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Influence of density of fixed assets on return on equity: A case study of Vietnam

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Abstract

Broadly speaking, telecommunication technology firms are continuing to reinforce their capacities, visions, and sustainable development for the sake of the promotion of digitalization, improvement of inner strength, and cooperation with the government and relevant agents, with a view to achieving complete digitalization and creating new opportunities for developments. The study investigates the influence of density of fixed assets (DFA) on return on equity (ROE) in the telecommunications technology firms listed on the Vietnam stock market. The study employs a set of aggregated data from 33 telecommunications technology

firms listed on the Vietnam stock market. The research uses both qualitative and quantitative research methods. For the quantitative research method, the supporting tool is Stata13 software. The research results show that, the factor density of fixed assets did not influence on ROE of telecommunications technology firms listed on the Vietnam stock market. Based on the findings, some recommendations are given for density of fixed assets for improving ROE in the telecommunications technology firms listed on the Vietnam stock market.

Keywords: Density of Fixed Assets (DFA), Return on Equity (ROE), Accounting, Finance, Telecommunications Technology Firms

JEL Classification codes: M41, F65

1. Introduction

Broadly speaking, telecommunication technology firms are continuing to reinforce their capacities, visions, and sustainable development for the sake of the promotion of digitalization, improvement of inner strength, and cooperation with the government and relevant agents, with a view to achieving complete digitalization and creating new opportunities for developments.

With the support from the government and the authorities of provinces across the country, in the last year, several telecommunication Technology firms promoted high-level exchange with the authorities at provinces and cities; signed agreements on cooperation for digitalization and training on knowledge of digitalization for leaders at provinces; organized many high-level meetings with leading private economic groups of the country, etc. Besides, with the current increasing demand for digitalization of international and domestic customers, telecommunications technology firms can benefit from exporting software.

Telecommunications technology firms listed on the Vietnam stock market are pioneering during the phase of renovation, which includes 3 major missions: Eliminate bureaucracy and subsidies; Develop multi-sector economy and integrate internationally. As a result, they have significantly contributed to the achievement of the country. However, the achievements of these enterprises are not yet proportional to their potential, especially in terms of human resources.

Investment in facilities, machinery and technology can generally be considered as investment in enterprises' fixed assets. While Abbasali & Malekian (2012) ^[1] showed that increasing investment in assets has a positive effect on the profitability of enterprises, Zeitun & Tian (2007) ^[11] and Onalapo & Kajola (2010) ^[8] argued the opposite. Therefore, it is evident that if enterprises invest too much on fixed assets without making improvements in business performance, it could result in waste of capital, causing a lack of capital to maintain the operation of business and production, which could consequently result in higher risk and weaker competitive edges.

Therefore, it is both practically and theoretically valuable to analyze and assess the influence of the density of fixed assets on return on equity.

2. Literature review

Return on equity

Return on equity (ROE) is an important indicator to assess the profitability of the firm. This ratio is one of the important indicators that investors are interested in. This ratio measures the profit after tax per unit of equity in a period.

$$Return\ on\ equity = \frac{Profit\ after\ tax}{Average\ equity\ of\ the\ period}$$

Source: Huong and Hao, 2011 [5]

ROE shows: How much profit is generated per capital unit, or in other words, the capacity to generate business results of a capital unit. The higher the efficiency of capital use, the greater the production and business efficiency of an enterprise.

High ROE index shows that the enterprise uses shareholders' money effectively, which means that the enterprise could harmonize the use of capital from shareholders' money and loans to enhance its competitive edges for raising capitals and expanding scales. Therefore, the higher ROE is, the more attractive the shares are to investors.

ROE is one of the most important criteria for shareholders, and it can assess the profitability per unit of capital that common shareholders invested. This criterion is an accurate measurement to indicate how many units of profit are generated per unit of capital spent. This ratio is universally used by investors to analyze and compare with other stocks in the same industry, which helps them make decisions on which company's stock to buy. High ROE index shows that the company uses shareholders' money effectively, which means that the company could harmonize the use of capital from shareholders' money and loans to enhance its competitive edges for raising capitals and expanding scales. Therefore, a high ROE will be more attractive to investors, as from the perspective of investors, it shows the final business outcome of the enterprise.

Density of fixed assets

As previously mentioned, previous research shows different outcomes on investigating the influence of fixed assets investments on profitability. The research by Abbasali & Esfandiar (2012) [1] shows that investment on fixed assets positively affects profitability, while Zeitun & Tian (2007) [11] argues that high proportion of fixed assets investment negatively affects profitability. Ngoc (2011) [7], Hang (2015) [4] share a common research result that fixed assets investment does not have a meaningful correlation with firm performance or profitability.

For telecommunications technology firms, machinery, software, etc. are considered the most important core of the enterprises' fixed assets. It is a testimony for the enterprise's level of technicality and current capability, and it is also an important factor that contributes to the enterprise's competitive edges. An enterprise with state-of-the-art equipment could reduce its labor cost, reduce project length, and guarantee the progress of projects, which helps reduce costs and higher profits could be realized sooner.

To continue previous research, after interviews with experts; this research chooses density of fixed assets as observed variable, with density of fixed assets defined as follows:

$$Density\ of\ fixed\ assets = \frac{Fixed\ Assets}{Total\ Assets}$$

Source: Huong and Hao, 2011 [5]

3. Methodology

This study uses both research methods, including: qualitative research methods and quantitative research methods.

Qualitative research methods: We used techniques of synthesis, analysis, comparison to evaluate the influence of density of fixed assets on return on equity. In addition to collecting previous studies, we interviewed experts who are leading lecturers in finance and accounting; financial directors in telecommunication technology firms. Qualitative research methods orientated and refined the research results of previous studies; from there, this study inherited and applied.

Quantitative research methods are based on table data, data are aggregated over 7 years, from 2015 to 2021. Rely on Global data service company and reputable websites, such as <http://cafef.vn>; <https://financevietstock.vn>, etc [10]. We collected data on indicators that reflected the ROE and Density of fixed assets. We collected financial indicators of 33 telecommunications technology firms listed on Vietnam stock market in the period 2015-2021 and within 2 months and collected 231 observed variables.



Fig 1: Research model

4. Results

4.1 Descriptive statistic

Table 1 show that the dependent variable includes 1 observed variables; the independent variable includes 1 observed variables. Each observed variable is described by 231 observations. Basic indicators such as mean, max, min, standard deviation (std), variance, skewness coefficient of variation, sum of variables, range, coefficient of variation (p50), coefficient of variation of each observed variable (cv) has been identified and these basic indices accurately reflect the current state of ROE and the influence of density of fixed assets (DFA) on the ROE of listed telecommunications technology firms.

Table 1: General descriptive statistics and detail descriptive statistics

General descriptive statistics					
Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent variable					
ROE	231	.1120303	.2791766	-.4891225	2.91825
Independent variable					
DFA	231	.2455233	.2050116	.0060721	1.036939
Detail descriptive statistics					
stats	ROE	DFA			
N	231	231			
sum	25.879	56.71589			
range	3.407372	1.030867			
variance	.0779396	.0420298			
cv	2.491974	.8349984			
skewness	7.644064	1.214101			
kurtosis	74.346824	4.287173			
p50	.0748219	.1966648			

4.2 Correlation analysis results

Table 2: Correlation analysis results of independent variable

	ROE	DFA
ROE	1.0000	
DFA	0.0218	1.0000

Table 2 shows the results of correlation analysis, also known as multicollinearity analysis. The results show that the absolute value of each correlation coefficient between 2

variables is less than 0.8; therefore, no multicollinearity occurs (Bryman & Cramer, 2001; Kohler & Kreuter, 2005; Torres-Reyna, 2007; Ditzen, 2018) ^[2, 6, 9, 3]. The remaining regression model has 1 independent variable with 1 observed variables, 1 dependent variable with 1 observed variables.

4.3 Regression Results Regression results without control variables

Table 3: OLS regression results

OLS regression results for observed variable ROS of the dependent variable (regress ROE DFA)						
Source	SS	df	MS	Number of obs = 231		
Model	.008552455	1	.008552455	F (1, 229) = 0.11		
Residual	17.9175557	229	.078242601	Prob > F = 0.7412		
Total	17.9261081	230	.077939601	R-squared = 0.0005		
				Adj R-squared = -0.0039		
				Root MSE = .27972		
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ROE	.0297443	.0899662	0.33	0.741	-.1475231	.2070116
DFA	.1047274	.0287511	3.64	0.000	.0480768	.161378

With 95% confidence degree, Table 3 shows: Value of F is equal to 0.11 < 1.96 and value of Prob is larger than value of F (Prob > F) by 0.7412 (> 0.05). Thus, the model is not consistent and statistically significant (Bryman & Cramer, 2001) ^[2]. Therefore, the research results are not accepted (Bryman & Cramer, 2001; Kohler & Kreuter, 2005; Torres-Reyna, 2007; Ditzen, 2018) ^[2, 6, 9, 3].

Not define the regression equation of DFA affects on ROE. The observed variable DFA does not influence on ROE.

ROE

ROE is synthesized and analyzed in detail in Table 4 and Table 5 as follows:

Table 4: Average ROE over the years of telecommunication technology firms listed on the Vietnam stock market

Description	2015	2016	2017	2018	2019	2020	2021	Average 2015-2021
ROE (%)	10.2	16.8	11.5	11.5	7.4	5.7	15.5	11.2

Sources: Global data service company, <https://finance.vietstock.vn/>; <http://cafef.vn> and authors synthesized ^[10]

Table 5: Average ROE over the years (2015-2021) of each telecommunication technology firms listed on the Vietnam stock market

STT	ROE<0		0<ROE<15%		15%<ROE<20%		ROE>20%	
	Mã CK	ROE	Mã CK	ROE	Mã CK	ROE	Mã CK	ROE
1	TTZ	-0.7	VIE	0.5	ADC	18.3	CNC	23.7
2	LTC	-6.2	VEC	1.4			FPT	24.6
3	SRB	-9.7	UNI	1.5			SRA	24.8
4			VAT	2.3			FOX	30.8
5			TST	2.4			IFC	43.3
6			SAM	3.1			ABC	44.6
7			CKV	4.2				
8			ELC	6.0				
9			POT	7.4				
10			ONE	7.8				
11			SVT	8.2				
12			SGT	8.3				
13			SMT	9.0				
14			CMT	9.6				
15			CNN	10.3				
16			KTS	10.6				
17			VLA	10.6				
18			ST8	11.0				
19			VTC	11.0				
20			CMG	11.7				
21			HPT	12.3				
22			TTN	12.9				
23			ITD	14.2				

Sources: Global data service company, <https://finance.vietstock.vn/>; <http://cafef.vn> and authors synthesized ^[10]

Table 4 shows that: The average ROE of the telecommunication technology industry over the years also has a clear fluctuation. In 2015, ROE reached 10.2%, in 2016, ROE increased slightly to 16.8%, and reduced in 2017 and 2018 with 11.5%, decreased to 7.4% and 5.7% in 2019 and 2020, and increased sharply in 2020 with 15.5%.

In the period 2015-2021, the industry average had an ROE of 11.2%. This indicates that 100 dong of equity creates 11.2 dong of profit after tax. Thus, in terms of the whole industry, the ROE of telecommunication technology firms is all over

11.2%. This number is relatively average.

Financial experts say that, the enterprise has sufficient financial capacity according to international standards, the ROE must be at least 15% for 3 consecutive years (ADC, ITD); $ROE \geq 20\%$ and last for at least 3 years then the enterprise has the position in the marketplace (CNC, FOX, FPT, SRA).

Density of fixed assets

Table 6: Density of fixed assets of telecommunication technology firms listed on the Vietnam stock market

TT	Code stock	2015	2016	2017	2018	2019	2020	2021
1	ABC	7.1%	6.2%	9.1%	4.1%	4.3%	5.6%	6.6%
2	ADC	10.2%	11.5%	10.1%	26.0%	25.0%	26.0%	25.5%
3	CKV	18.2%	48.9%	43.8%	47.8%	54.4%	70.0%	66.4%
4	CMG	38.8%	47.7%	51.5%	46.7%	42.1%	43.1%	41.1%
5	CMT	10.5%	9.3%	12.4%	12.6%	10.1%	10.7%	7.3%
6	CNC	88.8%	87.4%	91.3%	103.7%	68.5%	78.5%	30.4%
7	CNN	13.7%	12.8%	10.7%	6.7%	5.3%	33.6%	29.1%
8	ELC	19.7%	19.0%	18.6%	17.6%	13.7%	12.4%	7.8%
9	FOX	69.1%	74.8%	77.3%	63.5%	65.6%	57.9%	48.1%
10	FPT	27.9%	28.1%	35.7%	36.2%	37.4%	33.7%	32.1%
11	HPT	4.7%	4.7%	4.6%	5.9%	6.8%	14.0%	6.8%
12	IFC	17.2%	19.5%	16.2%	27.7%	32.6%	38.9%	38.9%
13	ITD	15.5%	18.5%	20.4%	21.7%	19.9%	16.7%	18.8%
14	KST	31.6%	24.3%	20.7%	27.1%	22.3%	25.4%	41.4%
15	LTC	9.5%	11.5%	4.7%	5.7%	6.0%	6.0%	7.2%
16	ONE	2.5%	2.9%	1.9%	2.0%	2.4%	5.3%	4.8%
17	POT	15.0%	21.8%	13.1%	11.1%	25.7%	28.9%	22.4%
18	SAM	29.3%	36.8%	30.5%	26.7%	25.0%	23.2%	17.7%
19	SGT	3.9%	4.9%	5.5%	5.6%	6.4%	5.5%	3.3%
20	SMT	28.3%	27.4%	33.3%	33.5%	35.6%	47.3%	45.3%
21	SRA	4.3%	22.6%	5.8%	7.3%	9.2%	7.8%	0.9%
22	SRB	27.0%	35.7%	39.2%	38.2%	38.7%	39.4%	39.3%
23	ST8	9.9%	18.0%	19.5%	15.6%	16.8%	12.0%	15.3%
24	SVT	7.4%	7.6%	8.8%	8.5%	8.0%	6.4%	2.8%
25	TST	41.5%	35.0%	26.2%	27.9%	23.5%	25.6%	24.9%
26	TTN	54.7%	59.5%	52.0%	59.1%	37.3%	59.0%	60.9%
27	TTZ	34.0%	34.7%	36.2%	26.8%	23.4%	25.8%	26.1%
28	UNI	0.6%	0.6%	0.6%	0.6%	2.8%	2.6%	1.4%
29	VAT	4.5%	3.4%	4.1%	4.3%	4.3%	3.4%	4.1%
30	VEC	21.8%	14.1%	15.1%	18.6%	23.7%	26.8%	32.4%
31	VIE	55.2%	79.5%	59.2%	62.1%	51.5%	30.4%	37.8%
32	VLA	4.5%	4.4%	4.2%	4.1%	9.6%	10.7%	25.8%
33	VTC	47.3%	29.6%	13.9%	12.5%	11.1%	18.6%	28.0%
Average		23.5%	26.1%	24.1%	24.8%	23.3%	25.8%	24.3%

Sources: Global data service company, <https://finance.vietstock.vn/>; <http://cafef.vn> and authors synthesized ^[10]

5. Discussion and implications

For telecommunication technology firms, competitive edges are improved by investing for development. Investing for development in the case of telecommunication technology firms could be understood as employing financial resources, material resources, labor and intellectual resources to construct and renovate facilities and infrastructure, purchase and install equipment; train human resources to conduct regular expenses related to these assets in order to maintain, improve and expand the enterprise' capacity of production and business.

Experts state that investment is a sacrifice of current resources to perform actions that could yield profitable result in the future. In terms of finance, the result is profit.

Telecommunication technology firms must employ material and financial resources, or in other words, expend to upgrade machinery and equipment, innovate technology,

train and improve knowledge of managers, engineers and staff, or to buy data of the market and competitors, etc. Therefore, investment, together with investment results, is the prerequisite condition for the improvement of the enterprise's competency.

According to experts, there are 3 forms of fixed assets investment in telecommunication technology firms, including:

(i). Investment in construction of factories, offices, etc. are activities that make use of capitals to expand and upgrade facilities and equipment, which include: Purchasing, renting, renovating offices; purchasing equipment and media for work at office, etc. These investments directly affect telecommunication technology firms' competitiveness by expanding distribution systems, innovating enterprises' facilities and public appearance, creating environments for

employees, and organizing convenient and modern places for meeting with customers.

Almost every telecommunication technology firm will take into consideration the scales of factories, floor plan, materials, construction costs and progress when it comes to investment of factories and building construction. In addition, telecommunication technology firms also pay attention to the total premises design and each item of construction of factories, warehouses, office buildings, infrastructure systems, etc.

At telecommunication technology firms, investment of factories is a product. As the construction is complete, it becomes telecommunication technology firms' assets that they could use for operating production and business.

Investment for construction of factories is a prerequisite initial investment. Most telecommunication technology firms use capitals to build initial facilities. System of factories speaks for the enterprise's capabilities, and investors also evaluate the business performance of an enterprise from its system of factories; therefore, factories help to attract investors' attention.

To their awareness of the importance of building factories, most telecommunication technology firms will allocate capitals for this category. However, the resources of capitals for investment of factories at telecommunication technology firms are not proportionate, as it depends on each enterprise's scale, business result and business strategy. Besides, the proportion of capital for construction of factories at telecommunication technology firms has a tendency to decrease in recent years.

Most telecommunication technology firms have well-equipped factory systems, which could satisfy employees' requirements at work. However, the state of the systems of factories needs to be modernized to suit current circumstances. On the other hand, the investment for factory construction needs to be revised and developed along with other forms of investment in telecommunication technology firms.

(ii). Investment of equipment and machineries: Modernization of equipment helps improve the quality of telecommunication products, innovate telecommunication products to satisfy customers, reduce the use of materials, the cost of product maintenance, and significantly cut down on production costs of enterprises. Modernization of machinery and equipment, together with smart organization of production and development of crews of engineers and skilled workers, is one of the basic measures to lower the cost by improving performance.

The process of buying machineries and equipment at most telecommunication technology firms includes: Research on the necessity of investment, opportunities and threats; Estimated investment scale and intended form of investment; Preliminary analysis and selection of technological & technical aspects and the conditions of materials, equipment, fueling, services and infrastructure; Estimated total investment and plans to mobilize sources of capitals and assessment of the ability to repay debt and generate profits; Preliminary estimation of investment profitability in terms of economic benefits, etc.

In recent years, bidding is one of the main methods to assign and contract products and projects in our country and it has brought enormous economic efficiency. Hence, in order to be qualified for bidding and winning the bid, telecommunication technology firms need to have advanced

technologies and equipment, provide specialized and standardized services. As a result, investment in innovating and upgrading technologies is always a matter of concern for telecommunication technology firms. Telecommunication technology firms focus on investing in new technologies and machinery with a view to satisfying requirements for products in terms of technicality, aesthetic, production progress, provision of services, etc. Every year, the volume of capitals for purchase of machinery and equipment at these enterprises is quite significant in the total investment amount. Therefore, most telecommunication technology firms are equipped with modern technology, allowing them to have a competitive position and foster development.

(iii). Investment of renovation of equipment and machineries

Investment to repair equipment and technology also receives a great deal of attention from telecommunication technology firms besides investment to purchase new equipment. This measure is advantageous as it helps make use of production capacity and reduce investment costs. The investment on repairing equipment and machinery at telecommunication technology firms has had a tendency to increase in recent years. The proportion of capital for investment of repair of equipment and machinery is also increasing.

This study has not found evidence for the influence of the factor density of fixed assets with the observed variable density of fixed assets. However, the ratio of fixed assets and total assets has a negative effect on the return on assets (Zeitun & Tian, 2007; Onaolapo & Kajola, 2010) ^[11, 8]. This could be due to the inefficiency of investing fixed assets, as the enterprise may not have a suitable selection of technology, equipment and machinery for projects, or the fixed assets' capacity may not have been fully used, and there may lack reasonable consideration between purchase and lease for projects, as under certain conditions, the cost to rent machines is significantly lower and more effective.

Telecommunication technology firms listed on the Vietnam stock market need to innovate technology, as the return of innovating technology for these enterprises is significant. The larger the production scale is, the higher the revenue and profit are. As a result, the enterprise's performance could be improved, and products' quality are improved, which could lead to higher consumption and return on equity (ROE) could also be increased. In addition, technological innovation also makes the capital structure of the company more reasonable, and to better implement this measure, telecommunications technology firms listed on the Vietnamese stock market need to:

Firstly, there needs to be research and analysis into the specific technological item in terms of practicality, necessity and benefits.

Secondly, the enterprise needs to consider the capability to mobilize mid and long-term capitals to financialize the innovation of technology.

Thirdly, it is necessary to establish a relationship with technology consulting companies to choose suitable and affordable modern equipment.

Fourthly, the technical staff's quality needs to be improved and equipped with knowledge to master new technology.

6. Conclusion

The study has not found any evidence for the influence of density of fixed assets on return on equity. However,

according to theory and research outcome by Abbasali & Esfandiar (2012) ^[1] shows that growth rate has a positive effect on profitability.

This study has presented the influence of the density of fixed assets on ROE of telecommunication technology firms listed on Hanoi Stock Exchange. This research outcome is a valuable document of reference for telecommunication technology firms and investors.

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