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THE EFFECTS OF SELECTED FINANCIAL RATIOS ON PROFITABILITY: AN EMPIRICAL ANALYSIS OF REAL ESTATE FIRMS IN VIETNAM

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The paper examines the determinants of profitability of real estate companies by using panel data of Vietnamese listed companies on the Hanoi stock exchange (HNX) and Ho Chi Minh City stock exchange (HOSE) from 2007 to 2020. Profitability ratios are measured by return on assets (ROA) and return on equity (ROE). The results indicate that the cost on revenue ratio, debt-to-equity ratio and the crisis and COVID-19 pandemic are negatively correlated with firm profitability. Meanwhile, the sales to current assets ratio, money supply growth rate and economic growth rate (GDPG) provide a positive correlation with profitability. We find that firm size and equity to total assets have positive effects on ROA, while there is a negative relationship between equity to total assets and ROE, and not enough evidence to conclude how firm size affects ROE. The study thereby provides

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suggestions and recommendations for the administrators of the government, real estate companies and investors in Vietnam.

Keywords: Profitability; real estate; financial ratios; return on assets; return on equity.

JEL Classification: G30, R30, G39

1. Introduction

The primary goal of the firm's management is to increase profits (Gabrusiewicz, 2014, p. 296). High profits reflect the financial strength, management level and dynamism of the businesses in production and industry, which, in turn, leads to conditions for expanding the scale of production and business operations (Tim Stobierski). The most common measures used to measure a company's profitability include return on assets (ROA), return on equity (ROE), return on sales (ROS), and return on capital employed (ROCE), among others. However, this paper will focus on the two indicators ROA and ROE as those which reflect the profitability of the company most efficiently.

Profitability, however, is not influenced by any single factor (Deloof, 2003). Some factors affect directly, while others only indirectly. They provide opportunities, threats and challenges for the company. For this reason, a consideration of a range of factors affecting the profitability ratio is essential for businesses in planning business strategies, recognizing their advantages, distributing profits appropriately, making an assessment of investment capital, and the expansion of the company, leading to economic stability and benefits to society. A range of authors, including Deloof (2003), Greene and Segal (2004), Raheman and Nasr (2007), Dong and Su (2010), Afeef (2011), Ariff and Rosly (2011) and Khidmat and Rehman (2014), use cost on revenue ratio (CRR), inventory turnover ratio (ITR), net sales to average current assets ratio (SCAR), debt-to-equity ratio (DER), equity to total assets ratio (EAR), firm size (FS) as the financial indicators which impact on the profitability. In addition, many studies document the importance of macroeconomic factors on firm profitability, such as money supply (Ariff and Rosly, 2011), economic growth rate (GDPG) (Rezina *et al.*, 2020), crises (Maudos, 2017) and the COVID-19 pandemic (Devi, 2020). Those findings are valuable reference sources for investors, credit institutions, related businesses, etc. Tiwari *et al.* (2021) find that macroeconomic and financial uncertainties have a nonlinear relationship.

At the end of 2007 and early 2008, Vietnam witnessed the real estate bubble phenomenon resulting from economic integration after joining the World Trade Organization (WTO) on January 11, 2007. The main reasons for this bitterness are the "easy" monetary policy; the uncontrolled money supply; the loose banking

system in credit risk management and loan capital; weak financial potential, lack of experience in risk management; and the global economic crisis, all of which exacerbated the internal problems of the real estate market. After the global financial crisis, the real estate market has shown signs of recovery since the end of 2013 and has developed stably. This industry has a significant effect on the economy of Vietnam in serving the needs of the people, the society and the economy, as well as indirectly promoting the national image of a dynamic emerging country. Real estate contributes more than 10% of gross domestic product (GDP) (in 2019) and accounts for approximately 30% of the economy's total activity. However, at the end of 2019, the outbreak of the COVID-19 pandemic has influenced almost all economic sectors, including the real estate industry. Thus, determining the influencing factor profitability of real estate companies is critical for enterprises to respond effectively and proactively to increase profitability and competitive advantage.

The COVID-19 epidemic has caused the real estate market to go into "hibernation," worsening financial, income and psychological concerns. As a result, demand plummeted. The quantity of housing projects and goods on the market has also decreased, particularly in the social and cheap housing categories. According to a General Statistics Office report, the construction sector in the country as a whole would grow by 6.76% in 2020, the lowest growth rate in the 2016–2020 timeframe. Because of market conditions, the number of newly registered real estate firms was 6,694, a 15.5% decrease from the previous year. Nearly 1,000 businesses have completed dissolution processes.

In that context and based on previous studies, the authors consider the influence of some basic financial factors on the real estate industry in case there are additional risk factors from the financial crisis (2008–2009), the economic and financial crisis (2011–2013) and the COVID-19 pandemic (2020). From there, evaluate and make some suggestions for the real estate industry in the Vietnam market during the time being affected by the COVID-19 pandemic. In addition, the paper also provides an up-to-date scientific-based reference for relevant subjects.

The remainder of the paper is organized as follows. Section 2 presents the relevant literature. Section 3 provides related theory and develops our hypotheses. Section 4 describes the data and methodology. Section 5 summarizes the empirical results and gives a discussion, and Sec. 6 is the conclusion.

2. Literature Review and Related Theory

2.1. *Relationship between costs, revenue and profitability*

Factors that directly affect the company's profitability are "revenue", which represents the proceeds from production, business and service provision activities

in a certain period; and "costs", which is the money businesses have to pay to support their activities. Greene and Segal (2004) have demonstrated the relationship between cost inefficiency and the profitability of the life insurance industry in the US. The result suggests that cost inefficiency in the life insurance industry is substantial relative to earnings, and this inefficiency is negatively associated with profitability. Besides, Gray *et al.* (2008) study the relationship of costs and revenue and find significant differences within the banking sector, with regional banks being less cost and revenue efficient relative to both city and trust banks. Nguyen *et al.* (2020) and Abbas *et al.* (2022) find that profitability is related to risk-taking behavior while Chang *et al.* (2019) find that profitability is related to leverage and Pho *et al.* (2021) find that profitability is related to liquidity.

2.2. *Relationship between inventory turnover and profitability*

Real estate companies often have higher inventories than businesses in other fields because the capital turnover in real estate is relatively slow. A high ITR implies efficiency of inventory management, while a low rate indicates poor sales or low demand for products or excess inventory. Findings from 1,009 non-financial Belgium firms from 1992 to 1996 suggest that a less efficient turnover rate has a negative impact on profitability, which is consistent with Lazaridis and Tryfonidis (2006), Falope and Ajilore (2009), Mansoori and Muhammad (2012) and Raheman and Nasr (2007). Similarly, Dong and Su (2010) have confirmed a robust negative relationship between inventory turnover and profitability. Nevertheless, Bashir and Ahmad (2013) studied 100 non-financial firms listed on the Karachi stock exchange (KSE) between 2005 and 2009 which indicates that there exists a positive relationship between inventory turnover and profitability. This finding is similar to outcomes of studies of Gill *et al.* (2011), and Mathuva (2015).

2.3. *Relationship between firm size and profitability*

Small businesses are more vulnerable to economic fluctuations such as financial crises or the decline of the overall economy, leading to an increased risk of bankruptcy. Thus, the paper considers the implication of FS in considering the factors that contribute to the growth of profitability. Studies by such as Zeitun and Tian (2014), Margaritis and Psillaki (2010), Pouraghajan *et al.* (2012), Singapurwoko and El-Wahid (2011), Pervan and Višić (2012) and Gleason *et al.* (2000) recognize that FS has a positive and significant impact on the efficiency of enterprises, which is to say, the larger the scale, the more profitable the business.

2.4. *Relationship between capital structure and debt and profitability*

The capital structure of real estate firms in Vietnam is unstable, based on bank loans with financial leverage risks, which impact the profitability of businesses.

Credit institutions have increasingly tightened real estate-related credit so that companies have to find new sources of capital to maintain their operations. Real estate companies with high equity, low debt can support stable operations better than others. Studies such as Bilal *et al.* (2013) find that the DER is negatively correlated with the profitability of the textile sector in Pakistan, while Khidmat and Rehman (2014) provide similar outcomes when the DER increases leading to profitability decreases in Pakistan. Pontoh and Ilat (2013) study listed companies in the Indonesian stock exchange in the period 2009–2011 and find a significant negative association between DER and profitability. Bilal *et al.* (2013) also find that the DER is negatively correlated with the profitability of the textile sector of Pakistan, and Khidmat and Rehman (2014) similarly report that the DER increases as profitability decreases.

However, contrary to the results of the above authors, the research of Namalathasan (2010) shows that the DER is positively and strongly associated with all profitability ratios. The results reported from Sufian (2011) and Benahmed-Daho *et al.* (2015) also report a positive association between EAR and ROA, similar to Almazari (2014), and Al-Jafari and Alchami (2014).

2.5. *Relationship between sales to current assets ratio and profitability*

The net SCAR expresses a ratio between net sales and total existing assets. A higher indicator signals the existence of a working capital deficit. A decrease of the rate is generally interpreted as a narrowing down of the company's activity, which leads to a reduction in production, thereby diminishing the number of inventories and accounting receivables on the current company's activity. Some studies show a positive relationship between this ratio and profit, notably Malhotra *et al.* (2009), who consider asset turnover by employing data envelopment analysis (DEA). They achieve relative efficiency scores for selected firms and find a positive association with profitability. It is consistent with Singapurwoko and El-Wahid (2011) and Pouraghajan *et al.* (2012), who show that there is a significant and positive relationship between variables of asset turnover ratio and FS with measures of the profitability of companies (ROA and ROE). Lee *et al.* (2004) also reported a positive effect on profitability in the context of the profitability of private hospitals in Korea. Suu *et al.* (2021) find that leverage has impacts on both ROA and ROE.

2.6. *Relationship between macrofactors and profitability*

Mamatzakis and Remoundos (2003) report a positive relationship between the effect of money supply and profitability. The findings of Haron and Azmi (2004) provide similar outcomes. Ariff and Rosly (2011) argue that Islamic bank practices

allow the banks to generate deposits and money supply by intensifying credit and operating within fractional policies of the banking system. Thus, either a tightening or relaxation of the money supply by the central bank can affect the profitability of Islamic banks. Concerning the influences of the money supply and oil prices on the US stock market, Rahman (2008) finds that adverse monetary shocks initially depress the US stock market. The impact of macroeconomic variables and bank characteristics on Jordanian Islamic banks is indicated by Al-Qudah and Jaradat (2013) that the growth of the money supply provides a good determinant for profitability.

According to Rezina *et al.* (2020), when an economy experiences an increase in GDP, it creates more opportunities for the companies to improve profits by expanding the market demand of the products through infrastructure and development projects. Moreover, Egbunike and Okerekeoti (2018) and Hassan and Muniyat (2019) also indicate that macroeconomic factors have positive influences on the profitability of the firms.

The global financial crisis from 2007 to 2008 has caused a lot of difficulties and challenges to the firms. Therefore, many studies have examined the factors affecting profitability in crisis periods. For example, Maudos (2017) concludes an adverse effect between the profitability and risk in the European banking sector. In addition, Kula *et al.* (2012) report a negative impact of the crisis on the profitability and liquidity of companies in the metallurgical industry in the Czech Republic during the financial crisis period. Similarly, Bouzgarrou *et al.* (2018) confirmed that the profitability ratios measured by ROE and ROA changed before and after the financial crisis. Moreover, Devi (2020) examines the impact of the COVID-19 pandemic on the profitability of 214 firms listed on the Indonesia stock exchange and the results indicated a decrease in profitability in the real estate and building construction industry. Vo *et al.* (2019) show that financial integration has good contributed to both economic development and economic growth.

3. Theory and Hypotheses

3.1. *Related theory*

Ratio analysis provides a tool to analyze and evaluate the financial situation of a business. Based on these results, administrators can have a better understanding of an entity's current financial position, and the influence of the ratios on profitability (Adjirackor *et al.*, 2017). Dansby *et al.* (2000) interpret the ratios as "fractional relationship of one number to another". Needles *et al.* (1996) define ratio analysis as "a technique of financial analysis in which meaningful relationship is shown between the components of financial statements". In effect, ratio analysis relates to

the methods of calculating and interpreting financial ratios to analyze and monitor firm profitability and the primary inputs for rate analysis with the purpose of analyzing the ratios to serve as a basis for decision-making (Gitman, 2009). Alternatively, financial ratio analysis is a simple comparison between specific pieces of information taken from a company's balance sheet and income statement (Auerbach, 1999).

3.1.1. *Trade-off theory*

According to the trade-off approach, each money source has its own set of benefits and costs. The trade-off between the benefit and the cost of debt financing determines the firm's optimal capital structure (Myers, 1984). According to the trade-off theory, higher-profit firms can receive more tax benefits by increasing borrowing without risking financial trouble and using a bigger percentage of debt finance in their capital structure. Trade-off theory, on the other hand, critiques it for being valid on the premise of no adjustment costs (Myers, 1984). Furthermore, the effect of maintaining earnings in the capital structure has been overlooked by trade-off theory; holding earnings has no cost and no risk. The majority of previous experimental studies concluded that capital structure had a negative influence on manufacturing business profitability. Umer *et al.* (2012) found a negative relationship between capital structure and company profitability once more. Companies prefer debt financing to improve their expected return, according to Hadlock and James (2002). Khoa *et al.* (2020) find that an optimal level of net-working capital maximizes firm value.

3.1.2. *The pecking order theory*

The pecking order theory, commonly known as the pecking order model, is concerned with the capital structure of a corporation. The hypothesis, popularized by Myers and Majluf in 1984, asserts that managers assess financial sources in a hierarchy. According to the pecking order idea, managers prefer the following forms of funding for investment opportunities: first, retained earnings, then debt, and last, equity financing as a last choice.

3.1.3. *The theories of strategy management*

Related theories of management can be mentioned such as inventory management strategy, receivable management strategy, etc. Inventory management is one of the keys to retail success. It is the process of making sure a business supplies enough goods that shoppers want, in just the right amount. By managing inventory, retailers will respond to customer demand promptly without experiencing shortages or oversupply. At the same time, it will help reduce costs and operate more

efficiently which is very important for the profitability of companies (Koumanakos, 2008). Under perfect conditions, companies would not have to keep inventory (Mathuva, 2013) because they will be required to produce exactly quantity to satisfy sales demand. However, due to imperfections, companies are forced to keep inventory to protect any case that happens. Existing studies (Gill *et al.*, 2011; Ching *et al.*, 2011; Eroglu and Hofer, 2011a) demonstrated that a firm profitability is affected by the amount of inventory held. Eroglu and Hofer (2011b) proposed that companies manage inventory in anticipation of improving profitability. Furthermore, receivables from customers usually account for a very large proportion of the total working capital of the business. The management of receivables is closely related to the consumption of products and services. The more businesses expand the sale of goods and services to customers, the more liabilities will increase. Of course, businesses can increase market share, increase sales, provide services and achieve desired profits. The impact of debt management greatly affects the working capital of the enterprise, strict and effective debt management will directly affect the capital rotation, organization and preservation of working capital of the enterprise. Debt management is also essential for businesses. Poor debt management increases the appropriation of working capital, leading to a lack of capital, leading to a series of debt management costs, debt collection costs and loan interest expenses to meet the operating needs of the business. Increasing receivables increases risks for businesses, more serious for businesses when the appropriation of this capital into bad debts, overdue debts, insolvency due to customers defaulting, bankruptcy, not only capital but also creates the risk of losing capital of the enterprise.

3.2. *Hypotheses*

3.2.1. *Cost on revenue ratio*

Małecka (2015) suggests that reduced expenses are positively associated with profitability in the SME sector. Similarly, Gray *et al.* (2008) and Greene and Segal (2004) show that cost inefficiency in the life insurance industry is substantial relative to profitability measures such as the ROE. Therefore, the study expects an inverse relationship between this ratio and profitability.

H1. The cost to revenue ratio is a negative relationship with profitability.

3.2.2. *Inventory turnover ratio*

Deloof (2003), Lazaridis and Tryfonidis (2006), Falope and Ajilore (2009), Mansoori and Muhammad (2012), Raheman and Nasr (2007) and Dong and Su (2010) find a negative relationship between inventory turnover and profitability.

Therefore, this study follows their findings to conjecture that there is a negative relationship between the two variables as in the following hypothesis.

H2. The real estate companies' inventory ratio is negatively related to profitability.

3.2.3. *Firm size*

Zeitun and Tian (2014), Margaritis and Psillaki (2010), Pouraghajan *et al.* (2012), Singapurwoko and El-Wahid (2011), Pervan and Višić (2012) and Gleason *et al.* (2000) recognized that FS has a positive effect on firm's efficiency, meaning that the larger the firm, the more efficient it is. Thus, this paper anticipated the positive impact of FS on the profitability of real estate companies, as in the following hypothesis.

H3. Firm size is positively connected to profitability.

3.2.4. *Debt-to-equity ratio*

Many papers mention how to improve firm profitability by maintaining leverage levels. Following Pontoh and Ilat (2013), a significant negative relationship between the DER and profitability is confirmed. Similarly, Bilal *et al.* (2013) and Khidmat and Rehman (2014) find that the DER is inversely correlated with returns. Based on these findings, we expect that this ratio has a negative connection with profitability. The hypothesis is given as follows.

H4. The Debt-to-equity ratio is negatively associated with profitability.

3.2.5. *Equity to total assets ratio*

Sufian (2011), Almazari (2014), Al-Jafari and Alchami (2014) and Benahmed-Daho *et al.* (2015) confirm a positive relationship between EAR and ROA. Thus, less financial leverage leads to higher profitability of the enterprise. These findings lead to the following hypothesis.

H5. The ratio of equity to total assets is positively correlated with profitability.

3.2.6. *Net sales to average current assets ratio*

The ratio is a signal for controlling working capital in corporations. The firm's profit decreases when sales to current assets fall (Malhotra *et al.*, 2009; Singapurwoko and El-Wahid, 2011; Pouraghajan *et al.*, 2012). Moreover, the increase in this ratio leads to better firm profitability as well as the profitability of a company (Lee *et al.*, 2004; Burja, 2011; Kaddumi and Ramadan, 2012) report that this ratio is related positively to the firm's profit. Following these findings, the paper expects

that a higher sales to current assets ratio leads to greater profitability. The hypothesis is as follows.

H6. The ratio of sales to working assets is positively correlated with profitability.

3.2.7. *Money supply growth rate*

Money supply growth (MSG) rate has a strong influence on inflation as well as on economic profitability, and the tightening or loosening policies, therefore, affect the profitability of domestic firms (Ariff and Rosly, 2011). The positive correlation between money supply and profitability had been confirmed in other papers (Al-Qudah and Jaradat, 2013; Mamatzakis and Remoundos, 2003). Following these findings, this study expects a positive link between MSG and profitability as in the following hypothesis.

H7. Money supply growth rate has a positive correlation with profitability.

3.2.8. *Economic growth rate*

GDP is the best way to measure economic growth. A high GDPG affects investors' expectations, which leads to an increase in demand for goods for the companies. According to Rezina *et al.* (2020), the GDP growth rate has a significant impact on profitability. Thus, we construct the hypothesis as follows.

H8. Economic growth rate positively affects profitability.

3.2.9. *Crisis and COVID-19 pandemic (RISK)*

The economic crisis leads to more difficulties and challenges for businesses. Maudos (2017) indicated that the crisis in mid-2007 adversely affected profits and risks in the European companies, which is consistent with the study of Račić *et al.* (2011), Kula *et al.* (2012) and Bouzgarrou *et al.* (2018). Similarly, Devi *et al.* (2020) have demonstrated that a negative outcome appeared in the real estate and building construction sector because of the COVID-19 pandemic. Thus, we construct the following hypothesis.

H9. The impact of the crisis is inversely correlated with profitability.

H10. The impact of the COVID-19 pandemic is a negative relationship with profitability.

4. Data and Methodology

4.1. *Data*

The paper uses data from 67 real estate companies listed on the Vietnamese stock market on two stock exchanges: the Hanoi stock exchange (HNX) and Ho Chi

Minh City stock exchange (HOSE). The data was collected from annual audited consolidated financial statements on the websites of companies listed from 2007 to 2020.

In 2007, Vietnam officially joined the WTO and was integrated into the world economy. From that time, internationalization and foreign investment have displayed an upward trend, which has brought capital to the Vietnamese market, especially the real estate market. The development of real estate is expected to occur with the growth of various sectors in Vietnam, such as iron, steel, design, construction, furniture manufacturing and trading. The basic feature of the real estate market in Vietnam is that the land is owned by the entire population, but the land use rights and properties attached to the land belong to many different forms of ownership. Therefore, the category of goods in the real estate market is land use rights and properties attached to the land, which have created a unique feature for the real estate market in Vietnam. Basically, the real estate market in Vietnam is an informal market — the parallel existence of two types of markets is the formal market and the informal market (underground market). The study only takes data from companies in the official market that have an Enterprise Registration Certificate and are listed on the HOSE and HNX. The information system for the real estate market is not really complete, lacks transparency, and is difficult to access.

4.2. *Variables*

Following previous research, the paper researches six factors of the company together with two macrofactors that affect the real estate businesses directly. We discuss the variables as follows.

First, the variable CRR is defined as

$$\text{Cost on revenue (CRR)} = \frac{\text{Cost}}{\text{Revenue}}$$

that directly affects the company's profit, in which costs include the cost of goods sold, selling expenses and general and administrative expenses, interest expenses and revenue consist of net sales of goods and services rendered, financial revenue and other income. The relation has been studied by Greene and Segal (2004) and Gray *et al.* (2008).

Second, the ITR defined by

$$\text{Inventory Turnover Ratio (ITR)} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

which measures the ability of inventory management in the entire operation of companies. It is considered in many other industries, especially in the real

estate sector (see, for example, Deloof (2003), Lazaridis and Tryfonidis (2006), Falope and Ajilore (2009), Mansoori and Muhammad (2012), Raheman and Nasr (2007) and Dong and Su (2010)).

The net SCAR defined as

$$\text{Net Sales to Average Current Assets Ratio (SCAR)} = \frac{\text{Net sales}}{\text{Average Current assets}}$$

measures the efficiency of using current assets to generate sales for the company (Malhotra *et al.*, 2009). Current assets contain cash, prepaid expenses, marketable securities, inventories and any other receivables.

The DER defined as

$$\text{Debt-to-equity ratio (DER)} = \frac{\text{Debt}}{\text{Equity}}$$

reflects the firm's debt ratio, which the business uses to spend for business and manufacturing operations, for example, Pontoh and Ilat (2013).

The ratio of equity to total assets (EAR) is defined as

$$\text{Equity to total assets (EAR)} = \frac{\text{Equity}}{\text{Total assets}}$$

as, for example, Sufian (2011), Benahmed-Daho *et al.* (2015), Almazari (2014) and Al-Jafari and Alchami (2014). It is used to measure the amount of equity of the business to the total assets. The higher the rate, the less financial leverage the company operates, implying that the company owns a larger proportion of its assets.

FS defined as

$$\text{Firm Size (FS)} = \text{Ln (total assets)}$$

is measured by taking the natural logarithm of total assets. Some researches, for example, Zeitun and Tian (2014), Margaritis and Psillaki (2010) and Pouraghajan *et al.* (2012), show a positive relationship between profitability and FS.

Following Maudos (2017), Bouzgarrou *et al.* (2018) and Devi (2020), we assign a value of 1 to both an economic crisis and COVID-19 pandemic, and 0 otherwise. The crisis and COVID-19 pandemic have a lot of influences on both the stock market and firms' profits.

GDPG defined as

$$\text{Economic growth rate (GDPG)} = \frac{\text{GDP}_n - \text{GDP}_{n-1}}{\text{GDP}_{n-1}}$$

is calculated on the annual percent change of GDP. Rezina *et al.* (2020) have found that GDP growth rate has a significant and positive impact on profitability.

Lastly, the MSG rate defined as

$$\text{Money supply growth rate (MSG)} = \frac{\text{MS}_{n-\text{MS}_{n-1}}}{\text{MS}_{n-1}}$$

is calculated from the percentage of money supply gap between years. Mamatzakis and Remoundos (2003) report a positive relationship between the effect of money supply and profitability.

4.3. *Research methodology*

The paper examines the factors that impact the profitability of real estate companies on the Vietnamese stock exchange by ordinary least squares (OLS) regression. In this study, the dependent variable is profitability, represented by either ROA or ROE. The influencing factors are included CRR, ITR, net SCAR, DER, EAR, FS, crisis and COVID-19 pandemic (RISK), GDPG and MSG rate. The authors have added macrovariables since profitability ratios are influenced by both internal and external influences. The research model is also used by some previous authors such as Firmansyah *et al.* (2018), Pontoh and Ilat (2013) and Khidmat and Rehman (2014). Therefore, we first use the following model.

To examine the factors that impact the profitability of real estate companies on Vietnamese stock exchange, we employ the following OLS regression:

$$
\begin{aligned}
\text{PROFITABILITY} = &\beta_1 + \beta_2 * \text{CRR} + \beta_3 * \text{ITR} + \beta_4 * \text{DER} + \beta_5 * \text{EAR} \\
&+ \beta_6 * \text{SCAR} + \beta_7 * \text{FS} + \beta_8 * \text{RISK} + \beta_9 * \text{GDPG} \\
&+ \beta_{10} * \text{MSG} + u.
\end{aligned}
\tag{1}
$$

In Model (1), the dependent variable (PROFITABILITY), is measured by ROA and ROE. Our independent variables include CRR, ITR, net SCAR, DER, EAR, FS, crisis and COVID-19 pandemic (RISK), GDPG and MSG rate. β_1 is an intercept, and β_2, β_3, β_4, β_5, β_6, β_7, β_8, β_9 and β_{10} are parameters associated with the corresponding independent variables included in the model. This research model is also used by some previous authors such as Firmansyah *et al.* (2018), Pontoh and Ilat (2013) and Khidmat and Rehman (2014).

$$
\begin{aligned}
\text{Model 1: ROA} = &\beta_1 + \beta_2 * \text{CRR} + \beta_3 * \text{ITR} + \beta_4 * \text{DER} + \beta_5 * \text{EAR} \\
&+ \beta_6 * \text{SCAR} + \beta_7 * \text{FS} + \beta_8 * \text{RISK} + \beta_9 * \text{GDPG} \\
&+ \beta_{10} * \text{MSG} + u
\end{aligned}
\tag{2}
$$

to represent the company's profitability ratio as the after-tax profit target on the total assets. We then use the following model:

$$\begin{aligned} \text{Model 2: } \text{ROE} = {} & \beta_1 + \beta_2 * \text{CRR} + \beta_3 * \text{ITR} + \beta_4 * \text{DER} + \beta_5 * \text{EAR} \\ & + \beta_6 * \text{SCAR} + \beta_7 * \text{FS} + \beta_8 * \text{RISK} + \beta_9 * \text{GDPG} \\ & + \beta_{10} * \text{MSG} + u \end{aligned} \tag{3}$$

to represent the company's rate of return that is the after-tax profit to equity ratio in which, β_1 is an intercept, and β_2, β_3, β_4, β_5, β_6, β_7, β_8, β_9 and β_{10} are parameters associated with the corresponding independent variables included in the model.

The weakness of the OLS regression model is that it may incorrectly identify the Durbin–Watson (DW) test (the most famous and most commonly used test for string correlation detection) and it considers companies as identical, with all observations grouped regardless of whether there are differences between businesses. This is often not a true reflection of reality because each firm is an entity with characteristics that can affect the objective function. Thus, a pool OLS model can lead to skewed estimates when these individual effects are not considered. This necessitates the use of a panel regression technique, in which a fixed-effects model (FEM) or random-effects model (REM) is used. The FEM is used to control other omitted variables and reflects the difference between real estate companies which is invariant over time. By using data over time, the model helps predict the impact of factors considered in the model on the profitability of real estate firms. A REM is used to control for omitted variables with constant values but which differ between real estate companies or variables that change over time but which are the same for all real estate companies. The regression model on the elements of profitability of real estate firms in Vietnam is presented as follows:

$$\begin{aligned} \text{ROA}_{it} = {} & C_i + \beta_1 * \text{CRR}_{it} + \beta_2 * \text{ITR}_{it} + \beta_3 * \text{DER}_{it} + \beta_4 * \text{EAR}_{it} \\ & + \beta_5 * \text{SCAR}_{it} + \beta_6 * \text{FS}_{it} + \beta_7 * \text{RISK}_{it} + \beta_8 * \text{GDPG}_{it} \\ & + \beta_9 * \text{MSG}_{it} + U_{it}, \end{aligned} \tag{4}$$

$$\begin{aligned} \text{ROE}_{it} = {} & C_i + \beta_1 * \text{CRR}_{it} + \beta_2 * \text{ITR}_{it} + \beta_3 * \text{DER}_{it} + \beta_4 * \text{EAR}_{it} \\ & + \beta_5 * \text{SCAR}_{it} + \beta_6 * \text{FS}_{it} + \beta_7 * \text{RISK}_{it} + \beta_8 * \text{GDPG}_{it} \\ & + \beta_9 * \text{MSG}_{it} + U_{it}, \end{aligned} \tag{5}$$

where C_i is constant, i and t identify the firm and year of observation, respectively.

To choose the best model from the pooled OLS (POLS), REM and FEM models, we use the F-test. We use the Hausman test to choose between FEM and REM. Based on the most appropriate model, testing on multicollinearity heteroscedasticity and autocorrelation among errors is conducted. Then, the generalized least squares (GLS) regression method is applied to resolve potential endogenous

problems. Gujarati *et al.* (2012) and Wooldridge (2002) have pointed out that the GLS regression method is an effective solution to overcome the autocorrelation phenomenon between the residuals between variables and the variance phenomenon of error of change.

5. Empirical Analysis and Discussion

5.1. *Descriptive statistics*

Table 1 shows the descriptive statistics of the variables for real estate companies listed on the HSX and HNX in Vietnam over 13 years from 2007 to 2020, a total of 842 observations.

Table 1. Descriptive statistics.

		Summarize			
Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA	842	0.04476	0.06825	−0.28	0.84
ROE	842	0.10824	0.18946	−1.75	1.49
CRR	842	0.88651	2.98155	−33.44	50.88
ITR	842	180.3288	2,728.242	−0.11	55,086.47
DER	842	1.71993	1.71362	0.00	19.75
EAR	842	0.46779	0.20208	0.05	1.00
SCAR	842	0.63063	0.71141	−0.01	6.95
FS	842	27.69776	1.71114	21.53	33.68
GDPG	842	0.06082	0.01320	0.03	0.09
MS	842	0.19520	0.08552	0.11	0.46

Notes: ROA = Net income/Total assets; ROE = Net income/Shareholder equity; CRR = Cost/Revenue; ITR = Cost of goods sold/Average inventory; FS = Ln (Total asset); DER = Debt/Equity; EAR = Equity/Total assets; SCAR = Net sales/Average current assets; GDPG = Economic growth rate; MSG = Money supply growth rate.

From Table 1, we know that the mean of net income is 4.48% with a standard deviation of 6.8% and the mean of the ROE is 10.82% with a standard deviation of 18.95%. This implies that real estate enterprises do not create a high return on total assets but still try to earn a better ROE than ROA due to the debt ratio.

Information from the descriptive statistics also indicates that the means of CRR and ITR are approximately 0.88 and 180.33, respectively and the logarithmic value of the mean of the FS is 27.7 with a maximum of 33.68 and a minimum of 21.53.

The ITR has a mean of 180.33 and the standard deviation figure is very high. However, for the data, the standard deviation does not have an "acceptable" threshold. The standard deviation merely shows us how dispersed the data is, but whether this is good or negative depends on study assumptions. As a consequence, it has no significant impact on the study's findings. The average ratio of DER and EAR are 1.72 and 0.47 with standard deviations of 1.71 and 0.2, respectively. With the net SCAR, 1 unit of total current assets produces 0.63 net sales with a standard deviation of 71.14%, while the largest ratio is 6.95 compared to the lowest ratio of -0.01. The last two variables are the MSG rate and GDPG with the average growth rates be 19.52% and 6.08%, the lowest growth rates be 11% and 3%, and the highest growth rates be 46% and 9%, respectively, during our studying period.

Table 2. Descriptive binary variable.

RISK	Freq.	%	Cum.
0	563	66.86	66.86
1	279	33.14	100.00
Total	842	100.00	

Notes: RISK $= 1$ during the crisis (from 2007 to 2008 and from 2012 to 2013), and COVID-19 pandemic in 2020 and zero otherwise.

Table 2 presents the frequency of the binary variable, for the crisis period of the study so that RISK $= 1$ during the crisis (from 2007 to 2008, between 2012 and 2013), and COVID-19 pandemic in 2020 and zero otherwise. The economy of Vietnam has been affected by crises and the COVID-19 pandemic. The binary variable for the risk periods of the study has 279 frequencies with 1 (if the economy was affected by crisis and COVID-19) and 0 with 563 frequencies.

5.2. *Correlation*

In order to examine whether there is any linear correlated relationship and detect where there is any multicollinearity problem among the variables, we estimate the Pearson coefficient of correlation between any pair of the variables and exhibit the results in Table 3.

Table 3. Pearson correlation matrix between variables in the research model.

	ROA	ROE	CRR	ITR	DER	EAR	SCAR	FS	RISK	GDP	MSG
ROA	1.0000										
ROE	0.8382**	1.0000									
CRR	−0.224**	−0.232**	1.0000								
ITR	0.0262	0.0070	−0.0045	1.0000							
DER	−0.1888**	−0.1465*	0.0788*	−0.0418	1.0000						
EAR	0.1508**	−0.0591	−0.084*	0.0536	−0.7558**	1.0000					
SCAR	0.1719**	0.1299**	−0.0091	0.1715**	−0.0628	0.1086**	1.0000				
FS	−0.0583	0.0014	−0.0267	−0.0617	0.0764*	−0.2893**	−0.3561**	1.0000			
RISK	−0.0969**	0.0744*	−0.0063	0.0598	0.067*	−0.0300	−0.0863**	−0.0949**	1.0000		
GDPG	0.169**	0.1355**	−0.0323	0.0210	0.0091	0.0114	0.0248	−0.051	−0.4243**	1.0000	
MSG	0.2595**	0.2632**	−0.0547	0.0614	0.0412	0.0009	0.0320	−0.2139**	0.2214**	0.3209**	1.0000

Notes: ** and * note that the correlation is significant at the 0.01 and 0.05 levels, respectively.
CRR = Cost on revenue; ITR = Cost of goods sold/Average inventory; FS = Ln (Total asset); DER = Debt/Equity; EAR = Equity/Total assets; SCAR = Net sales/Average current assets; RISK = 1 during the crisis (from 2007 to 2008 and from 2012 to 2013), COVID-19 pandemic in 2020 and zero otherwise., GDPG = Economic growth rate; MSG = Money supply growth rate.

From Table 3, we find significantly positive correlations between the profit-ability variables with SCAR, GDPG, and MSG, and both CRR and DER are significantly and negatively correlated with profitability indicators: ROA and ROE, of profitability, inferring that these variables play major roles to have high prof-itability. Moreover, the correlation of each pair of ITR, FS and dependent variables is not significant. Since there are some highly correlated variables, there could have a collinearity problem among the variables. To identify how serious the collinearity problem is, we estimate the variance inflation factors (VIFs) and discuss them in the next subsection.

5.3. *Variance inflation factor*

To detect multicollinearity, we use the VIF to determine the correlation among the independent variables. The results are shown in Table 4.

Table 4. VIF.

Variable	VIF	1/VIF
CRR	1.02	0.984469
ITR	1.04	0.959441
FS	1.39	0.720265
DER	2.47	0.404326
EAR	2.68	0.372491
SCAR	1.21	0.828718
RISK	1.52	0.657055
MSG	1.4	0.71535
GDPG	1.57	0.634966
Mean VIF	1.59	

Notes: CRR = Cost on revenue; ITR = Cost of goods sold/Average inventory; FS = Ln (Total asset); DER = Debt/Equity; EAR = Equity/Total assets; SCAR = Net sales/Average current assets; RISK = 1 during the crisis (from 2007 to 2008 and from 2012 to 2013), COVID-19 pandemic in 2020 and zero otherwise, GDPG = Economic growth rate; MSG = Money supply growth rate.

Table 4 indicates that the VIF values range from 1.02 to 2.68, and are always lower than 10. Thus, we conclude that multicollinearity is not a problem and all variables are still used for the study.

5.4. *Regression result and discussion of findings*

This paper has empirically analyzed the effects of firm-specific and macroeconomic factors on the profitability of real estate companies by performing regression using POLS, FEM and REM.

Firstly, we use the POLS regression model with Prob $> F = 0.0001$ which is less than a 5% significant level. Besides, we use the White test for heteroskedasticity and the Wooldridge test for autocorrelation in the POLS model. The results illustrate that Prob $> \chi^2$ in two tests is less than 5% so autocorrelation and heteroskedasticity are likely to occur.

Secondly, FEM and REM models give the results that Prob $> F$ is less than 5%, which implies that the two models have statistical significance.

Finally, we use the Hausman test to select the most suitable estimation method among POLS, FEM and REM (Gujarati *et al.*, 2012). The results indicate that the REM is more appropriate for ROA because Wald χ^2 (9) is 217.64 and that of Hausman with Prob $> \chi^2 = 0.1177$ is more than alpha (5% level), and FEM is suitable for ROE because financial development test (Sabir *et al.*, 2019) with $F(9, 766) = 34.28$ has significance at the 1% level and that of Hausman with Prob $>$ chi2 $= 0.0010$ less than 5% level.

In order to examine whether there are any defects in the selected model after the Hausman test, the authors conduct the Breusch and Pagan Lagrangian multiplier test for random effects. The results indicate that ROA and the independent variables exhibit heteroscedasticity (Prob $> \chi^2 = 0.000 < 0.05$) and autocorrelation (Prob $> F = 0.0048 < 0.05$). Similarly, ROE and the independent variables are tested by the modified Wald test for heteroskedasticity in the fixed effect regression model and the Wooldridge test for autocorrelation in panel data. The results show a correlation phenomenon (as Prob $> F = 0.0117 < \alpha = 0.05$) and the model exhibits heteroscedasticity (Prob $> \chi^2 = 0.000 < \alpha(\alpha = 0.05)$), respectively.

We choose to resolve the autocorrelation by the GLS regression method because this method is an effective solution to overcome the autocorrelation phenomenon between the residuals of the variable heteroscedasticity (Wooldridge, 2002). The results of the methods are reported in Tables 5 and 6.

We find a low negative relationship between CRR, DER, risk ratio (RISK) and profitability (ROA). Meanwhile, the remaining variables including EAR, GDPG, net SCAR, FS and MSG rate have positive effects on ROA. However, ITR is not statistically significant, so the impact of ITR on ROA cannot come to the conclusion. The results of the regression model on profitability factors (with the dependent variable ROA) of real estate enterprises in Vietnam are presented as

Table 5. Results of research models between ROA and independent variables.

	Regression coefficients			
ROA	POLS	FEM	REM	GLS
CRR	−0.00440***	−0.00364***	−0.00393***	−0.00386***
	[−6.10]	[−5.29]	[−5.77]	[−4.74]
ITR	−0.000000424	5.15E−09	−0.000000148	0.000000515
	[−0.53]	[0.01]	[−0.20]	[1.36]
DER	−0.00686***	−0.00479**	−0.00552***	−0.00364***
	[−3.51]	[−2.32]	[−2.80]	[−2.81]
EAR	0.0000492	0.0612***	0.0316	0.0324**
	[0.00]	[2.76]	[1.63]	[2.48]
SCAR	0.0156***	0.0156***	0.0156***	0.0171***
	[4.74]	[4.30]	[4.55]	[6.21]
FS	0.00227	0.00612**	0.00377*	0.00440***
	[1.55]	[2.23]	[1.94]	[4.05]
RISK	−0.0173***	−0.0165***	−0.0172***	−0.00957***
	[−3.10]	[−3.19]	[−3.33]	[−3.20]
GDPG	0.113	0.0878	0.0963	0.183*
	[0.56]	[0.47]	[0.52]	[1.83]
MSG	0.226***	0.248***	0.236***	0.130***
	[7.68]	[8.57]	[8.49]	[8.32]
_Cons	−0.0576	−0.200**	−0.117*	−0.131***
	[−1.18]	[−2.36]	[−1.88]	[−3.66]
N	842	842	842	842
R^2	0.189	0.224		
	$F(9, 832) = 21.49$	$F(9, 766) = 24.58$	Wald chi2(9) = 217.64	Wald chi2(9) = 257.53
	Prob > F = 0.0000***	Prob > F = 0.0000***	Prob > F = 0.0000***	Prob > Chi2 = 0.0000***

Notes: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively. CRR = Cost on revenue; ITR = Cost of goods sold/Average inventory; FS = Ln (Total asset); DER = Debt/Equity; EAR = Equity/Total assets; SCAR = Net sales/Average current assets; RISK = 1 during the crisis (from 2007 to 2008 and from 2012 to 2013), COVID-19 pandemic in 2020 and zero otherwise, GDPG = Economic growth rate; MSG = Money supply growth rate.

Table 6. Results of research models between ROE and independent variables.

	Regression coefficients			
ROE	POLS	FEM	REM	GLS
CRR	−0.0138***	−0.0111***	−0.0120***	−0.0101***
	[−7.14]	[−6.13]	[−6.68]	[−5.07]
ITR	−0.00000162	8.91E−07	−0.00000113	−0.00000013
	[−0.76]	[−0.45]	[−0.57]	[−0.15]
DER	−0.0509***	−0.0583***	−0.0553***	−0.0225***
	[−9.73]	[−10.74]	[−10.60]	[−3.95]

Table 6. (*Continued*)

ROE	Regression coefficients			
	POLS	FEM	REM	GLS
EAR	−0.414***	−0.357***	−0.392***	−0.182***
	[−8.96]	[−6.11]	[−7.61]	[−4.76]
SCAR	0.0352***	0.0328***	0.0336***	0.0294***
	[4.00]	[3.42]	[3.71]	[4.46]
FS	0.0000822	0.00214	0.00104	0.00509
	[0.02]	[0.30]	[0.20]	[1.62]
RISK	−0.0460***	−0.0422***	−0.0441***	−0.0255***
	[−3.08]	[−3.08]	[−3.23]	[−3.23]
GDPG	−0.123	−0.131	−0.119	0.485*
	[−0.23]	[−0.27]	[−0.24]	[1.79]
MSG	0.656***	0.710***	0.688***	0.381***
	[8.32]	[9.34]	[9.36]	[9.18]
_Cons	0.272**	0.189	0.239	0.239
	[2.08]	[0.85]	[1.44]	[−0.25]
N	842	842	842	842
R^2	0.246	0.287		
	$F(9, 832) = 21.49$	$F(9, 766) = 34.28$	Wald chi2(9) = 304.18	Wald chi2(9) = 226.53
	Prob > F = 0.0000***	Prob > F = 0.0000***	Prob > F = 0.0000***	Prob > Chi2 = 0.0000***

Notes: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively. CRR = Cost on revenue; ITR = Cost of goods sold/Average inventory; FS = Ln (Total asset); DER = Debt/Equity; EAR = Equity/Total assets; SCAR = Net sales/Average current assets; RISK = 1 during the crisis (from 2007 to 2008 and from 2012 to 2013), COVID-19 pandemic in 2020 and zero otherwise, GDPG = Economic growth rate; MSG = Money supply growth rate.

follows:

$$ROA = -0.131 - 0.00386 * CRR - 0.00364 * ITR + 0.0324 * EAR$$
$$+ 0.0171 * SCAR + 0.0044 * FS - 0.00957 * RISK$$
$$+ 0.183 * GDPG + 0.130 * MSG.$$

Based on the summary results of Table 6 the regression model in this study is formulated as follows:

$$ROE = 0.239 - 0.0101 * CRR - 0.0225 * DER - 0.182 * EAR + 0.0294 * SCAR$$
$$- 0.0255 * RISK + 0.0.485 * GDPG + 0.381 * MSG.$$

Table 6 indicates that CRR, DER, EAR and risk factor (RISK) have negative impacts on ROE; whereas net SCAR, GDPG and MSG rate show opposite results. Finally, there are not enough grounds to determine the relationship between ITR, FS and ROE.

These results can be discussed as follows.

CRR is negatively correlated with the profitability of real estate firms at the 1% significance level. This result is consistent with earlier findings of Greene and Segal (2004), and Gray *et al.* (2008). This reveals that real estate firms with a higher CRR show their lower profitability. Specifically, if this ratio increases 1 unit, ROA or ROE would decrease 0.00386 units and 0.0101 units, respectively. Thus, to increase the profitability of the firm, the enterprise needs to reduce costs for the entire enterprise, such as selling expenses, administrative expenses and interest expenses. In particular, construction firms should speed up the construction, use modern technology in building to reduce these costs. The paper infers that although this variable has a small impact on profits, it could still be considered because cost is one of the factors that directly affect profits.

The ITR is not significant at all three-levels (1%, 5% and 10%). Thus, there is not enough evidence to conclude the impact of this variable according to the original expectations of the authors. This regression result is similar to Sekeroglu *et al.* (2014) which indicated there is no correlation between inventory turnover and profitability in the retail sector.

The DER has a small negative influence on both ROA and ROE at 1% level, -0.00364 and -0.0225, respectively. This finding is similar to Khidmat and Rehman (2014), Pontoh and Ilat (2013) and Bilal *et al.* (2013). The negative coefficient indicates that if real estate companies increase/decrease debt, they have lower/higher profitability. This debt arises because not all company needs can be met by the company's own capital. DER ratio calculation of property and real estate companies has a fairly high DER value. The higher the DER reflects the relatively high risk of the firms, pressure to pay the debt and interest on the company's debt which affects profit.

The EAR ratio has a positive (0.0324 at 5% level) and significant negative impact (-0.182 at 1% level) on ROA and ROE, respectively. This means that an increase in the proportion of capital to assets leads to a rise in the ROA and a decrease in the ROE. This positive result is supported by Sufian (2011), Benahmed-Daho *et al.* (2015), Almazari (2014) and Al-Jafari and Alchami (2014) who find that a large capitalization allows the company to be relatively safer from liquidation as well as reduces the dependence on external funding and increases profitability. Particularly, for real estate companies, the higher capital ratio encourages the company management to improve the efficiency of profitability, which ultimately impacts on profits, as well as maintains public trust because of the available capital. Thus, our findings support the theory that the higher the value of EAR, the higher profitability. Nevertheless, the negative result of ROE states that when the enterprise has a very high EAR, it does not take sufficient advantage of loans to maximize its profits and debt interest tax shields, where the tax shield

allows a reduction in taxable income for corporations achieved through claiming allowable deductions such as mortgage interest, medical expenses, charity donations and depreciation.

The net SCAR measures the ability of businesses to generate sales from their investment in total assets. The results reveal a positive influence on ROA increased by approximately 0.0171% and ROE by 0.0294% per unit of SCAR (with 1% significance level). This finding is consistent with Malhotra *et al.* (2009), Singa-purwoko and El-Wahid (2011), Pouraghajan *et al.* (2012) and Lee *et al.* (2004). The assets of real estate companies in Vietnam are often larger than in other industries, so this ratio will be low unless sales are high. Because the companies find ways to increase sales, sign many construction contracts for large projects, complete on schedule, etc.

The size of the firm (FS) shows a positive correlation with ROA at the 1% significance level but it has no statistical significance with ROE. This result is in good agreement with previous studies, such as Zeitun and Tian (2014), Margaritis and Psillaki (2010), Pouraghajan *et al.* (2012), Singapurwoko and El-Wahid (2011), Pervan and Višić (2012), Malik (2011), Mumtaz *et al.* (2013), Odusanya *et al.* (2018) and Gleason *et al.* (2000). According to Asimakopoulos *et al.* (2009), large firms tend to be more profitable than smaller ones.

Firms with large sizes have more advantages in negotiating the price for their inputs to reduce the cost and increase their profitability. However, Margaretha and Supartika (2016) reported a negative relationship between FS and profit-ability because the larger firms would be harder to manage their organizational effectiveness from overcoming problems in the bureaucratic management structure.

Crisis of economy, finance and COVID-19 pandemic (RISK) give an inverse result with the profitability at the 1% significance level when causing ROA to decrease by 0.00957 units and ROE by 0.0255 units. Consistent with previous findings (Kula *et al.*, 2012; Maudos, 2017; Bouzgarrou *et al.*, 2018), our results show that the crisis has a significantly negative effect on profit. Devi *et al.* (2020) reported that the decline in people's income in the economic crisis during the COVID-19 pandemic will certainly decrease people's purchasing power so that sales activity will also decrease. However, the crisis and COVID-19 pan-demic have negligible impact on the profitability of real estate companies in the study.

MSG rate has a significant positive impact on ROA (0.13) and ROE (0.381) at the significance level of 1%, which is similar to Ariff and Rosly (2011) and Kariuki (2015). Nevertheless, an increase in the money supply is the cause of inflation which is one of the factors that have both positive and negative effects on economic growth. Therefore, moderate inflation is seen as an economic incentive by

encouraging capital mobilization and increasing exchange rate flexibility. Low inflation can help lubricate commodity and labor markets and increase relative flexibility in prices.

GDPG has a significant impact (0.183 and 0.485) on the profitability (ROA and ROE in turn) of real estate firms at the 10% significant level. This finding is similar to Rezina *et al.* (2020) and Doan *et al.* (2020). GDP growth creates the investors' trust in the real estate market and concerned firms that help the companies to solve their inventory and then expands the profitability.

6. Concluding Remarks

This paper investigates the factors that impact the profitability of 67 real estate companies listed on the HOSE and HNX in Vietnam for the period from 2007 to 2020 with 842 observations. Pooled regression (POLS), FEM, REM and GLS have been applied to determine the effect of internal and external factors on the firm's profitability. From the findings above, the government, the real estate companies, the investors and the researchers have a comprehensive perspective on the impact of firm-specific and macroeconomic factors on the profitability of real estate firms in Vietnam. To enable the company to actively deal with it and develop suitable policies to improve corporate profitability.

Firstly, the money supply, according to the findings, has a substantial impact on the profitability of real estate enterprises, particularly during times of crisis or COVID-19 epidemic. As a result, to manage inflation, the government should keep the money supply at a low level and implement necessary steps to stabilize the economy in general and the real estate industry in particular. Because the pandemic is predicted to endure until 2022, and various new virus strains are causing many problems for Vietnam, measures and tactics to generate demand for non-essential industries, such as real estate, are required. Moreover, the GDP growth rate also partly affects the industry, so the government also needs a clear strategy and roadmap to improve the growth rate of the economy.

Secondly, real estate firms should have contingency plans in place to keep costs to a minimum. To minimize expenses and increase revenues, businesses should look into integrating new technologies in construction and sales, for example. Furthermore, capital restructuring, a lower DER and better execution of trade credit policy, and a debt recovery strategy can all increase a company's profitability.

Finally, while investing in a real estate firm, investors should carefully analyze profitability and examine internal and external variables impacting the company to make the best decision possible, especially during sensitive moments such as crises and pandemics. Fourth, in the case of real estate projects that are mortgaged by corporations to borrow cash from credit institutions, the same credit institutions or

other credit institutions subsequently lend the money to consumers who want to acquire flats in the real estate project. Because the credit institution has twice disbursed for two distinct loans for one collateral, the risk of lending that collateral is a real estate project is quite high. This is also a danger of collateral for lending institutions, so they must be vigilant to prevent it, as well as carefully analyze the operating profitability and profitability of real estate enterprises.

The study contributes to the body of information on the firm-specific and macroeconomic factors that influence real estate business profitability, which will be useful for future research. Other helpful metrics, such as return on investment (ROI), ROS, dividend yield (DY), and other components, such as legal concerns, management capabilities and leadership gender, were not discussed under the constraints of the paper. Future research into this topic might be quite intriguing.

Acknowledgments

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