ARTICLE
Factors Affecting the Profitability of Cement Manufacturing Enterprises in Tuyen Quang Province
Hoang Anh Dao*   Pham Thanh Tra   Tran Thao Nguyen
Tantrao University, Yenson District, Tuyenquang Province, Vietnam

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ABSTRACT
This study focuses on analyzing the factors affecting the production and business efficiency of cement manufacturing enterprises in Tuyen Quang province. Production and business efficiency is measured by profitability ratios including return on assets (ROA), return on equity (ROE) and return on sales (ROS). Using a quantitative research method through estimating a linear regression model based on data of two cement manufacturing companies in the period 2019-2021, the research results show that the factors affecting business efficiency of cement manufacturing enterprises in Tuyen Quang province include size of enterprise, cost ratio, average collection period, inventory turnover, fixed assets turnover and debt ratio.

1. Introduction
Nowadays, Vietnam has been developing the market economy with open-door policies and deep integration into the regional and global economy. The development of the market economy has been situating the national economy and its enterprises in several opportunities and challenges because of fierce international competition. The most important goal of all enterprises in the market economy is to improve production and business efficiency because it is the survival condition of each enterprise, creating requirements for businesses to use resources efficiently and also promoting innovation and creativity in their strategies. Over 3 centuries along with the country’s history, the cement industry is considered one of the industrial sectors playing a very important role in the development of the national economy as well as the industrialization and modernization of the country. In 2019, the cement industry had total revenue of VND 119,000 billion, contributing 1.9% to Vietnam’s gross domestic product (GDP) and accounting for 5.5% contribution of the industry and construction to GDP [1], in which, many enterprises are ranked in list of large-scale companies in Southeast Asia.

*Corresponding Author:
Hoang Anh Dao,
Tantrao University, Yenson District, Tuyenquang Province, Vietnam;
Email: hoanganhdaok47ftu@gmail.com

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Tuyen Quang province is a mountainous province in the North of Vietnam. Since 2020, like all administrative units nationwide, Tuyen Quang province has carried out the task of socio-economic development and national defense and security in the context that the world economy in general and Vietnam’s economy are affected seriously by the Covid-19 epidemic. In spite of big challenges, the province has achieved important results in realizing the dual goal. The growth rate of gross domestic product (GRDP) reached 7.16% compared to 2019; GRDP per capita is 44 million VND/person/year. Industrial production value reached VND 14,316 billion, up 13.15%; production value of agriculture, forestry and fishery 9,213.1 billion VND, increased by over 4% compared to 2019; food production was over 34.6 thousand tons and many other remarkable results \[2\]. Few could argue that cement manufacturing enterprises have been contributing positively to the socio-economic development of the province. However, in recent years, despite actively implementing equitization, these enterprises’ profits are often very low, even negative due to different causes. In other words, the profitability of these businesses is assessed as very bad. Along with strong international integration and competition, cement manufacturing enterprises in Tuyen Quang province have to plan strategies to improve their production and business efficiency as well as their competitiveness, especially their profitability to overcome difficulties in the current period.

2. Literature Review and Methodology of the Research

In the world, there have been many scientific works studying about performance and profitability of enterprises in different fields such as manufacturing, services, finance, banking... The studies often refer to the indicators measuring business efficiency, especially the profitability of the business and factors affecting it. For this topic, typical authors include AJ. Singh, Ramond S.Schmidgall, Sanjai Bhagat, Brian Bolton, Prasetyantoko Agustinus, Parmono Rachmadi, Rami Zatun, Heibatollah Sami, Humera Khatab, Maryam Masood and others. They have published many academic valuable and practical scientific works.

The author Ong Tze San and The Boon Heng (2011) published a study named “Capital structure and corporate performance of Malaysian construction sector” in International journal of Humanities and Social Science. This is a study to measure business performance of enterprises through financial indicators such as ROA, ROE, EPS with dependent variables reflecting the debt index. The data were collected from 49 construction enterprises listed on the Malaysian stock market in the period of 2005 – 2008. The authors divided them into 3 categories: large, medium and small enterprises. The results of the study show that, for large firms, return on capital with debt-to-market value and earnings per share (EPS) with long-term debt per common stock has a positive relationship. While EPS and debt to capital (DC) are negative with each other. Marginal operating profit with long-term debt per common share is positively related in medium-sized firms while EPS with DC has a negative relationship in small enterprises \[3\].

Costea Valentin (2012): “Determinants of corporate financial performance”. This author believes that financial efficiency is not only very important for the stability of the business with an expression of increasing the market value of shares, but also influences on decisions of shareholders and investors. Basing on financial data of 16 companies listed on the Bucharest stock exchange from 2005 to 2011, the study mentioned main factors affecting to financial effectiveness of enterprises through return on assets ratio, net profit margin and Tobin’s Q coefficient with explanatory variables including growth rate of total revenue, growth rate of fixed assets, financial leverage, business size, dividends... The results show that factors such as the growth rate of total revenue, dividend and price to earnings ratio have a positive influence on net profit margin; enterprise’s size has also a positive effect on ROA, Tobin’s Q and net profit margin. After that, this study recommended that administrators could need to choose suitable policies of increasing dividend and total assets in order to increase operational efficiency of the business \[4\].

Muhammad MuZaffar Saeed, Ammar Ali Gull et al. (2013) with the topic called “Impact of Capital structure on banking performance: A case study of Pakistan” publishing in the Interdisciplinary Journal of Contemporary Research in Business assessed the impact of capital structure on operational efficiency through ROA, ROE, and EPS indicators with independent variables and two control variables. The independent variables are ratio of short-term debt, long-term debt and total debt to equity while the two control variables include enterprise’s size and growth rate of total assets among 25 banks listed on Karachi stock exchange in Pakistan basing on data collected from 2007 to 2011. The results show that short-term debt ratio, total debt and firm’s size have a positive effect, while long-term debt ratio has a negative effect on ROA, ROE and EPS ratio. Growth rate of total asset has no effect on ROA and ROE \[5\].

The research called “Solutions to improve production and business efficiency in Vietnamese construction enterprises” by Nguyen Dinh Hoan in 2017 has systematized the theoretical and practical bases of production and
business efficiency of construction enterprises in Vietnam through studying the experience of improving production and business efficiency of construction enterprises in the world and thereby drawing lessons for Vietnamese construction enterprises. At the same time, from analyzing practical issues of the production and business efficiency in construction enterprises, the author has drawn the results, shortcomings and causes in the production and business activities of Vietnamese construction enterprises. Then, the author provided financial solutions to increase the operational capacity of enterprises [6].

In 2020, Bui Van Trinh and Le Huu Tran conducted a research with the topic “Analysis of business performance in small and medium-sized enterprises: A case study in Can Tho city”. This research used regression analysis data from 143 enterprises to study the current operating situation and analyze the factors affecting on the business efficiency of small and medium-sized enterprises in Can Tho city. Thereby the authors proposed some solutions to improve business efficiency of these enterprises [7].

Business efficiency in this study is measured by profitability ratios. There are many ways to determine the profitability ratios, of which three types of return are used by several researches: (i) Return on Assets (ROA); (ii) Return on Equity (ROE); (iii) Return on Sales (ROS). The factors affecting profitability include:

**Fixed assets turnover**

Researches by R.Zeitun and G.G.Tian (2007), Abbasali Pouraghajan (2012) shows that the value of fixed assets has an impact on a business’s profitability [8,9]. All enterprises try to use fixed assets rationeally to achieve the highest profit; at the same time they always look for funding sources to increase existing fixed assets to expand business size. Maintaining the ratio of fixed asset investment at a reasonable level and exploiting maximum capacity has a positive effect on the profitability of enterprises, and vice versa.

**Debt ratio**


**Size of enterprise**

R.Zeitun, G.G.Tian (2007), Mahfuuzah Salim & Dr. Raj Yadav (2012), Md. Imran Hosain (2016) are some typical authors researched about the relationship between firm size and profitability through economies of scale. However, large-scale enterprises have more cumbersome and less flexible structure, thereby reducing the operational efficiency of the enterprises [8,11,13]. In this study, enterprise size is measured by the growth rate of total assets.

**Inventory turnover ratio**

Maintaining planned inventory is to help the company be more proactive in producing and consuming products, thereby promptly meeting production and business needs, avoiding the risk of losing customers or stopping production. However, a lot of unplanned inventory also generates additional costs such as warehousing and storage costs, etc., which affects the profitability of the business. Some researchers show that there is an impact of inventory turnover on profitability such as Deloof (2003), Pedro Juan Garcia -Teruel, Pedro Martinez- Solano (2007), T.A.N.R. Jayarathnea (2014) [10,14,15].

**Average collection period**

The hypothesis that the average collection period of enterprises has a relationship with profitability has been proven by Deloof (2003), Pedro Juan Garcia - Teruel and Pedro Martinez- Solano (2007), T.A.N.R. Jayarathnea (2014). Sales on credit increase sales opportunities, thereby increasing the business’s profitability. However, if the value of sales on credit is too high, it will increase the cost of receivables, especially the risk of arising risks for doubtful receivables [10,14,15].

**Cost ratio**

According to Amelia Burja (2011), the cost has a relationship with the profitability of enterprises. To increase profits and improve business efficiency, businesses must find ways to save costs or use costs most effectively [16,17].

From reviewing previous studies, the author proposes a model to analyze the factors affecting the profitability of cement manufacturing enterprises in Tuyen Quang province as follows:

\[ Y_{it} = \beta_1 + \beta_2 \text{Fixt} + \beta_3 \text{Debt} + \beta_4 \text{Size} + \beta_5 \text{InvT} + \beta_6 \text{Acp} + \beta_7 \text{Cost} + u_{it} \]

in which:
- \( Y_{it} \): Profitability ratios (ROA; ROE; ROS)
- Fixt: Fixed assets turnover
- Debt: Debt ratio
- Size: Size of enterprise (growth rate of total assets)
- InvT: Inventory turnover ratio
- Acp: Average collection period
Data collecting method: Financial statements and annual reports of two cement manufacturing enterprises (including Tuyen Quang Cement Joint Stock Company and Tan Quang Cement Joint Stock Company) in the period 2019-2021. The data is provided by the Department of Taxation of Tuyen Quang province.

**Data processing methods**

- Ratio analysis method: Basing on indicators in the financial statements and annual reports, the author calculated and measured these enterprises’ financial ratios relating to the liquidity, solvency, profitability and business efficiency.
- Method of illustration by charts: The paper uses some types of charts to illustrate the situation of financial indicators of two cement manufacturing companies, especially the changes of their profitability ratios in the period 2019-2021.
- Because there are two cement manufacturing enterprises in Tuyen Quang province, the study uses population regression model on STATA16 software to estimate the research model: linear regression (Pooled OLS). Table 1 below listed variables using in the model, attaching each variable’s description and calculation formula.

<table>
<thead>
<tr>
<th>Name</th>
<th>Explanation</th>
<th>Calculation Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROS</td>
<td>Return on Sales: measures how much profit is being created from dollar of sales.</td>
<td>ROS = Earnings after taxes / Net sales</td>
</tr>
<tr>
<td>ROA</td>
<td>Return on Assets: measures how efficiently a company is using its assets to generate profit.</td>
<td>ROA = Net income / Total assets</td>
</tr>
<tr>
<td>ROE</td>
<td>Return on Equity: reflects how efficiently a company is using its equity to generate profit.</td>
<td>ROE = Net income / owner’s equity</td>
</tr>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixt</td>
<td>Fixed assets turnover: measures how much net revenue per each dollar of capital put into fixed assets.</td>
<td>Fixt = Net sales / Average fixed assets</td>
</tr>
<tr>
<td>Debt</td>
<td>Debt ratio: measures the relative amount of a company’s assets that are provided from debts.</td>
<td>Debt ratio = Total liabilities / Total assets</td>
</tr>
<tr>
<td>Size</td>
<td>Size of enterprise: estimated by the growth rate of total assets.</td>
<td>Growth rate of total assets = (total assets (^t) – total assets (^{t-1})) / total assets (^{t-1}) × 100%</td>
</tr>
<tr>
<td>Inv</td>
<td>Inventory turnover ratio: measures how many times a company’s inventory is sold and replaced over a given period.</td>
<td>Inventory turnover ratio = Cost of goods sold / Average inventory</td>
</tr>
<tr>
<td>Acp</td>
<td>Average collection period: shows how many days it takes for the receivables collected.</td>
<td>Average collection period = 360 days / Receivable turnover ratio</td>
</tr>
<tr>
<td>Cost</td>
<td>Cost ratio: measures how much cost the business must spend to get a dollar of revenue.</td>
<td>Cost ratio = Total cost / Sales</td>
</tr>
</tbody>
</table>
3. Results and Discussion

Basing on the balance sheet, the total assets of Tuyen Quang Cement Joint Stock Company tend to increase in the period 2018-2021, but the growth rate of total assets tends to decrease gradually. The company’s asset structure also changed. The proportion of fixed assets in total assets tends to decrease, while that of inventories increases rapidly. Figure 1 below mentioned generally the structure of total asset of this enterprise.

Figure 2 showed that although the total liabilities and equity of the enterprise have tended to increase over the years, it is easy to see that liabilities are the main source of capital financing of the enterprise. In the capital structure, the owner’s equity was negative because of negative annual undistributed profit. In other words, the loss of the enterprise in the period 2019-2021 is very large.

In the period 2019-2021, the structure of assets and capital of Tuyen Quang Cement Joint Stock Company which are illustrated by Figure 3 and Figure 4 below shows that the company has used capital mainly for investment in fixed assets, accounting for nearly 90 percent of total assets.

![Figure 1. Asset structure of Tuyen Quang Cement Joint Stock Company](image1)

Source: Calculated and illustrated from the company’s balance sheet [18]

![Figure 2. Capital structure of Tuyen Quang Cement Joint Stock Company](image2)

Source: Calculated and illustrated from the company’s balance sheet [18]
In order to evaluate the production and business efficiency of enterprises, the indicators of profitability are mostly concerned by investors and administrators. These indicators show the attractiveness of investments as well as the ability to expand production and development of enterprises. Figure 5 shows that the general characteristics of the profitability indicators of cement manufacturing enterprises in Tuyen Quang province in the period of 2019 - 2021 are still very low. While the ROS and ROA of these companies tend to improve gradually from 2020, ROE tends to decrease.

According to linear regression model, the values of adjusted $R^2$ are all more than 0.99. It means that the variation of dependent variables in the regression model of ROS, ROA and ROE could be explained by independent variables for 100%, 99.59% and 99.73% respectively. After checking for multicollinearity, regression analysis results of the dependent variables including ROA, ROE and ROS affected by the independent variables are shown in the Table 2 below:
Figure 5. Average profitability ratios of cement manufacturing enterprises in Tuyen Quang province
Source: Calculated and illustrated from the companies’ financial statements [18,19]

Table 2. Summary of Linear Regression Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>ROS</th>
<th>ROA</th>
<th>ROE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixt</td>
<td>0.072*</td>
<td>0.097*</td>
<td>0.070*</td>
</tr>
<tr>
<td></td>
<td>(–0.11)</td>
<td>(–0.194)</td>
<td>(–0.528)</td>
</tr>
<tr>
<td>Debt</td>
<td>0.045**</td>
<td>0.045**</td>
<td>0.053*</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td>(0.01)</td>
<td>(0.428)</td>
</tr>
<tr>
<td>Size</td>
<td>0.065*</td>
<td>0.117</td>
<td>0.100</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.007)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>InvT</td>
<td>0.038**</td>
<td>0.064*</td>
<td>0.051*</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.039)</td>
<td>(0.098)</td>
</tr>
<tr>
<td>Acp</td>
<td>0.048**</td>
<td>0.076*</td>
<td>0.058*</td>
</tr>
<tr>
<td></td>
<td>(0.0002)</td>
<td>(0.004)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Cost</td>
<td>0.004***</td>
<td>0.038**</td>
<td>0.029**</td>
</tr>
<tr>
<td></td>
<td>(–1.076)</td>
<td>(–2.661)</td>
<td>(–6.800)</td>
</tr>
<tr>
<td>_cons</td>
<td>0.005***</td>
<td>0.389</td>
<td>0.289</td>
</tr>
<tr>
<td></td>
<td>(0.903)</td>
<td>(0.246)</td>
<td>(0.699)</td>
</tr>
<tr>
<td>adj. R-sq</td>
<td>1.000</td>
<td>0.9959</td>
<td>0.9973</td>
</tr>
</tbody>
</table>

* p<0.1, ** p<0.05, *** p<0.01
(value): coef.

Source: synthesized from the results of regression analysis using STATA16 software

- Fixed assets turnover (Fixt) is statistically significant at 10% and has a positive impact on all 3 dependent variables. Specifically, in the absence of other factors, when the fixed assets turnover increases by 1%, ROS decreases by 0.072%, ROA decreases by 0.097%, and ROE decreases by 0.07%. The reason may be that the fixed assets of these two enterprises are cement factories and production lines of great value; however, they are almost such old and out of date that they do not have a positive impact on profitability.

- In the condition that other factors remain constant, debt ratio (Debt) has a positive impact on all 3 dependent variables. A 1% increase in debt ratio creates increases in ROS, ROA and ROE by 0.045%, 0.07% and 0.053% respectively. This situation can prove that these enterprises have used financial leverage to invest in fixed assets rather
than in business activities, which causes the profitability ratio to increase.

- Size of enterprise (Size) affects positively on ROS while it has no statistically significant with ROA and ROE. In the absence of other factors, when the growth rate of total assets increases 1%, ROS increases 0.065% because of economies of scale. However, this result doesn’t seem to make much economic sense because as an increase in investment in assets commonly create an increase in ROA. This result may be due to the research model of only 2 enterprises in which one of them continuously reduced its total assets according to descriptive statistics.

- Inventory turnover (InvT) has an effect on ROA, ROE at the statistical significance level of 10% (0.064 and 0.051 respectively) while it affects on ROS at 5% (0.038). ROE increases when inventory turnover increases because when an increase in inventory turnover ratio means fast selling that contributes to upgrading ROE. Moreover, inventory is one type of current assets of the business, an increase in inventory turnover means an increase in asset utilization efficiency, which has a positive impact on ROA. At the same time, goods sold quickly contribute to good cost control and increase ROS.

- In the absence of other factors, as average collection period (Acp) increases by 1%, ROS, ROA and ROE also increase by 0.048%, 0.076 and 0.058% respectively. An increase in the average collection period will increase the profitability of the business. This shows that cement manufacturing enterprises in Tuyen Quang province mainly sell goods with deferred payment. This is also the general reality of sales in the cement industry.

- Cost ratio (Cost) has a negative effect on all 3 dependent variables at level of 1% with ROS, and 5% with ROA and ROE. In the absence of other factors, when cost ratio increases 1%, ROS decreases by 0.004%, ROA decreases by 0.038% and ROE decreases by 0.029%. The production and business costs including cost of goods sold, selling and administrative expenses, interest expenses, and etc. are directly related to determining the profit of a business. Certainly, a reasonable system of cost control directly affects the profitability of businesses.

### 4. Conclusions and Recommendations

The study proposed 6 factors affecting the profitability of enterprises. Using quantitative methods, the research results showed that the factors affecting the profitability of cement manufacturing enterprises in Tuyen Quang province include:

- All 6 factors affect ROS, of which 4 factors have a positive effect including debt ratio, size of enterprise, inventory turnover and average collection period. Two factors affect positively are fixed assets turnover and cost ratio.

- There are 5 factors affecting ROA and ROE. Debt ratio, inventory turnover and average collection period affect ROA and ROE in positive direction while fixed assets turnover and cost ratio are two negative affecting factors.

From the above research results, the author proposes some recommendations to improve the profitability of cement manufacturing enterprises in Tuyen Quang province as follows:

Firstly, enterprises need to have a plan to invest more and renovate fixed assets such as planning to renovate and invest in new fixed assets; regularly monitoring the use of fixed assets to make timely adjustments to avoid waste in the process of production and business. Enterprises also have to plan long-term strategies to invest in fixed assets in order to create competitiveness in production and business activities, sell fixed assets with low efficiency to avoid capital stagnation and maximize the capacity of fixed assets.

Secondly, it is necessary for enterprises to well manage the sales of deferred payments so that they may limit the risk of doubtful debts adversely affecting profitability. Some solutions can be used such as strengthening debt collection; developing effective credit sales policies to facilitate many customers to buy goods and promote the growth of sales.

Thirdly, businesses have to exploit their liabilities well to develop their assets and profitability by: regularly planning for use of cash; maintaining the debt ratio to total assets at a reasonable level; limiting investments and purchases fixed assets by short-term loans; paying down the loans in order to gradually balance the status of finance; frequently assessing the importance and urgency of each liability to pay according to its priority.

Next, enterprises have to develop an inventory plan that is suitable with business characteristics to reduce costs, avoid capital stagnation, increase capital use; and at the same time help businesses be proactive in their operations and looking for production inputs.

Another recommendation is setting up consumable cost norms and planning expenses by setting standards associated with each specific working condition about both price and quantity because the variation of these two factors can affect the change of cost.

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Conflict of Interest

There is no conflict of interest.

References


