONCLUSION

Based on M-Score of joint-stock enterprises - VINACOMIN in the period 2015-2017, conditions coal mining joint-stock enterprises - VINACOMIN can be a complication of Beneish M-Score model, given a specific effect on signs of financial statements - VINACOMIN. The results will support the VINACOMIN and State agencies have useful solutions, honesty, transparency of financial statements to protect the rights and benefits of individuals associated to the coal mining enterprises - VINACOMIN.

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may be caused by the pressure of attracting indirect investment because according to the development plan for the Viet Nam Coal Industry up to 2020, with a vision to 2030, the total required investment capital is estimated at over 269,000 billion dong (an average of 17.934 trillion dong per year) for the coal industry by 2030. Particularly for NBC, it is currently implementing a pit project with nearly 5,400 billion dong of total investment, a 34-year implementation period, starting in 2011 with a planned construction period of 06 years. In addition, up to December 31, 2017, NBC's debt to equity ratio was 4.6 times, it may be necessary to publish a financial statement with positive information to attract investment capital as well as to create trust for the relevant individuals and organizations, etc., will put pressures on Board of Directors to implement fraudulent financial statements.

#### CONCLUSION

Based on M-Score of 09 coal mining joint-stock enterprises - VINACOMIN in the period 2015-2017, combined with practical conditions coal mining joint-stock enterprises - VINACOMIN can be confirmed that the application of Beneish M-Score model has a specific effect on the early warning signs of financial statement fraud in coal mining enterprises - VINACOMIN. Research results will support the parent company - VINACOMIN and State management agencies have useful solutions to ensure the honesty, transparency of financial statement to protect the rights and legitimate interests of individuals and organizations related to the coal mining joint-stock enterprises - VINACOMIN.

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## THE CURRENT COMPANIES

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\*C

**Abstract:** This article presents the current situation of the stock market and analyzes the total market capitalization, market capitalization. The market is still very large.

**Keywords:** Market capitalization

## INTRODUCTION

A long-standing economic system, as well as the dependent on the capital system. This has implications for the total market capitalization and the economy. The market is still very large and are leading to a high capital economy, negatively affecting the competitiveness of the economy.

However, the concern is shared. According to the International Financial Supermarket by the end of 2017, the economy from the including commercial companies, fund management companies) was estimated to increase compared to the end of 2016.

In particular, capital market reached a new milestone, leading to a 66.4% increase of capital from the end of 2016. This increase in growth of capital from the end of 2016 which was reaching VND 6.5 trillion.



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