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IMPACT OF DIVERSIFICATION ON FIRM RISK LISTED ON VIETNAM STOCK EXCHANGE

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CHAPTER 1: INTRODUCTION

Firm risk has a great significance for the company itself and its stakeholders. Diversification is an important decision that should be considered and made by any company, especially during the maturity phase of the company. Diversification not only brings benefits but also poses many risks to the company. Worldwide empirical studies on the effect of diversification on firm risk have produced mixed results. In Vietnam, there has not been any research on the impact of diversification on firm risk having the approach like this thesis. The approach of the thesis is to use the two-step process of Heckman (1979) to study the impact of geographic diversification and industrial diversification on systematic risk, idiosyncratic risk and total risk. Therefore, the thesis has 4 following research objectives:

Objective 1: determine the impact of diversification on systematic risk of listed firms.

Objective 2: determine the impact of diversification on idiosyncratic risk of listed firms.

Objective 3: determine the impact of diversification on total risk of listed firms.

Objective 4: suggest some recommendations to firm managers and investors based on the research results.

New scientific and practical contributions of the thesis

New scientific contributions

When studying the impact of diversification on firm risk, the thesis investigates both business diversification and geographical diversification which influence on systemic risk, idiosyncratic risk and total corporate risk. The thesis can be considered as the first study in Vietnam to investigate on diversification of firm risk according to this approach. The research results

provide more empirical evidence on the impact of diversification on firm risk in Vietnam, thus enriching the experimental evidence on cooperate diversification in the world, and contributing new empirical evidence on the impact of diversification on firm risk in Vietnam.

The two-step process of Heckman (1979) is applied to study the impact of diversification on firm risk. The thesis has demonstrated the existence of self-selection bias in diversifying firm decisions in the Vietnamese market, as shown by the coefficient of the inverse Mill's ratio, which is negative and statistically significant at the 5% level in all research models. This result has not been shown in previous studies on the topic of diversification on firm risk in Vietnam.

Besides applying agency cost theory, internal capital market theory and resource allocation theory, the thesis has also applied the portfolio theory by Markowitz (1952) to study the impact of corporate diversification to corporate risk in Vietnam. This can be considered one of new points of this thesis because the portfolio theory was originally built for investors of the financial market and for diversifying financial asset.

New practical contributions

Diversification is an important and decisive policy that companies need to consider implementing, especially during the maturity stage, when growth opportunities get slowly down or begin to decline. At this stage, it is so crucial for companies to diversify for increasing growth opportunities, seeking profits in other business lines or in other geographic regions. Therefore, the thesis offers some practical and specific contributions to companies as follows:

The thesis reveals that the companies which implement different types of diversification can bear different levels of systematic risks. Particularly, geographic multiple-segment firms may be the most at risk while geographic

single-segment firms may be less risk, or domestic multi-segment firms may be even less risk, and finally domestic single-segment firms may be at the least risk. Because the factors of systematic risk are unpredictable, the results of this study would suggest implications for companies.

The thesis demonstrates that there are some different effects of industrial diversification and geographic diversification on the firm's idiosyncratic risk. Industrial diversification increases idiosyncratic risk, but geographic diversification reduces idiosyncratic risk.

The thesis also shows that industrial diversification and geographic diversification have different effects on total risk. The former increases total risk, but the latter does not clearly affect total risk.

The thesis identifies additional risks arising from diversifying the company and recommends some solutions to help the company control risks.

The new contributions of the thesis are crucial not only to help companies identify and control risks when diversifying, but also assist investors in determining the expected rate of return to value the company's stock, or making decisions to invest in company shares.

CHAPTER 2: LITERATURE REVIEW

Two types of diversification investigated in this study consist of:

Geographic diversification is the process in which a company expands its investments on a wide or narrow scale in one or many geographical areas. The greater the number of geographical areas in which a company operates, the greater the degree of geographic diversification a company has (Capar, Chinta, & Sussan, 2015; Jafarinejad et al., 2018).

Industrial diversification is the expansion of the number of business industries by a company (Jafarinejad et al., 2018).

Firm risks consist of:

Systematic risk (also known as market risk): According to Ross et al. (2013), systematic risk is the risk due to factors outside the company, which are uncontrollable and widely affect all companies in the market. In other words, systematic risks are risks from the outside of an industry or a business, such as war, inflation or economic and political events, etc. Firms are highly exposed to systematic risk are those whose sales, profits and stock prices are often changed immediately after economic and political developments and stock market movements. Thus, the risks that can be classified as systematic risks include: natural disasters, epidemics, political risks, economic risks, exchange rate risks, interest rate risks, commodity price risks, operational risk, tax risk, etc.

Idiosyncratic risk (or unique risk, or specific risk) is the risk that occurs to a company or a certain industry, it is independent of factors such as economic, political or factors affecting the whole company as system-wide in nature. For example, a strike or a competitor developing a new product or an innovative technological invention creating by a certain company just affect the profits of a particular company or a certain industry but not the whole market system in general (Bui Huu Phuoc, 2014). Thus, the risks that can be classified as idiosyncratic risks include: construction risk, liquidity risk, employee fraud risk, maintenance risk, change in demand and tastes of customers, the emergence of new competitors, obsolete company goods, customer satisfaction with the company's goods and services, etc.

Total firm risks equal systematic risks plus idiosyncratic risks.

Theories explaining the impact of diversification on firm risks

Portfolio diversification theory was proposed by Markowitz (1952), which argues that diversification will reduce idiosyncratic risk. Within the scope of

this thesis, the author studies the application of Markowitz's (1952) portfolio theory to explain firm diversification. Specifically, the author uses measures of systematic risk, idiosyncratic risk and total risk based on the market model. These measures are derived from capital market theory, which is underpinned by portfolio theory, to explain firm diversification.

Agency cost theory was developed by Jensen and Meckling (1976), which explains about the impact of diversification on risk, namely diversification increases firm risk.

The content of the internal capital market theory explains the impact of diversification on firm risk, shown in two aspects: diversification reduces firm risk but at the same time, diversification also increases firm risk.

The resource allocation theory was discussed by Wernerfelt (1984), explaining the impact of diversification on firm risk in two opposite directions: diversification has the effect of reducing firm risk, but in the opposite direction, it increases firm risk by itself.

Based on a brief review of related studies, the thesis identifies and inherits previous studies on the following contents: research methods, diversification measurement variables, risk estimation models and identification diversification trend models.

CHAPTER 3: METHODOLOGY

Basing on the theories, the results of related studies and combining with the practical situation, the thesis proposes 8 hypotheses:

H1: Geographic diversification increases firm's systematic risk.

H2: Industrial diversification increases firm's systematic risk.

H3: The higher the firm’s degree of diversification is, the greater the systematic risk gets.

H4: Geographic diversification reduces firm's idiosyncratic risk.

H5: Industrial diversification reduces firm's idiosyncratic risk.

H6: Geographic diversification reduces idiosyncratic risk more than industrial diversification.

H7: Geographic diversification does not affect clearly on total firm risk.

H8: Industrial diversification does not affect clearly on total firm risk.

3.1. Research models

Ordinal probit model identifying firm diversification trend

$$DUMSG_{it} = \alpha_0 + \alpha_1 LTA_{it} + \alpha_2 ES_{it} + \alpha_3 SG_{it} + \alpha_4 PND_{it} + \alpha_5 GDP_{it} + \varepsilon_{it} \text{ (model 1)}$$

Where: DUMSG is a dummy variable that takes value equal to 0 for domestic single-segment firm, 1 for domestic multi-segment firm, 2 for global single-segment, and 3 for global multi-segment firm. The business sector has diversified geographically. Control variables include: firm size (LTA), profitability (ES), revenue growth (SG), industry characteristics (PND), macro characteristics (GDP).

Equation estimating systematic risk, idiosyncratic risk and total risk

Market model:

$$R_{it} = \alpha_{it} + \beta_{it} R_{mt} + \varepsilon_{it}$$

Where R_{it}= the return on security I (i=1…281) in month t,

α_{it}: intercept coefficientof period t and equals $\overline{R_{it}} - \beta\overline{R_{mt}}$

R_{mt} = the market rate of return in month t, which is rate of return of VNIndex if the firm listed on on the Ho Chi Minh City Stock Exchange and of HNX index if the firm listed on listed on the Hanoi Stock Exchange.

β_{it} = systematic risk of firm i in year t,

ε_{it} = residuals, this study uses the standard deviation of residuals ε_{it} to get idiosyncratic risk of firm i in year t.

Total risk is the standart deviation of the return on security of firm i in year t ($\sigma_{R_{it}}$).

Models ivestigating the impact of diversification on firm risk

The model ivestigating the impact of diversification on systematic risk

$$BETA_{it} = \alpha_0 + \alpha_1 DIV_{it} + \alpha_2 LMC_{it} + \alpha_3 LEV_{it} + \alpha_4 LIQ_{it} + \alpha_5 ROA_{it} + \alpha_6 EFF_{it} + \alpha_7 CI_{it} + \alpha_8 MB_{it} + \alpha_9 IMR_{it} + \varepsilon_{it} \text{ (model 2)}$$

The model ivestigating the impact of diversification on idiosyncratic risk

$$IR_{it} = \alpha_0 + \alpha_1 DIV_{it} + \alpha_2 LMC_{it} + \alpha_3 LEV_{it} + \alpha_4 LIQ_{it} + \alpha_5 ROA_{it} + \alpha_6 EFF_{it} + \alpha_7 CI_{it} + \alpha_8 MB_{it} + \alpha_9 IMR_{it} + \varepsilon_{it} \text{ (model 3)}$$

The model ivestigating the impact of diversification on total risk

$$TR_{it} = \alpha_0 + \alpha_1 DIV_{it} + \alpha_2 LMC_{it} + \alpha_3 LEV_{it} + \alpha_4 LIQ_{it} + \alpha_5 ROA_{it} + \alpha_6 EFF_{it} + \alpha_7 CI_{it} + \alpha_8 MB_{it} + \alpha_9 IMR_{it} + \varepsilon_{it} \text{ (model 4)}$$

$BETA_{it}$ = systematic risk of firm i in year t

IR_{it} = idiosyncratic risk of firm i in year t, which is standard deviation of residuals ε_{it}

TR_{it} = total risk of firm I in year t, which is the standard deviation of return on security of firm i in year t $(\sigma_{R_{it}})$

DIV is a variable representing for diversification measured in three ways. For a representative of diversification, the author estimates a model, namely dividing model 2 into models 2.1, 2.2, 2.3, 2.4, 2.5, 2.6 and 2.7; dividing model 3 into models 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, and 3.7; and splitting model 4 into models 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, and 4.7. Particularly, models 2.1, 3.1 and 4.1 use variables representing diversification as GM, GS, DM, DS, models 2.2, 3.2 and 4.2 use a variable representing diversification as DGEO, model 2.3 , 3.3 and 4.3 use a variable representing diversification as NG, models 2.4, 3.4 and 4.4 use a variable representing diversification as BHG, and models 2.5, 3.5 and 4.5 use a variable representing diversification ss DSEC, models 2.6, 3.6 and 4.6

use a variable representing diversification as NS, and models 2.7, 3.7 and 4.7 use a variable representing diversification as BHS.

The remaining variables in model 2, model 3 and model 4 consist of firm size (LMC), financial leverage (LEV), liquidity (LIQ), return on assets (ROA), operating efficiency (EFF), capital intensy (CI), growth opportunies (MB) and inverse Mills ratio (IMR)

3.2. Research methodology

The thesis ia a quantitative research with some specific methods such as descriptive statistics, correlation analysis, t-test and Heckman's (1979) 2-step process regression. The reason Heckman's 2-step process regression method is used is that the decision to diversify is the company's own choice – it is not random; the companies decide to diversify or not to diversify by themselves, this is considered a problem of self-selection bias (José Manuel Campa & Simi Kedia, 2002; de Andrés et al., 2017; Villalonga, 2004), and factors affecting the diversification tendency of companies can also affect firm risk. Therefore, the diversification variable will be correlated with the residuals (error term) in the research model of the impact of diversification on firm risk, and the OLS estimation method is not really suitable (de Andrés et al. ., 2017) while Heckman's (1979) 2-step regression method considers this self-selection bias as an omitted variable and corrects it. First, the predicted probability of the firm's decision to diversify to calculate the inverse Mill's ratio, and then includeds it in regession model in step 2 to correct the self-selection bias.

3.3. Research data

Sample: 281 non-finacial firms

Time of date: data estimating systematic risk, idiosyncratic risk and total risk are collected from 2012-2020, data calculating variables in the research models

are collected from 2016- 2020, and data calculating the revenue growth (SG) in model 1 are collected from 2015-2020.

CHAPTER 4: RESULTS AND DISCUSSION

4.2. Research results

4.2.1. Factors affecting firm diversification trend (model 1)

Company size, profitability and industrial features are three characteristics that affect the trend of firm diversification.

4.2.2. Descriptive statistics results of the variables in model 2, model 3 and model 4

The mean of degree of firm's geographic diversification is 0.086, measured by the Berry-Herfindahl index, the mean of the number of geographic divisions is 1,369. Compared with geographic diversification, listed companies have a higher degree of industrial diversification, with the mean of 0.195, measured by the Berry-Herfindahl index and the mean of the number of industrial segments is 2,219. The mean of company size is 11,704, the mean of debt ratio is 0.491, the mean of liquidity is 2,315, the mean of profitability (ROA) is 0.058, the mean of operating performance is 1,021, the mean of ratio of fixed assets to total assets is 0.220, the mean of ratio of market value to book value is 1.064.

4.2.3. Correlation analysis results of model 2, model 3 and model 4

Both geographic diversification and industrial diversification are positively correlated with systematic risk. Specifically, geographic diversification has a positive correlation of 0.08 if measured by the number of geographic divisions (NG), which is positive 0.07 if the measure of geographic diversification is Berry–Herfindahl index (BHG). Industrial diversification has a positive correlation of 0.18 if measured by the number of industrial segments (NS),

which is positive 0.15 if the measure of industrial diversification is the Berry-Herfindahl index (BHS).

For idiosyncratic risk, geographic diversification has a negative correlation of -0.04 for both measures of geographic diversification as the number of geographic divisions (NG) and Berry-Herfindahl index (BHG). In contrast, industrial diversification is positively correlated (0.05) with idiosyncratic risk whether measuring industrial diversification by the number of industrial segments (NS) or the Berry–Herfindahl index (BHS).

Geographic diversification is negatively related to total risk, which is -0.03 if measured by the number of geographical divisions (NG) and -0.02 if measured by the Berry-Herfindahl index (BHG)). However, industrial diversification is positively correlated with total risk, which is 0.08 whether measuring by the number of industrial segments (NS) or the Berry–Herfindahl index (BHS).

The correlation between control variables and systematic risk is divided into two groups, including (i) the group of control variables with positive correlation is firm size (LMC) 0.44, financial leverage (LEV) 0 .03, capital intensity (CI) 0.09, growth opportunity (MB) 0.06 and (ii) the group of control variables with negative correlation is liquidity (LIQ) -0.07, profitability (ROA) -0.003, operating efficiency (EFF) -0.15.

Only financial leverage (LEV) is positively correlated with idiosyncratic risk (0.06). The remaining control variables are all negatively correlated. Particularly, company size (LMC) -0.24, liquidity (LIQ) -0.04, profitability (ROA) -0.18, operating efficiency (EFF) -0.02 , capital intensity (CI) -0.11 and growth opportunity (MB) -0.05.

For total firm risk, financial leverage (LEV) is positively correlated with total risk (0.08). The remaining control variables all have negative correlations such as: company size (LMC) -0.18, liquidity (LIQ) -0.06, profitability (ROA)

-0.18, operating efficiency (EFF) -0.04, capital intesity (CI) -0.11 and growth opportunity (MB) -0.05.

Based on the Farrar and Glauber (1967) standard of 0.8, combined with the results of the correlation analysis, it can be concluded that there is no significant autocorrelation between the independent variables in the model because the correlation coefficients have a low value (less than 0.8).

The results of the model selection test from model 2.1 to model 2.7, from model 3.1 to model 3.7 and from model 4.1 to model 4.7 show that the fixed effect model (FEM) is the most suitable model when compared with the conventional linear regression model (pooled OLS) and the random effects model (REM).

The results of defect test of fixed effects model (FEM) from model 2.1 to model 2.7, from model 3.1 to model 3.7 and from model 4.1 to model 4.7 show that there is no linearity phenomenon between the independent variables, but there is autocorrelation, heteroskedasticity and cross-sectional dependence. To overcome these phenomena, increase the reliability of the research results, the author estimates the regression with standard error of Driscoll and Kraay (1998).

Model regression results determine the impact of diversification on the firm's systematic risk (from model 2.1 to model 2.7)

Consistent with hypothesis H1, geographic diversification increases the firm's systematic risk. Consistent with hypothesis H2, industrial diversification increases the firm's systematic risk. Consistent with hypothesis H3, both geographic diversification and industrial diversification increase systematic risk at significance level of 15, the effect of increasing systematic risk of GM (geographic multi-segment) is the largest (0.251), followed by GS (geographic single-segment) at 0.109 and DM (domestic multi-segment) at 0.108.

The control variables, including firm size (LMC) and capital intensity (CI), have the same positive effect on systematic risk with significance level of 1% from model 2.1 to model 2.7. Also at significance level of 1%, operating efficiency (EFF) and return on assets (ROA) have the converse effect on systematic risk from model 2.1 to model 2.7. growth opportunity (MB) has a negative effect on systematic risk at significance level of 10%. Other control variables such as financial leverage (LEV) or liquidity (LIQ) do not have a statistically significant impact on the systematic risk.

The coefficient of the inverse Mill's ratio is negative and statistically significant at the level of 5% (from model 2.1 to model 2.7).

Model regression results determine the impact of diversification on the firm's idiosyncratic risk (from model 3.1 to model 3.7)

Geographic diversification reduces the firm's idiosyncratic risk. The impact of industrial diversification increases the firm's idiosyncratic risk, and both industrial diversification and geographic diversification increase the firm's idiosyncratic risk.

Firm size (LMC), return on assets (ROA) and capital intensity (CI) negatively affect the firm's idiosyncratic risk. Liquidity (LIQ) has the converse effect on idiosyncratic risk. Operating effeciency (EFF) has a negative effect on idiosyncratic risk. Financial leverage (LEV) and growth opportunity (MB) have no statistically significant effect on firm's idiosyncratic risk.

The coefficient of the inverse Mill's ratio is negative and statistically significant at the level of 5% (from model 3.1 to model 3.7).

Model regression results determine the impact of diversification on the firm's total risk (from model 4.1 to model 4.7)

Geographic diversification has a positive effect on total firm risk when measuring diversification by dummy variables, but when measuring

diversification by the number of geographic segments, it has a negative effect on total risk. With all three measures of industrial diversification, namely dummy variables, the number of industrial segments and the Berry-Herfindahl index showing that industrial diversification increases total firm risk but with different significance. Both idustrial diversification and geographic diversification increase total firm risk at significance level of 1%.

Firm size (LMC) , return on assets (ROA) and capital intensity (CI) negatively affect the total firm risk. Liquidity (LIQ) has a negative impact on total risk. Operating effeciency (EFF) has a negative effect on total firm risk. There is no statistically significant relationship between financial leverage (LEV) and total firm risk. Growth opportunity)MB) does not have a statistically significant effect on total firm risk.

The coefficient of the inverse Mill's ratio is negative and statistically significant at the level of 5% (from model 4.1 to model 4.7).

4.3. Discussion

4.3.1 Discuss the characteristics that influence the firm diversification tendency (model 1)

Large-sized companies tend to be highly diversified, and conversely, highly diversified companies are often large in size, and in order to carry out their industrial diversification and geographic diversification, they must invest safely and wisely. The results of this study are consistent with those of Villalonga (2004), Dastidar (2009), de Andrés et al. (2017) and they are also consistent with the resource allocation theory that states larger firms diversify to take advantage of the firm's internal available resources. In addition, companies with low profitability tend to diversify to seek higher profits in other industries and other geographic regions, the results of this study are consistent with Jose Manuel Campa and Simi Kedia (2002).

Industrial characteristics also affect the firm's diversification tendency, the more diversified companies in the same industry are, the higher the diversification ability is. The results of this study are consistent with de Andrés et al. (2017) and José Manuel Campa and Simi Kedia (2002). Explaining these results, the author thinks that whenever and wherever there is stiff competition between companies in the same industry. Companies always want to achieve what competitive companies have done in order to affirm the company's position, create trust for shareholders, and improve the company's image for investors.

4.3.2. Discuss the impact of diversification on the firm's systematic risk

Industrial diversification increases the firm's systematic risk

Systematic risk affects most industries and companies, so domestic multi-segment firms will be more affected than domestic single-segment firms. The more domestic multi-segments the company diversifies, the more similar in the company's portfolio to the market portfolio is (the larger ρ_{itmt}), so the fluctuations of the factors which cause systematic risk will have a strong impact on domestic multi-segment firms, the higher the degree of industrial diversification is, the stronger the impact achieves. Thus, firms having the high degree of diversification will have low systematic risk when the market risk is low and the factors causing systematic risk are less volatile. In contrast, firms that carrying out a high degree of industrial diversification will have higher systematic risk and when systematic risk is high, the factors causing systematic risk are more volatile.

The sources of risk affecting revenue, expenses, profit, cash flow, volatility of stock prices, causing fluctuations in the stock's return, in terms of the market, are risks. The firm's systematic risks include natural disasters, epidemics, political risks, economic risks, exchange rate risks, interest rate

risks, operational risks (changing in the minimum wage of the management agency affecting the company's operating costs), tax risks, regulations on health and safety at work, regulations on environmental protection.

Geographic diversification increases the firm's systematic risk

The benefit of geographic diversification is that helps a company to have various cash flows from different markets, the company's correlation coefficient with the market will be low, the higher the degree of geographic diversification is, the lower the correlation coefficient is (the lower ρ_{itmt}) which helsp reduce the firm's systematic risk. Companies carrying out geographical diversification are not only affected by domestic systematic risk factors but also also directly exposed to systematic risks from abroad. If foreign systematic risks affecting firms outweigh the benefits of geographic diversification, the firm's systematic risk will increase (Reeb et al., 1998).

The geographic single-segment firms can bear systematic risks (natural disasters, epidemics, political risks, economic risks, exchange rate risks, interest rate risks, operational risks, financial risks, tax risks, health and safety regulations at work, environmental protection regulations) are larger than domestic single-segment firms.

The higher a firm's diversification is, the greater the systematic risk gets

Domestic multi-segment firms can face a higher systematic risk than domestis single-segment firms and geographic single-segmnet can also face greater systematic risk than domestic single-segment firms. Therefore, it can be seen that geographic multi-segment firms can bear the greatest systematic risk (because of the dual effect) when compared to the remaining types of firm (domestic multi-segment firms and geographic single-segment firms).

4.3.3. Discuss the impact of diversification on idiosyncratic risk

The impact of industrial diversification on idiosyncratic risk

When implementing industrial diversification, the company can diversify cash flows in many different business industries, the company can take advantage of available resources to exploit the internal capital market, increase debt capacity and save tax costs to help reduce the firm's idiosyncratic risk. But the company has to bear the arising risks rising agency costs, overexploiting company resources, increasing the possibility of capital misallocation, construction risk, liquidity risk, employee fraud risk, maintenance risks, changing demands and tastes of customers, appearing new competitors, environmental pollution problems, safety issues in the workplace, security issues, theft, cultural problems, surveillance problems or asymmetric information increase transaction costs and increase the firm's idiosycratuc risk. If the benefits of industrial diversification are not enough to compensate the arising risks, it will increase the firm's idiosyncratic risk.

Issues and risks arising when the company implements indstrial diversification include agency costs, over-exploitation of company resources, increasing possibility of capital misallocation, construction risks, liquidity risk, employee fraud risk, maintenance risk, changing customers' needs and tastes, appearing new competitors, management, supervision and asymmetric information, transaction costs, environmental pollution, safety issues in the workplace, security issues, theft, building company culture.

The impact of geographic diversification on idiosyncratic risk

Similar to the expectation expressed in hypothesis H4, the author finds that geographic diversification reduces idiosyncratuc risk. This research result is consistent with the portfolio theory of Markowitz (1952), with the positive side of internal capital market theory, resource allocation theory and research results of Jafarinejad et al. (2018). When diversifying geographically, a company incurs the same risks as it does industrial diversification, but the

benefits of geographic diversification outweigh the benefits of industrial diversification.

- The Government has policies to support companies to carry out diversify geographic diversification and invest abroad. Domestic companies that diversify their industry do not receive this support.
- The product consumption market of companies that diversify geographically is larger than that of companies that diversify their industry.
- The problems that arise when diversifying geographical areas are easier to solve and have more advantages than diversifying industry.

The impact of both industrial diversification and geographic diversification on idiosyncratic risk

The companies have both industrial diversification and geographic diversification have to bear additional risks such as construction risk, liquidity risk, employee fraud risk, maintenance risk, changine customers' needs, and tastes, appearing new competitors, management problems, monitoring, asymmetric information, transaction costs, environmental pollution problems, problems about workplace safety, security issues, theft, building company culture. Due to geographic diversification, the company enjoys the benefits of this type of diversification, so the combined effect increasing the idiosyncratic risk of the company having both industrial diversification and geographic diversification is lower than the company only has industrial diversification.

4.3.4. Discuss the impact of diversification on total firm risk

Be consistent with expectations of hypothesis H7, the results show that geographic diversification has an ambiguous effect on total firm risk. The reason is that geographic diversification increases systematic risk but reduces the firm's idiosyncratic risk (total firm risk equals systematic risk plus idiosyncratic risk).

Be contrary to expectations of hypothesis H8, industrial diversification increases total firm risk. This research result is consistent with the research results in model 2 and model 3, which suggests that industrial diversification increases the firm's systematic risk and idiosyncratic risk, therefore increase the total firm risk (total firm risk equals systematic risk plus idiosyncratic risk).

Using theories to explain diversification creasing firm risk

Portfolio theory is used to explain firm diversification because:

Company diversification helps reduce idiosyncratic risk due to diversifying cash flow, but this benefit is not high enough for idustrial diversification.

The benefits of diversifying cash flow in portfolio theory are greater for firms that choose to geographic diversification.

Agency cost theory states that managers implement firm diversification for their own personal purposes than for the benefits of the company. When carrying out industrial diversification or geographicr diversification, the size of companies will be larger, so the companies have to hire more departmental managers, contributing to get worse the problem of agency costs.

Internal capital market theory: the flip side of internal capital market theory holds that firms misallocate internal capital to industries or geographies because of the privilege-seeking behaviors of managers, lobbyists or if there are many industrial divisions, or geographical areas will increase the possibility of misallocation of capital.

Resource allocation theory: the flip side of resource allocation theory holds that firms do not use available resources efficiently, for example, the resources for a certain industry or geographic area, but are used for another other geographical areas or over-exploiting the capacity of machinery and equipment.

4.3.5. Discuss the impact of control variables on firm risk

Firm size: Not as expected, firm size has a positive effect on systematic risk. Since systematic risk affects most firms, large firms will be affected hard due to a systematic disadvantage compared to smaller firms. In contrast, firm size has a negative effect on idiosycratic risk and total risk due to getting economic benefits from scale.

Financial leverage: Thanks to the stable interest rate level, companies using financial leverage do not affect the firm's risk.

Liquidity: Companies with good liquidity will promptly meet the company's due debts, thereby reducing risks for the company.

Return on assets: Companies with high return on assets and stable cash flow will receive positive reviews from investors, thus reducing systematic risk, idiosyncratic risk and total firm risk.

Operating efficiency: Companies with high operating efficiency will be stable which help to reduce systematic risk, idiosyncratic risk and total firm risk.

Capital intensity: Firms with large fixed assets will be heavily affected by systematic risk, but on the other hand, companies can exploit fixed assets for other businesses and geographies helping the company be more flexible, so it will reduce idiosyncratic risk and total firm risk.

Growth opportunities: Companies that are highly valued by investors and have high growth opportunities often have a positively financial ability, high profitability and good operating efficiency, which helps to reduce the systematic risk.

Inverse Mill's Ratio: The coefficient of the inverse Mill's ratio is negative and statistically significant at the 5% level in all models, confirming the problem of self-selection bias and hence the research method following the two-step

process of Heckman (1979) used in the thesis is appropriate (de Andrés et al., 2017).

CHAPTER 5: CONCLUSION & RECOMMENDATIONS

5.1. Summary of research results

For systematic risk, the thesis proves that industrial diversification and diversification of geographic increase the firm's systematic risk. There are some main risks such as natural disasters, epidemics, political risk, economic risk, exchange rate risk, interest rate risk, commodity price risk, operation risk, tax risk.

For idiosyncratic risk, the thesis proves that industrial diversification increases idiosyncratic risk, but geographic diversification reduces the firm's idiosyncratic risk. Idiosyncratic risk consits of construction risk, liquidity risk, employee fraud risk, maintenance risk, changing demands and tastes of customers, emerging new competitors, obsolete company goods, customer satisfaction of the company's goods and services.

For total firm risk, the thesis shows that industrial diversification increases total risk while geographic diversification affects total risk uclearly.

Along with agency cost theory, resource allocation theory, internal capital market theory, Markowitz's (1952) portfolio theory can be applied to explain firm diversification.

There is a problem of self-selection bias in the firm's decision to diversify.

Besides revealing the results on the impact of diversification on risk, the thesis also disvocers other characteristics that affect firm risk as follows:

Firm size has a positive effect on systematic risk but has a negative effect on idiosyncratic risk and total firm risk.

Financial leverage has no effect on the firm's systematic risk, idiosyncratic risk, and total risk.

Liquidity has no effect on systematic risk, but has a negative effect on idiosyncratic risk and the total firm risk.

Profitability has a negative effect on both systematic risk, idiosyncratic risk and total risk of the firm.

Operating effeciency has a negative effect on both systematic risk, idiosyncratic risk and total firm risk.

Capital intensity has a positive effect on systematic risk but negatively affects idiosyncratic risk and total firm risk.

Growth opportunities have a negative effect on systematic risk, but not on idiosyncratic risk and total firm risk.

5.2. Recommendations

Based on the finding results, the thesis suggests some recommendations to company managers and investors as follows:

5.2.1. Recommendations to company managers

After the introduction and development phase, companies move to the maturity one, in this phase, the company's growth opportunities get slow down and begin to decrease. Therefore, in order to survive and continue to grow, companies must consider making the decision to diversify. To be able to diversify successfully, the company needs to identify and control the following risks and issues:

First, companies can apply portfolio theory to explain and justify their decision to diversify.

Second, companies should pay close attention to agency costs, especially in joint stock companies.

Third, companies need to complete the project evaluation process to make investment decisions, to be transparent about the information of internal projects, to have the equality in project evaluation. In addition, senior mangers

need to recognize the profitability and risk of projects and to distribute internal capital to high-potential projects fairly.

Fourth, the company regularly evaluates the use of available resource in the company such as considering the using capacity of machinery and equipment, thereby making the right decisions about the distribution of resources in the company. .

Fifth, the company managers need to realize that governing a small-sized firm is different from governing a large-sized firm. When the company implements a strategy of diversifying its industries and/or diversifying geographical areas, the firm size is larger than before, so it is necessary to increase management capacity to meet the needs of increasing company size.

Sixth, diversified companies need to pay attention to natural disasters and epidemics.

Seventh, diversified companies should pay attention to political risks.

Eighth, diversified companies need to consider economic risk.

Ninth, diversified companies need to contemplate exchange rate risk.

Tenth, diversified companies need to pay attention to interest rate risk.

Eleventh, diversified companies should ponder commodity price risk.

Twelfth, diversified companies should consider operational risk.

Thirteenth, diversified companies need to pay close attention to tax risk.

Fourteenth, diversified companies need to think of construction risk.

Fifteenth, diversified companies need to take care of liquidity risk.

Sixteenth, diversified companies need to consider employee fraud risk.

Seventeenth, diversified companies need to take care of maintenance risk.

Eighteenth, diversified companies should be concerned for with the issue of supervision.

Nineteenth, companies need to pay attention to the problem of asymmetric information.

Twentieth, when determining the cost of capital to support investment decisions on projects in new geographical areas (geographic diversification) or business expansion projects (industrial diversification), companies should adjust to a higher level of risk with a higher cost of capital because geographic diversification or industrial diversification will face many arising risks.

5.2.2. Recommendations to investors

Based on the finding results, the thesis suggests some recommendations to investors as follows:

First, when determining the expected return on assets to decide the stock price and support investment decisions based on the CAPM capital asset pricing model and the discounted cash flow model, investors need to concerned for diversification strategy the company is applying.

Second, investing in diversified companies has no effect on indirect diversification of firm's portfolio because the systematic risk of diversified firms tends to be higher than the systematic risk of non-diversified firms.

Third, investors need to define their risk appetite clearly. If investors are risk-taking people searching high returns, they should invest in companies with a high degree of diversification; conversely, investors should invest in companies that are not diversified.

Fourth, the idiosyncratic risk of large-sized companies is low, and the return on assets in large-sized companies tends to be more stable.

Fifth, although the research results do not show a statistically significant effect of financial leverage on firm risk, investors also need to pay attention to companies that use large amounts of loan capital in the capital structure.

Sixth, when considering investing in companies with high liquidity, investors should not change the systematic risk level for these companies because the research results show that high liquidity does not affect the firm's systematic risk. Return on assets in companies having sufficient liquidity tend to be more stable due to reducing the idiosyncratic risk of liquidity.

Seventh, investors should invest in companies with high profitability and good performance.

Eighth, when investing in companies with fixed assets accounting for a large proportion of total assets, investors need to assess the situation and forecast the fluctuations of macro factors to make appropriate investment decisions.

Ninth, for companies with high growth opportunities, the systematic risk will be large. Therefore, investors should base their decisions on risk appetite to make appropriate decisions. If an investor wants to achieve a large return and accept high risk, he/she should invest in companies with great growth opportunities.

5.3. Limitation of the study and recommendation for further studies

The thesis proposes to study the nonlinear relationship between geographic diversification, industrial diversification and systematic risk, idiosyncratic risk and total risk in further studies.

The thesis proposes further studies using Fama-French 3-factor models, Carhart 4-factor models to estimate risk when researching on the same topic - the impact of diversification on firm risk in Vietnamese market.

Although the sample of 281 companies is above the minimum requirement with an error of ±5%, it is still quite small. Further studies on sam the subject should increase the number of firms in the sample.

The following studies should use estimation methods that overcome the problem of self-selection bias to study the topic of firm diversification.

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