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Firm Characteristics and Capital Structure Decision: Evidence from Seafood Processing Enterprises in the South Central Region of Vietnam

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Abstract
Purpose: The aim of this study is to investigate the firm characteristics that affect capital structure of seafood processing companies in South Central Coast of Vietnam. In addition, this study also explores the differences in capital structure among companies with different types of ownership in various regions as well as those with debt ratio greater than and less than the optimal debt threshold (57.39 per cent, see Nguyen Thanh Cuong (2014) for details). **Design/methodology/approach:** The investigation has been performed using panel data procedure for a sample of 90 unlisted seafood processing enterprises in the South Central region (SEASCRs) and 22 listed seafood processing enterprises in the other region of Vietnam (SEALISTs) during 2005–2011. The firm characteristics are analyzed as determinants of capital structure according to different explanatory theories. The hypothesis that is tested in this paper is that the debt ratio at time t depends on the size of the firm at time t, tangible fixed assets of the firm at time t, the growth opportunities of the firm at time t, the profitability of the firm at time t, the business risk of the firm at time t, its liquidity ratio at time t, its interest expense ratio at time t and its income tax ratio at time t. The SEASCRs that maintain a debt ratio above 57.39 per cent using a dummy variable are also distinguished. We also using a dummy variable to evaluate the differences about the capital structure of SEASCRs with regard to firm ownership. In addition, with regard to evaluate the differences about the capital structure of seafood processing enterprises in different regions, we also using a dummy variable.**Findings:** The findings of this study justify the hypothesis that there is a negative relation between the debt ratio of the firms and their tangible fixed assets, their growth opportunities, their profitability, their liquidity ratio and their business risks. Size and interest expense ratio appears to maintain a positive relation. According to the dummy variable there is a differentiation in the capital structure among the SEASCRs with a debt ratio greater than 57.39 per cent and those with a debt ratio lower than 57.39 per cent. In addition, this study also findings the differences in capital structure among SEASCRs with different types of ownership and the differences about the capital structure of seafood processing enterprises in various regions. Our findings are consistent with the Trade off theory and Pecking order theory. **Originality/value:** The findings suggest implications for SEASCRs on flexible usage of financial leverage to increasing firm value and lowering cost of capital.
Keywords: Capital Structure, Debt Ratio Threshold, SEASCRs, regional characteristics.
JEL code: G32, G34

1. Introduction

In recent years, based on the theory of modern capital structure, many empirical studies uncovered the important factors explaining the capital structure decisions in different countries. These studies focused primarily on four aspects as follows:

(i) to identify the determinants of corporate capital structure in various countries such as the China (Chen, 2004); Turkey (Saylgan et al., 2006; Teker et al., 2009); United Arab Emirates (ElKelish, 2007); Ghana (Andani et al., 2012); Greece (Eriotis et al., 2007); Indonesia (Bambang et al., 2013); Jordan (Faris, 2010); Malaysia (Baharuddin et al., 2011); Nigeria (Akinlo et al., 2011); Pakistan (Shah et al., 2007; Afza et al., 2011); Romania (Vătavu, 2012);...

(ii) to compare the capital structure and the determinants of capital structure across countries. For example, Booth et al. (2001) conducted research about the capital structure of ten developing countries, namely Malaysia, Zimbabwe, Mexico, Brazil, Turkey, Jordan, India, Pakistan, Thailand, and South Korea. Similarly, Gurcharan (2010) studied the capital structure in the ASEAN countries including Malaysia, Indonesia, Philippines and Thailand;…

(iii) to compare the capital structure between companies with debt ratio (total debt to total assets ratio) greater than and less than the debt threshold. For instance, there is a comparative study about capital structure between companies with debt ratio greater than 50% and those with debt ratio less than 50% in Greece (Eriotis et al., 2007) and in India (Singhania et al., 2010);

(iv) to compare the determinants of capital structure between listed and unlisted firms. Specifically,

Andani et al. (2012) studied the factors affecting the capital structure of listed and unlisted companies in Ghana. In Vietnam, in recent years, there have been several studies about the determinants of Vietnamese corporate capital structure, the issue of research for the factors affecting the capital structure of enterprises Vietnam has implemented many authors. For example, Tran Dinh Khoi Nguyen and Ramachandran (2006) studied the capital structure of small and medium enterprises in Vietnam whereas Biger, Nam V. Nguyen and Quyen X. Hoang (2008) studied the determinants of capital structure of companies in Vietnam. Additionally, Okuda and Lai Thi Phuong Nhung (2012) identified the factors affecting the debt ratio of listed companies in Vietnam while Dzung et al. (2012) studied the capital structure of listed companies on the stock market in Vietnam in the context of financial development. Regarding the factors influencing the corporate capital structure, the above authors typically used the following factors in their research model: firm size, tangible fixed assets, growth opportunities, profitability, liquidity, debt tax shield and tax corporate income. Other factors like business risk and interest expense have not been considered by domestic researchers yet. Moreover, only a few studies have compared the capital structure between state and private enterprises, between listed and unlisted companies. However, the differences about capital structure among other types of enterprise such as joint stock companies, companies with foreign capital investment, limited liability companies and private enterprises are not researched yet. Similarly, there exists an absence of study about the differences about the capital structure of enterprises within the same industry in different regions. Also, there is no study comparing the capital structure as well as the impact of capital structure's determinants between company groups with capital structure greater and smaller than the optimal capital structure in the same industry. In addition, these studies only focused on the general level of the capital structure of enterprises, with little targeting a specific industry, especially fisheries. Obviously, each sector has its characteristics and its typical capital structure. Therefore, research on capital structure for each industry are crucially essential.

Vietnam has many outstanding advantages for the development of seafood processing. This industry is one of the key export sectors contributing to about 4% of the nation's GDP. To obtain this achievement, it is also worth mentioning the significant contribution of the seafood processing enterprises in South Central Coast, including following provinces and cities: Da Nang, Quang Nam, Quang Ngai, Binh Dinh, Phu Yen, Khanh Hoa, Ninh Thuan, and Binh Thuan. According to the provincial statistical yearbooks of the South Central region during 2005-2012 period, South Central fisheries witnessed an annually average increase of about 5.44% in GDP growth rate. Similarly, the labour force participation rate increased by 3.31% per annum while the figure for production value was 22.34%. Also, there was a steady increase of 9.83% in export value and 6.73% in export volume. Consequently, Vietnam's seafood industry has set a strategic goal to achieve an average growth rate of 8-10% per annum and the exports value of 8-9 billion US dollars per year by 2020. However, to accomplish this, Vietnamese seafood processing companies and particularly those South Central Coast in particular have to solve problems with capital, a very important factor in business.

The purpose of this study is to evaluate the impact of firm characteristics on the decision of capital structure of seafood processing companies in South Central Coast of Vietnam. In addition, this study also explores the differences in capital structure among companies with different types of ownership in various regions as well as those with debt ratio greater than and less than the optimal debt threshold.

The paper is divided into six sections. The next session presents an overview of the literature on capital structure and develops testable hypotheses. In section 3, we describe our data and we justify the choice of the variables used in our analysis. The fourth section presents the research methodologies. The fifth section presents the result of the empirical analysis and a discussion of the conclusions that can be derived from the results. Finally, we summarize our findings and suggest some implications in the last section.

2. Literature Review and Hypotheses

Modigliani and Miller (1958) were the pioneers in theoretically examining and algebraically demonstrating the effect of capital structure on firm value. In a frictionless and perfect markets world, the irrelevant capital structure of Modigliani and Miller (1958) argued that firm value was independent of firm capital structure. In their subsequent paper, Modigliani and Miller (1963) relaxed their assumption by incorporating corporate tax benefits as determinants of the capital structure of firms. They proposed that firms should employ as much debt capital as possible in order to achieve the optimal capital structure. Other theories that have been advanced to explain the capital structure of firms include trade-off theory, pecking order theory, agency theory,... However, out of these theories of capital structure, two models appear to come across strongly, namely Pecking Order Theory (POT), Static Trade-off theory (TOT). The Static Trade-off theory suggests that a value-maximizing firm will find an optimal capital structure by trading off benefits and costs of debt financing. So, in a Static Trade-off consideration, managers regard the firm's debt-equity decision as a trade-off between interest tax shields of debt and the costs of financial distress. The pecking order theory proposed by Myers (1984), Myers and Majluf (1984), it starts with the assumption of asymmetric information, indicating that managers know more about their companies' prospects, risks, and values than do outside investors. The pecking order theory suggests that there is

a hierarchy of firm preferences with regard to the financing of their investments and that there is no well-defined target debt ratio. Different views have been put forward regarding the capital structure choice. This section will attempt to apply the theories of capital structure (POT, TOT), and develop testable hypotheses that examine the determinants of capital structure in seafood processing companies in South Central Coast of Vietnam.

✓ **Firm size:** According to the trade-off theory of capital structure, large-scale firms are generally able to get more loan than the small-scale enterprises. Specifically, in order to obtain external capital, small businesses bear higher costs than big ones due to asymmetric information. Hence, big businesses are advantageous over small businesses when accessing the capital markets, which indicates that there exists a positive relationship between capital structure and company size. This view is supported by many empirical studies conducted in diversified countries, including Booth et al. (2001), Eriotis et al. (2007), Gurcharan (2010), Faris (2010), Singhania et al. (2010), Akinlo et al. (2011), Baharuddin et al. (2011), Vătavu (2012), Andani et al. (2012), Bambang et al. (2013). In Vietnam, the positive relation between firm scale and the capital structure is also proved in many studies such as Tran Dinh Khoi Nguyen and Ramachandran (2006), Biger, Nam V. Nguyen and Quyen X. Hoang (2008), Dzung et al. (2012), Okuda and Lai Thi Phuong Nhung (2012), Tran Hung Son (2012). According to the tradeoff theory of capital structure and the empirical studies' results obtained by national and international researchers as well as the scale characteristics of seafood processing companies in South Central of Vietnam, the author suggests the following hypothesis:

H1: Firm size has a positive relation (+) to the capital structure

✓ **Tangible fixed assets:** Tangible fixed assets are deemed a determinant of firm's capital structure. However, there are two opposing arguments toward this view. Firstly, the capital structure's tradeoff theory and the pecking order theory state that tangible fixed assets have a positive relation with capital structure. According to these two theories, previous researchers argued that companies with great value of tangible fixed assets usually get loan with relatively more favorable conditions than businesses with low collateral value, because using tangible assets as collateral assets will make a positive signal better to creditors. The empirical research supporting this view includes Shah et al. (2007), Teker et al. (2009), Faris (2010), Baharuddin et al. (2011), Andani et al. (2012), Bambang et al. (2013). Conversely, the opponents point that the relationship between tangible fixed assets and capital structure is negative. They argue that in countries with developing domestic bond market, bank debt is the primary source of capital of enterprises. Moreover, domestic banks prefer lending short term rather than long term. This makes the firms use short-term loan to finance long-term investments. As a result, in the debt structure of these companies, short-term debt accounted for a major proportion than long-term debt. The empirical studies conducted in developing countries supporting for this view include Booth et al. (2001), Saylgan et al. (2006), Akinlo et al. (2011). In Vietnam, a number of empirical studies such as Tran Dinh Khoi Nguyen and Ramachandran (2006), Biger, Nam V. Nguyen and Quyen X. Hoang (2008), Dzung et al. (2012) found a negative relationship between fixed assets and capital structure of the business. By contrast, research conducted by Tran Hung Son (2012) detected a positive relationship between fixed assets and capital structure of the business. According to the experimental results of previous researchers in developing countries and the above-mentioned attributes of debt and asset structure of the seafood processing companies in the South Central of Vietnam, the author hypothesized as follows:

H2: Tangible fixed assets have a negative relation (-) to the capital structure

✓ **Growth Opportunities:** The theoretical study agreed that growth opportunities are associated with capital structure. Based on the trade-off theory of capital structure suggests that firms with greater growth opportunities typically maintain a low debt ratio, which indicates a negative relationship between growth opportunities and capital structure. The empirical studies supporting for this view include Eriotis et al (2007), Shah et al. (2007), Gurcharan (2010), Singhania et al. (2010), Akinlo et al. (2011), Andani et al. (2012). On the other hand, the pecking order theory believes that firms with high growth opportunities are expected to demand more debt financing in the future. In other words, there exists a positive relationship between growth opportunities and capital structure. The empirical studies supporting for this view include Saylgan et al. (2006), Faris (2010), Baharuddin et al. (2011), Bambang et al. (2013). In Vietnam, some empirical studies show that growth opportunities have a positive relationship with the capital structure of the business (see Tran Dinh Khoi Nguyen and Ramachandran (2006), Biger, Nam V. Nguyen and Hoang Quyen X. (2008), Dzung et al. (2012) for details). According to the tradeoff theory of capital structure and empirical results of previous authors as well as the characteristics of the seafood processing enterprises in the South Central of Vietnam, the author hypothesizes as follows:

H3: growth opportunities related negative (-) to the capital structure

✓ **Profitability:** Based on the pecking-order theory, businesses with high profitability will prefer the internally financial sources rather than the external ones. Specifically, the internal source from retained earnings will be used first, followed by new bonds issued. Finally, new shares will be issued as the last preferred source if necessary. This suggests that there exists a negative relationship between profitability and capital structure. The empirical studies supporting for this view include Booth et al. (2001), Saylgan et al. (2006), Shah et al. (2007),

Gurcharan (2010), Faris (2010), Akinlo et al. (2011), Baharuddin et al. (2011), Andani et al. (2012), Bambang et al. (2013). In Vietnam, the empirical studies of Tran Dinh Khoi Nguyen and Ramachandran (2006), Biger, Nam V. Nguyen and Quyen X. Hoang (2008), Dzung et al. (2012), Okuda and Lai Thi Phuong Nhung (2012), Tran Hung Son (2012) also found a negative relationship between profitability and capital structure. According to the pecking order theory and empirical results of the previous authors as well as the characteristics of the seafood processing enterprises in the South Central of Vietnam, the author hypothesizes as follows:

H4: Profitability has a negative relationship (-) with capital structure

✓ **Liquidity:** According to pecking order theory, when seeking capital fund, companies prefer internal financing from retained earnings rather than external financing. Therefore, for companies with great ability to generate retained earnings, demand for external capital will not be crucial if current assets are sufficient to finance the investment. This refers a negative relationship between liquidity and capital structure. The empirical studies supporting for this view include Eriotis et al. (2007), Singhania et al. (2010), Afza et al. (2011). However, the trade-off theory of capital structure states that firms with high liquidity generally maintain a higher debt ratio, indicating a positive relation between liquidity and capital structure. The empirical studies supporting for this view include Akinlo et al. (2011), Andani et al. (2012). In Vietnam, the empirical studies of Dzung et al. (2012), Tran Hung Son (2012) found a negative relationship between liquidity and capital structure. According to the pecking order theory and empirical results of the preceding authors as well as the characteristics of the seafood processing enterprises in the South Central of Vietnam, the author hypothesizes as follows:

H5: Liquidity has a negative relation (-) to capital structure

✓ **Business risks:** Many theoretical studies have shown that business risk or earnings volatility is one of the factors that affect the capital structure of the business. According to the tradeoff theory of capital structure and the pecking order theory, firms with high volatility in income face greater risk in the payment of debts. This implies that firms with high earnings volatility will borrow less and prefer the internal funds. Thus, a negative relationship between business risk or earnings volatility and capital structure is expected. The empirical studies supporting for this view include Booth et al. (2001), Fama và French (2002), Jong et al. (2008), Sharif et al. (2012). However, there are several studies detecting a positive relationship between business risk and capital structure such as research of Vătavu (2012) in Romania, research of Tran Dinh Khoi Nguyen and Ramachandran (2006) examining the small and medium enterprises in Vietnam. According to the tradeoff theory of capital structure, the pecking order theory and the empirical results of preceding researchers as well as the current reality of the South Central seafood processing businesses in Vietnam, the author suggests the following hypothesis:

H6: Business risks has a negative relation (-) to the capital structure

✓ **Interest expense:** The tradeoff theory of capital structure proposes that interest expense incurred in the use of debts is an important factor affecting the debt decisions of firms. The high borrowing costs limits the firm's ability to get loan and vice versa. This means that there is a negative relationship between interest expense and corporate capital structure. The empirical studies supporting for this view include Marsh (1982) researching UK businesses, Afza et al. (2011) testing car and engineering companies in Pakistan. However, there exists an alternative view that when the firms have no choice but to borrow to finance its operations, firms must borrow to operate even if the borrowing rates rise. This implies a positive relationship between interest expense and capital structure. The empirical studies supporting for this view include Afza et al. (2011), Eriotis et al. (2007), Singhania et al. (2010). In Vietnam, the interest expense variable is not interested much when modeling the determinants of capital structure by empirical researchers. According to the empirical results of preceding researchers as well as the current reality of the South Central seafood processing businesses in Vietnam, the author suggests the following hypothesis:

H7: Interest expense has a positive relation (+) to the capital structure

✓ **The rate of corporate income tax:** The impact of corporate income tax on capital structure is the main content of much research on capital structure. According to the tradeoff theory of capital structure, firms suffering the high tax rate typically use more debt to take advantage of the tax shield. This suggests a positive relationship between corporate income tax and capital structure. The empirical studies supporting for this view include Afza et al. (2011). In Vietnam, research of Le Thi Phuong Vy and Phung Duc Nam (2013) has found a positive relationship between corporate income tax and corporate capital structure. Contrary to this study, Tran Hung Son (2012) has found a negative relationship between corporate income tax and corporate capital structure. For this relationship, the author suggests that a positive relationship between the corporate income tax and capital structure is expected in the context of the seafood processing businesses in the South Central of Vietnam. Therefore, the author hypothesizes as follows:

H8: corporate income tax rate has a positive (+) to the capital structure

3. Data and Variables

3.1. Sample Description

In this study, the data set includes a combination of 90 unlisted seafood processing enterprises in the South Central region and 22 listed seafood processing enterprises in the other region of Vietnam from 2005–2011. For some enterprises, collected data consists of balance sheets and annual business outcome reports. Following the above sample selection process, a total of 784 observations are collected, including 154 and 630 for listed seafood processing enterprises in the other region and unlisted seafood processing enterprises in the South Central region of Vietnam respectively across a period of 7 years. Sample ratios are presented in the following table.

Table 1. Sample distribution

Enterprises	**Observations**	**Percentage (%)**
Listed Vietnam's Seafood Processing Enterprises in the other region of Vietnam (SEALISTs)	154	20%
Unlisted Vietnam's Seafood Processing Enterprises in the South Central region of Vietnam (SEASCRs)	630	80%
Total	**784**	**100%**

Source: Enterprises listed on two stock exchange markets HoSE and HASTC in the other region of Vietnam + Enterprises surveyed in the South Central region of Vietnam.

3.2. Variables

In this study, we only use book value to calculate variables. Market value is not considered because characteristics of Vietnam's seafood processing enterprises are the number of listed companies on the stock market is limited. Our dependent variable is the debt ratio. It is used as the main measure of capital structure, which is defined as the ratio of total debt divided by the total assets of the firm.

TD/TA = Total debt / Total assets

On the basis of previous studies, eight explanatory variables are used in this research: enterprise size, tangible fixed assets, growth opportunities, profitability, business risk, liquidity, interest expense, and income tax rate of enterprise. As far as independent variables are concerned, we have selected several proxies that appear in the empirical literature.

- ✓ Firm size (SIZE) = Natural logarithm of the total assets
- ✓ Tangible fixed assets (TANG) = Ratio of fixed assets to total assets
- ✓ Growth Opportunities (SG) = Percentage change in total revenue
- ✓ Profitability (PROF) = Earnings before Interest and Tax / Total revenue
- ✓ Liquidity (LIQ) = Current Assets / Current Liabilities
- ✓ Business risks (RISK) = Standard deviation of Earnings before Interest and Tax / Total Asset
- ✓ Interest expense (IOE) = Interest Payments / Earnings before Interest and Tax
- ✓ The rate of corporate income tax (TAX) = Income tax of enterprise / Earnings before tax

We also differentiate the firms that heavily use debt capital (i.e. a debt ratio more than 57.39 per cent) using a dummy variable. We define DUM = 1, if firms have TD/TA > 57.39 per cent and DUM = 0 for the remaining enterprises. With regard to firm ownership, we divided unlisted seafood processing enterprises in the South Central region of Vietnam into two groups: the first group for limited liability companies and private enterprises, and the other for joint stock companies, companies with foreign capital investment. As a dummy variable, we define FORM = 1 for limited liability companies and private enterprises, and FORM = 0 for joint stock companies, companies with foreign capital investment. As a dummy variable, with regard to evaluate the differences about the capital structure of seafood processing enterprises in different regions, we define LOCATION = 1 for unlisted seafood processing enterprises in the South Central region of Vietnam, and LOCATION = 0 for listed Seafood Processing enterprises in the other region of Vietnam.

4. Research Methodologies

Since the sample contains data across firms and over time, the panel data method is employed. The analysis process follows four stages. In the first stage, we conduct regressions of all determinants related to a firm's characteristics (size, tangibility, growth, profitability, liquidity, business risk, interest expense and income tax rate of enterprise) on capital structure. In the second stage, we add a dummy variable (DUM) to evaluate the differences about the capital structure and its determinants between LSEASCRs (TD/TA ≤ 57.39 per cent) and OSEASCRs (TD/TA > 57.39 per cent). In the 3rd stage, we add a dummy variable (FORM) to consider the effect of firm ownership on capital structure of SEASCRs. In the last stage, we add a dummy variable (LOACATION) to consider the effect of regional factor on capital structure of Vietnam's Seafood Processing Enterprises. These regression model can be specified as follows:

✓ Model 1 is applicable to Seafood Processing Enterprises in the South Central Region of Vietnam (SEASCRs):

$$(TD/TA)_{it} = \alpha + \sum_{j=1}^{n} \beta_j X_{jit} + u_{it} \quad (1)$$

✓ Model 2 is applicable to evaluate the differences about the capital structure between LSEASCRs (TD/TA ≤ 57.39 per cent) and OSEASCRs (TD/TA > 57.39 per cent):

$$(TD/TA)_{it} = \alpha + \sum_{j=1}^{n} \beta_j X_{jit} + DUM_{it} + u_{it} \quad (2)$$

✓ Model 3 is an interaction model applicable to a combined sample of LSEASCRs (TD/TA ≤ 57.39 per cent) and OSEASCRs (TD/TA > 57.39 per cent):

$$(TD/TA)_{it} = \alpha + \sum_{j=1}^{n} \beta_j X_{jit} + \sum_{j=n+1}^{2n} \beta_j DUM_{it} X_{jit} + u_{it} \quad (3)$$

✓ Model 4 is applicable to evaluate the differences about the capital structure of SEASCRs with regard to firm ownership:

$$(TD/TA)_{it} = \alpha + \sum_{j=1}^{n} \beta_j X_{jit} + FORM_{it} + u_{it} \quad (4)$$

✓ Model 5 is applicable to evaluate the differences about the capital structure between SEASCRs and listed Seafood Processing enterprises in the other region of Vietnam:

$$(TD/TA)_{it} = \alpha + \sum_{j=1}^{n} \beta_j X_{jit} + LOCATION_{it} + u_{it} \quad (5)$$

Where X_{jit} is the jth explanatory variable for the ith firm at time t, which is size of firm i at time t ($SIZE_{it}$), tangible assets of firm i at time t ($TANG_{it}$), growth opportunities of firm i at time t (SG_{it}), profitability of firm i at time t ($PROF_{it}$), business risk of firm i at time t ($RISK_{it}$), liquidity of firm i at time t (LIQ_{it}), interest expense of firm i at time t (IOE_{it}), income tax rate of firm i at time t (TAX_{it}). $(TD/TA)_{it}$ is debt ratio for the ith firm at time t. DUM_{it} = 1, if firm i at time t have $(TD/TA)_{it}$ > 57.39 per cent and DUM = 0 for the remaining enterprises, $FORM_{it}$ = 1 for limited liability companies and private enterprises, and $FORM_{it}$ = 0 for joint stock companies, companies with foreign capital investment, $LOCATION_{it}$ = 1 for SEASCRs, and $LOCATION_{it}$ = 0 for listed Seafood Processing enterprises in the other region of Vietnam. α is the intercept, u_{it} is a disturbance term ($u_{it} \sim iid(0, \sigma^2)$) and is defined as $u_{it} = \mu_i + v_{it}$. Where μ_i denotes the unobservable individual effect and v_{it} denotes the remainder disturbance.

Commonly used estimation methods for panel data are the ordinary least squares method (pooled OLS), the random-effect model (REM), and the fixed-effect model (FEM). However, the DUM, FORM and LOCATION variable cannot be used in the fixed-effects model. In addition, the business risk variable acts as a dummy variable and also cannot be used in the fixed-effects model. For this reason, we did not use the fixed-effect method. In order to find out whether the pooled OLS method or the random-effect method would be more proper, we performed a Breusch Pagan Lagrange test in which pooled OLS was the null hypothesis.

5. Results and Discussion

5.1. Panel unit root test results

The panel data regression model requires that variables considered in the model need to be stationary in order to avoid the so-called spurious regression. This study, we first perform the panel unit root test by the Levin- Lin-Chu (2002) and the Im, Pesaran and Shin (2003) approaches.

Table 2. Panel unit-root test results

Variables	Levin- Lin-Chu (2002)		Im, Pesaran and Shin (2003)	
	t-statistic	P-value	z-statistic	P-value
$(TD/TA)_{it}$	-18.0200	0.0000***	-2.7747	0.0000***
$SIZE_{it}$	-14.2492	0.0000***	-3.9675	0.0000***
$TANG_{it}$	-14.1827	0.0000***	-2.4923	0.0063***
SG_{it}	-20.9811	0.0000***	-7.3985	0.0000***
$PROF_{it}$	-19.4170	0.0000***	-3.4528	0.0000***
LIQ_{it}	-29.2709	0.0000***	-3.8215	0.0001***
IOE_{it}	-11.0289	0.0000***	-3.7472	0.0001***
TAX_{it}	-17.7892	0.0000***	-2.7568	0.0029***

Notes: ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

As shown in table 2, the nulls of the unit root (non-stationary) are all rejected, which indicates that all the variables are stationary, that is, I(0). Accordingly, we proceed with full analysis.

5.2. Descriptive statistics of variables

Table 3 presents the descriptive statistics related to debt ratio with the determinants of capital structure. Financial information was collected from balance sheets and annual business outcome reports during 2005–2011 periods. Total observations (SEASCRs) in the model are 630 samples, including 246 and 384 for LSEASCRs and OSEASCRs respectively.

Results of descriptive statistics in table 3 show that debt-to-asset ratio (TD/TA) of all SEASCRs is 59.39%, which implies that for the period of 2005 to 2011, 59.39% of financing debt of the firms are generated against the total assets of SEASCRs. They are 75.07% and 34.90% for OSEASCRs and LSEASCRs respectively. The standard deviation of the debt-to-asset ratio is 23.26%, minimum value of the debt-to-asset ratio is 0.192% and the maximum value is 98.32%. They are 10.66%, 57.39%, 98.32% and 14.95%, 0.192%, 57.39% for OSEASCRs and LSEASCRs respectively. Similarly, the mean, standard deviation, minimum and maximum values for all independent variables are given in this table. From the result, it was shown that size has the smallest value of CV, which is 0.0640. This means that size has less variability, higher consistency and stability. Meanwhile, profitability with CV is 46.8159 indicates that it has higher variability, less consistency and stability.

Table 3. Descriptive statistics of sample variables

	Mean	Median	Std. Dev.	Minimum	Maximum	CV
SEASCRs (Observations = 630)						
$(TD/TA)_{it}$	0.5939	0.6397	0.2326	0.0192	0.9832	0.3917
$SIZE_{it}$	23.7785	23.7311	1.5208	20.3455	28.5690	0.0640
$TANG_{it}$	0.2945	0.2546	0.2034	0.0011	0.9138	0.6907
SG_{it}	0.0528	0.0832	0.5033	-2.3901	2.6893	9.5320
$PROF_{it}$	0.0025	0.0059	0.1158	-0.9189	0.6931	46.8159
LIQ_{it}	2.0159	1.2183	3.2976	0.0299	35.1664	1.6358
$RISK_{it}$	0.0429	0.0327	0.0370	0.0035	0.2288	0.8627
IOE_{it}	0.5716	0.3370	1.0692	0.0000	14.1445	1.8706
TAX_{it}	0.1634	0.2500	0.1230	0.0000	0.3200	0.7528
LSEASCRs (Observations = 246)						
$(TD/TA)_{it}$	0.3490	0.3621	0.1495	0.0192	0.5739	0.4283
$SIZE_{it}$	23.0556	22.8245	1.4070	20.3455	28.5690	0.0610
$TANG_{it}$	0.3256	0.3032	0.2141	0.0041	0.9114	0.6576
SG_{it}	0.0780	0.1487	0.5246	-1.8688	2.0367	6.7290
$PROF_{it}$	0.0239	0.0091	0.1215	-0.4889	0.6931	5.0874
LIQ_{it}	3.4149	1.8949	4.9394	0.3041	35.1664	1.4464
$RISK_{it}$	0.0485	0.0397	0.0419	0.0034	0.2287	0.8656
IOE_{it}	0.2520	0.0049	0.4349	0.0000	2.9386	1.7261
TAX_{it}	0.1571	0.2500	0.1265	0.0000	0.3200	0.8051
OSEASCRs (Observations = 384)						
$(TD/TA)_{it}$	0.7507	0.7395	0.1066	0.5739	0.9832	0.1421
$SIZE_{it}$	24.2415	24.2454	1.4076	20.9397	27.9189	0.0581
$TANG_{it}$	0.2746	0.2359	0.1939	0.0011	0.9138	0.7062
SG_{it}	0.0367	0.0664	0.4892	-2.3901	2.6893	13.3349
$PROF_{it}$	-0.0113	0.0040	0.1099	-0.9189	0.2363	-9.7691
LIQ_{it}	1.1196	1.0972	0.4347	0.0299	4.7462	0.3882
$RISK_{it}$	0.0394	0.0292	0.0330	0.0035	0.2287	0.8399
IOE_{it}	0.7763	0.6156	1.2841	0.0000	14.1445	1.6540
TAX_{it}	0.1675	0.2500	0.1207	0.0000	0.3200	0.7210

Notes: Std. Dev. denotes standard deviation. For the coefficient of variation (CV), the higher the number indicates the larger the dispersion of the variable, and the lower the number of CV, the smaller the dispersion of the variable.

5.3. Analysis the correlation between all the predictors

Gujarati (2004) explains that multicollinearity indicates the existence of a perfect or less than perfect linear relationship between some or all explanatory variables of a regression model. To test the existence of multicollinearity in the regression model, VIF (Variance Inflation Factor) is used. If VIF value is greater than 10, it indicates multicollinearity. Results in table 4 show that correlation between predictors can cause the multicollinearity, but here correlation between predictors is fairly small not greater than cut point 0.4. In addition, testing the assumptions of classical generate VIF value less than 1.5. This shows that there is no multicollinearity in the models.

Table 4. Pearson correlation coefficient matrix

	$SIZE_{it}$	$TANG_{it}$	SG_{it}	$PROF_{it}$	LIQ_{it}	$RISK_{it}$	IOE_{it}	TAX_{it}	VIF
SEASCRs (Observations = 630)									
$SIZE_{it}$	1.000								1.10
$TANG_{it}$	-0.116	1.000							1.08
SG_{it}	0.026	-0.019	1.000						1.02
$PROF_{it}$	-0.033	-0.132	0.079	1.000					1.16
LIQ_{it}	-0.158	-0.087	0.035	0.014	1.000				1.06
$RISK_{it}$	0.155	-0.177	-0.076	-0.021	0.073	1.000			1.12
IOE_{it}	0.160	-0.019	-0.053	-0.121	-0.132	-0.136	1.000		1.13
TAX_{it}	-0.080	-0.026	0.071	0.341	-0.027	-0.112	-0.212	1.000	1.20
LSEASCRs (Observations = 246)									
$SIZE_{it}$	1.000								1.03
$TANG_{it}$	-0.074	1.000							1.09
SG_{it}	0.033	-0.043	1.000						1.03
$PROF_{it}$	0.103	-0.178	-0.006	1.000					1.31
LIQ_{it}	-0.043	-0.192	0.029	-0.097	1.000				1.15
$RISK_{it}$	0.386	-0.214	-0.062	0.217	0.060	1.000			1.18
IOE_{it}	0.215	0.015	0.031	-0.131	-0.182	-0.250	1.000		1.12
TAX_{it}	-0.098	-0.005	0.082	0.352	-0.056	-0.064	-0.109	1.000	1.29
OSEASCRs (Observations = 384)									
$SIZE_{it}$	1.000								1.36
$TANG_{it}$	-0.077	1.000							1.13
SG_{it}	0.052	-0.010	1.000						1.02
$PROF_{it}$	-0.029	-0.133	0.134	1.000					1.28
LIQ_{it}	-0.064	-0.140	0.048	0.295	1.000				1.10
$RISK_{it}$	0.086	-0.177	-0.099	-0.270	-0.101	1.000			1.47
IOE_{it}	0.056	0.011	-0.069	-0.092	-0.076	-0.096	1.000		1.28
TAX_{it}	-0.107	-0.034	0.066	0.350	0.266	-0.146	-0.284	1.000	1.20

Notes: VIF is calculated by $1/(1-R^2)$, with R^2 stated in the regression model result using STATA.

5.4. Difference in mean debt ratios across sample groups

Further analyses were carried out to test the differences in the mean values (using a t-test) among companies with different types of ownership in various regions as well as those with debt ratio greater than and less than the optimal debt threshold. We specifically sought to find out whether there are differences in the debt ratios (capital structures) among the sample groups. The results indicated in Table 5 show statistically significant differences the debt ratios between LSEASCRs and OSEASCRs. OSEASCRs seem to exhibit significantly higher debt ratios than LSEASCRs, suggesting that OSEASCRs are significantly more likely to attract debt in their capital structure than LSEASCRs. The results also indicate statistically significant differences between the capital structure of LP_SEASCRs and that of JF_SEASCRs. LP_SEASCRs seem to exhibit significantly higher debt ratios than JF_SEASCRs, suggesting that LP_SEASCRs are significantly more likely to attract debt in their capital structure than JF_SEASCRs. However, the results indicated in table 5 show statistically significant differences the long-term debt ratio between SEASCRs and SEALISTs. SEASCRs seem to exhibit significantly higher long-term debt ratios than SEALISTs.

Table 5. Test difference in mean debt ratios across sample groups with unequal variances

Group	Total debt ratio (TD/TA)	Short-term debt ratio (SD/TA)	Long-term debt ratio (LD/TA)
Test between LSEASCRs and OSEASCRs			
LSEASCRs	0,3490	0,3067	0,0423
OSEASCRs	0,7507	0,6465	0,1042
t-statistics	-39,3165***	-25,6556***	-6,2829***
Test between LP_SEASCRs and JF_SEASCRs			
LP_SEASCRs	0,6081	0,5289	0,0792
JF_SEASCRs	0,5497	0,4673	0,0824
t-statistics	-2,7222***	-2,87667***	0,2693
Test between SEASCRs and SEALISTs			
SEASCRs	0,5939	0,5138	0,0801
SEALISTs	0,5692	0,5081	0,0611
t-statistics	-1,2324	-0,2871	-1,8270**

Notes: LSEASCRs, OSEASCRs denotes firms have (TD/TA) ≤ 57.39% and (TD/TA) > 57.39%, respectively. LP_SEASCRs denotes limited liability companies, private enterprises, JF_SEASCRs denotes joint stock companies, companies with foreign capital investment. SEASCRs denotes unlisted seafood processing enterprises in the South Central region, SEALISTs denotes listed seafood processing enterprises in the other region of Vietnam.

5.5. The Regression Results

The estimation results are reported in Tables 6, 7, 8, 9 and 10. In the regression models, we added the option 'robust' to control for heteroskedasticity. Results of Breusch and Pagan Lagrangian multiplier test for random effects in Table 6, 7, 8, 9 and 10 indicates that random effects model should be appropriate for this study as compared to Pooled OLS model. Therefore, for the remainder of the analysis we work with random effects model.

5.5.1. The regression results of model 1

As shown in the Table 6 of multi-variable regression results of determinants of capital structure for SEASCRs with Random effects model, it can be seen that the power of the model is given by the high F-statistic of 121.81. According to R^2 within the independent variables explain the 22.31 per cent of the size in the debt ratio. Having further corroborated the relationships between the significant explanatory variables and the dependent variables, it is found that:

- ✓ **For size by assets (SIZE),** regression coefficients of this variable are positive (0.0444) and statistically significant at 1%, in other words this results supports a hypothesis *H1: Firm size has a positive relation (+) to the capital structure.* This can be explains that, regarding the seafood processing industry in South Central of Vietnam, most companies in this industry are small-scale ones, which are not capable to obtain complete and trustworthy financial statements, leading to the asymmetric information between owners and lenders. This makes the small and medium enterprises face more difficulties in accessing loans from financial institutions. This result shows that larger size by assets will lead to higher financial leverage, which is relevant to Trade off theory and experimental research findings by Booth et al. (2001), Eriotis et al.(2007), Gurcharan (2010), Faris (2010), Singhania et al. (2010), Akinlo et al.(2011), Baharuddin et al.(2011), Vătavu (2012), Andani et al. (2012), Bambang et al. (2013), Tran Dinh Khoi Nguyen and Ramachandran (2006), Biger, Nam V. Nguyen and Quyen X. Hoang (2008), Okuda and Lai Thi Phuong Nhung (2012) [53], Tran Hung Son (2012).

Table 6. The regression results of model 1 – This model is applicable to Seafood Processing Enterprises in the South Central Region of Vietnam (SEASCRs)

Independent variables	Random effects			Pooled OLS		
	Coeff	t-Stat	Sig.	Coeff	t-Stat	Sig.
$SIZE_{it}$	0.0444	3.27	***0.001	0.0456	10.73	***0.000
$TANG_{it}$	-0.2068	-3.11	***0.002	-0.1748	-4.04	***0.000
SG_{it}	-0.0263	-2.39	**0.017	-0.0252	-1.84	*0.067
$PROF_{it}$	-0.2213	-3.78	***0.000	-0.3142	-5.13	***0.000
LIQ_{it}	-0.0234	-4.09	***0.000	-0.0329	-6.73	***0.000
$RISK_{it}$	-1.0886	-3.41	***0.001	-0.9598	-4.07	***0.000
IOE_{it}	0.0134	2.36	**0.018	0.0244	3.30	***0.001
TAX_{it}	0.1155	1.64	*0.100	0.1291	1.99	**0.047
Constant	-0.3319	-0.99	0.323	-0.3647	-3.35	***0.001
Observations			630			630
R^2 within			0.2231			0.4520
F-statistic			***121.81			***48.91
Breusch and Pagan Lagrangian multiplier test for random effects - Test: Var(u) = 0 $\chi^2(1)$ = 374.39 and P_Value > χ^2 = 0.0000***						

✓ **For tangible fixed assets (TANG),** regression coefficients of this variable are negative (-0.2068) and statistically significant at 1%, specifically it supports a hypothesis *H2: Tangible fixed assets have a negative relation (-) to the capital structure.* This can be explains that, regarding the seafood processing businesses in the South Central of Vietnam, the author's research found that the vast majority of total liabilities of these enterprises were short-term debt (>87%) in comparison with the very minor proportion of long-term debt (<13%). Moreover, in terms of assets structure, fixed assets generally occupied a small proportion in asset structure (<30%) compared to current assets (>70%), which is mainly because all investments in the fixed assets are often implemented at the initial period of business life. These findings are entirely reasonable under financial principles. That is, the long-term debt is used to finance fixed assets, while short-term debt is used to finance current assets. Additionally, due to the seasonality of seafood products, the seafood processing business in the South Central of Vietnam usually have a high demand of working capital in peak season. In addition, the bond market in Vietnam is still relatively small and just developing thereby making the firms to rely on bank debt. Moreover, banks in Vietnam prefer short-term loans on favorable term than risky long-term loans, which makes firms to finance long-term investment using short-term borrowing. Thus, a negative relationship between tangible fixed assets and capital structure is probably appropriate in the context of seafood enterprises in the South Central of Vietnam. This finding is relevant to experimental research findings by Booth et al. (2001), Saylgan et al. (2006), Akinlo et al. (2011), Tran Dinh Khoi Nguyen and Ramachandran (2006), Biger, Nam V. Nguyen and Quyen X. Hoang (2008), Dzung et al. (2012).

✓ **For growth opportunities (SG)**, regression coefficients of this variable are negative (-0.0263) and statistically significant at 5%, specifically it supports a hypothesis *H3: growth opportunities related negative (-) to the capital structure*. This can be explains that, for the seafood processing enterprises in the South Central of Vietnam, when they have more opportunities to expand, more export contracts for example, the internally generated fund is most preferred, followed by the outsourcing under contractual agreement and lastly by new short-term bank debt. Therefore, a negative relationship between growth opportunities and capital structure may be appropriate in the context of the seafood processing enterprise in the South Central of Vietnam. This finding is relevant to Trade off theory and experimental research findings by Eriotis et al. (2007), Shah et al. (2007), Gurcharan (2010), Singhania et al. (2010), Akinlo et al. (2011), Andani et al. (2012).

✓ **For profitability (PROF),** regression coefficients of this variable are negative (-0.2213) and statistically significant at 1%, specifically it supports a hypothesis *H4: Profitability has a negative relationship (-) with capital structure*. As mentioned above, most of the seafood processing enterprises in the South Central of Vietnam are small- and medium-sized enterprises, which often face difficulties when accessing debt financing. In addition, these enterprises are mainly limited liability and privately owned companies. Hence, in order to maintain their control and avoid dilution, these companies' owners prefer to use retained earnings to finance their operations. In other words, a negative relationship between profitability and capital structure may be appropriate in the context of the seafood processing enterprises in Vietnam's South Central. This finding is relevant to Pecking order theory and experimental research findings by Booth et al. (2001), Saylgan et al. (2006), Shah et al. (2007), Gurcharan (2010), Faris (2010), Akinlo et al. (2011), Baharuddin et al. (2011), Andani et al. (2012), Bambang et al. (2013), Tran Dinh Khoi Nguyen and Ramachandran (2006), Biger, Nam V. Nguyen and Quyen X. Hoang (2008), Dzung et al. (2012), Okuda and Lai Thi Phuong Nhung (2012), Tran Hung Son (2012).

✓ **For liquidity (LIQ),** regression coefficients of this variable are negative (-0.0234) and statistically significant at 1%, specifically it supports a hypothesis *H5: Liquidity has a negative relation (-) to capital structure.* This negative relation is agreed by the author to fit in the context of the seafood processing businesses

in the South Central of Vietnam, because of their capital structure characterized by the large proportion of short-term or working capital over the total capital. In addition, firms with high liquidity maintain a relatively high amount of current assets, which means that they maintain high cash inflows. As a consequence, they are able to use these inflows in order to finance their operating and financing activities. Thus, they do not use much debt capital in comparison with firms that are not so profitable because they prefer to use these funds rather than debt capital. This finding is relevant to Pecking order theory and experimental research findings by Eriotis et al. (2007), Singhania et al. (2010), Afza et al. (2011), Dzung et al. (2012), Tran Hung Son (2012).

✓ **For business risks (RISK),** regression coefficients of this variable are negative (-1.0886) and statistically significant at 1%, specifically it supports a hypothesis *H6: Business risks has a negative relation (-) to the capital structure.* This can be explains that, in terms of Vietnamese seafood processing enterprises, which often have a very high business risk, banks are reluctant to lend, and similarly, firms are reluctant to borrow. This finding is relevant to Trade off theory, Pecking order theory and experimental research findings by Booth et al. (2001), Fama và French (2002), Jong et al. (2008), Sharif et al. (2012).

✓ **For interest expense (IOE),** regression coefficients of this variable are positive (0.0134) and statistically significant at 5%, in other words this results supports a hypothesis *H7: Interest expense has a positive relation (+) to the capital structure.* Regarding the seafood processing enterprises in the South Central of Vietnam, bank loans often dominate their debt structure. The increase of interest rates during the past years led to the soaring borrowing costs positioning these firms in financial problems. However, for survival, these companies still have to borrow to operate. This makes interest expense increase with the growth in debt. Thus, a positive relationship between capital structure and interest expense is probably appropriate in this case. This finding is relevant to Trade off theory, Pecking order theory and experimental research findings by Eriotis et al. (2007), Singhania et al. (2010), Afza et al. (2011).

✓ **For corporate income tax rate (TAX),** regression coefficients of this variable are positive (0.1155) and statistically significant at 10%, in other words this results supports a hypothesis *H8: corporate income tax rate has a positive (+) to the capital structure.* This result shows that the increase in tax provision encourages the firm to go for debt financing to avail the tax shield. This finding is relevant to Trade off theory and experimental research findings by Afza et al. (2011), Le Thi Phuong Vy and Phung Duc Nam (2013).

5.5.2. The regression results of model 2

As shown in the Table 7 with Random effects model, it can be seen that the power of the model is given by the high F-statistic of 129.62. According to R^2 within the independent variables explain the 61.09 per cent of the size in the debt ratio. The statistical significance of the dummy variable (DUM) and its positive sign indicate that there is a distinction in the capital structure between firms who have debt ratio greater than 57.39 per cent and those that do not have. According to our results from the Random effects model these firms use, OSEASCRs seem to exhibit significantly higher debt ratios than LSEASCRs (29.55 per cent), suggesting that OSEASCRs are significantly more likely to attract debt in their capital structure than LSEASCRs.

Table 7. The regression results of model 2 – This model is applicable to evaluate the differences about the capital structure between LSEASCRs and OSEASCRs

Independent Variables	Random effects			Pooled OLS		
	Coeff	t-Stat	Sig.	Coeff	t-Stat	Sig.
$SIZE_{it}$	0.0167	3.01	***0.003	0.0102	3.49	***0.001
$TANG_{it}$	-0.0597	-1.38	0.166	-0.0516	-2.07	**0.039
SG_{it}	-0.0143	-1.85	*0.064	-0.0116	-1.40	0.161
$PROF_{it}$	-0.0275	-0.55	0.582	-0.0560	-1.32	0.187
LIQ_{it}	-0.0173	-6.02	***0.000	-0.0198	-7.51	***0.000
$RISK_{it}$	-0.4040	-2.13	**0.033	-0.2833	-2.31	**0.021
IOE_{it}	0.0033	0.90	0.369	0.0043	0.97	0.333
TAX_{it}	-0.0159	-0.35	0.726	-0.0467	-1.18	0.239
DUM_{it}	0.2955	16.70	***0.000	0.3348	29.59	***0.000
Constant	0.0880	0.66	0.508	0.2203	3.15	***0.002
Observations			630			630
R^2 within			0.6109			0.7886
F-statistic			***764.95			***224.26
Breusch and Pagan Lagrangian multiplier test for random effects - Test: Var(u) = 0 $\chi^2(1)$ = 129.62 and P_Value >χ^2 = 0.0000***						

5.5.3. The regression results of model 3

As shown in the Table 8 with Random effects model, it can be seen that the power of the model is given by the high F-statistic of 856.81. According to R^2 within the independent variables explain the 64.15 per cent of the size in the debt ratio. The regression coefficient of statistic significance at 1% in interaction variable (DUM_{it}*$SIZE_{it}$ =

0.0182) indicating that size by assets of OSEASCRs has far more impacts on capital structure in comparison with LSEASCRs. In addition, regression coefficient of statistic significance at 10% in interaction variable (DUM_{it}*LIQ_{it} = -0.0695) indicating that liquidity of LSEASCRs has far more impacts on capital structure in comparison with OSEASCRs'. Meanwhile, regression coefficient is not statistically significant in interaction variables (DUM_{it}*$TANG_{it}$, DUM_{it}*SG_{it}, DUM_{it}*$PROF_{it}$, DUM_{it}*$RISK_{it}$, DUM_{it}*IOE_{it} and DUM_{it}*TAX_{it}), which means that tangible fixed assets, growth opportunities, profitability, business risks, interest expense and corporate income tax rate of LSEASCRs are insignificant in explaining higher financial leverage compared to OSEASCRs'.

Table 8. The regression results of model 3 – This model is an interaction model applicable to a combined sample of LSEASCRs and OSEASCRs

Independent variables	Random effects			Pooled OLS		
	Coeff	t-Stat	Sig.	Coeff	t-Stat	Sig.
$SIZE_{it}$	0.0061	1.14	0.256	-0.0031	-0.87	0.385
$TANG_{it}$	-0.0005	-0.01	0.994	-0.0095	-0.22	0.822
SG_{it}	-0.0180	-1.26	0.206	-0.0140	-0.96	0.336
$PROF_{it}$	-0.0002	0.00	0.998	-0.0385	-0.56	0.576
LIQ_{it}	-0.0159	-6.24	***0.000	-0.0185	-7.32	***0.000
$RISK_{it}$	-0.5122	-2.09	**0.037	-0.2182	-1.16	0.246
IOE_{it}	0.0168	0.65	0.513	0.0277	1.05	0.293
TAX_{it}	0.0757	1.02	0.309	0.0882	1.44	0.152
DUM_{it}*$SIZE_{it}$	0.0182	6.21	***0.000	0.0197	10.98	***0.000
DUM_{it}*$TANG_{it}$	-0.1271	-1.39	0.163	-0.0790	-1.44	0.149
DUM_{it}*SG_{it}	0.0058	0.38	0.707	0.0036	0.21	0.836
DUM_{it}*$PROF_{it}$	0.0450	0.39	0.693	0.0456	0.50	0.615
DUM_{it}*LIQ_{it}	-0.0695	-1.86	*0.063	-0.0532	-2.56	0.011
DUM_{it}*$RISK_{it}$	0.3049	1.00	0.316	0.0355	0.15	0.884
DUM_{it}*IOE_{it}	-0.0154	-0.59	0.558	-0.0264	-0.99	0.321
DUM_{it}*TAX_{it}	-0.1270	-1.25	0.210	-0.2034	-2.59	***0.010
Constant	0.2961	2.48	**0.013	0.4784	6.42	***0.000
Observations			630			630
R^2 within			0.6415			0.7994
F-statistic			***856.81			***137.82
Breusch and Pagan Lagrangian multiplier test for random effects - Test: Var(u) = 0 $\chi^2(1)$ = 143.75 and P_Value > χ^2 = 0.0000***						

5.5.4. The regression results of model 4

As shown in the Table 9 with Random effects model, it can be seen that the power of the model is given by the high F-statistic of 133.88. According to R^2 within the independent variables explain the 22.28 per cent of the size in the debt ratio. The statistical significance of the dummy variable (FORM) and its positive sign indicate that there is a distinction in the capital structure between LP_SEASCRs and JF_SEASCRs. According to our results from the Random effects model these firms use, LP_SEASCRs seem to exhibit significantly higher debt ratios than JF_SEASCRs (6.38 per cent), suggesting that LP_SEASCRs are significantly more likely to attract debt in their capital structure than JF_SEASCRs. This can be explains that, JF_SEASCRs use a variety of financing instruments, both public and private, while LP_SEASCRs typically use bank loans and private equity, mainly based on the financial support of the entrepreneur and his or her family. Moreover, LP_SEASCRs do not issue securities that are priced in public markets.

Table 9. The regression results of model 4 – This model is applicable to evaluate the differences about the capital structure of SEASCRs with regard to firm ownership

Independent Variables	Random effects			Pooled OLS		
	Coeff	t-Stat	Sig.	Coeff	t-Stat	Sig.
$SIZE_{it}$	0.0475	3.23	***0.001	0.0505	10.79	***0.000
$TANG_{it}$	-0.2050	-3.10	***0.002	-0.1710	-3.99	***0.000
SG_{it}	-0.0264	-2.41	**0.016	-0.0241	-1.76	*0.078
$PROF_{it}$	-0.2155	-3.73	***0.000	-0.2860	-4.77	***0.000
LIQ_{it}	-0.0230	-3.91	***0.000	-0.0316	-6.55	***0.000
$RISK_{it}$	-0.9858	-3.11	***0.002	-0.8913	-3.69	***0.000
IOE_{it}	0.0133	2.36	**0.018	0.0241	3.38	***0.001
TAX_{it}	0.1087	1.53	0.125	0.0997	1.52	0.129
$FORM_{it}$	0.0638	1.79	*0.074	0.0575	3.27	***0.001
Constant	-0.4586	-1.21	0.227	-0.5259	-4.20	***0.000
Observations			630			630
R^2 within			0.2228			0.4615
F-statistic			***133.88			***45.53
Breusch and Pagan Lagrangian multiplier test for random effects - Test: Var(u) = 0 $\chi^2(1)$ = 368.57 and P_Value >χ^2 = 0.0000***						

5.5.5. The regression results of model 5

As shown in the Table 10 with Random effects model, it can be seen that the power of the model is given by the high F-statistic of 104.28. According to R^2 within the independent variables explain the 21.95 per cent of the size in the debt ratio. The statistical significance of the dummy variable (LOCATION) and its positive sign indicate that there is a distinction in the capital structure between SEASCRs and SEALISTs. According to our results from the Random effects model these firms use, SEASCRs seem to exhibit significantly higher debt ratios than SEALISTs (13.73 per cent), suggesting that SEASCRs are significantly more likely to attract debt in their capital structure than SEALISTs. This can be explains that, SEASCRs do not issue securities that are priced in public markets, SEASCRs typically use bank loans and private equity. While SEALISTs use a variety of financing instruments, both public and private.

Table 10. The regression results of model 5 – This model is applicable to evaluate the differences about the capital structure between SEASCRs and listed Seafood Processing enterprises in the other region of Vietnam (SEALISTs)

Independent Variables	Random effects			Pooled OLS		
	Coeff	t-Stat	Sig.	Coeff	t-Stat	Sig.
$SIZE_{it}$	0,0409	3,33	***0,001	0,0371	8,89	***0,000
$TANG_{it}$	-0,1742	-2,86	***0,004	-0,1607	-3,93	***0,000
SG_{it}	-0,0165	-1,58	0,114	-0,0112	-0,86	0,392
$PROF_{it}$	-0,2352	-4,09	***0,000	-0,3317	-5,21	***0,000
LIQ_{it}	-0,0248	-3,98	***0,000	-0,0354	-6,50	***0,000
$RISK_{it}$	-0,3207	-0,95	0,341	-0,2607	-1,80	**0,072
IOE_{it}	0,0165	2,65	***0,008	0,0332	3,75	***0,000
TAX_{it}	0,1335	2,04	**0,041	0,1520	2,53	**0,012
$LOCATION_{it}$	0,1373	2,73	***0,006	0,1246	6,23	***0,000
Constant	-0,4305	-1,26	0,206	-0,3252	-2,74	***0,006
Observations			784			784
R^2 within			0,2195			0,4157
F-statistic			***104,28			***33,61
Breusch and Pagan Lagrangian multiplier test for random effects - Test: Var(u) = 0 $\chi^2(1)$ = 528.40 and P_Value >χ^2 = 0.0000***						

6. Conclusions

In this study, we conduct our analysis in order to investigate how some specific firm characteristics determine the firm's capital structure. We use the panel data derived by the financial statements of 90 unlisted seafood processing enterprises in the South Central region (SEASCRs) and 22 listed seafood processing enterprises in the other region of Vietnam (SEALISTs) during 2005–2011. Two econometric panel data techniques, random effects and Pooled OLS are employed. The results shows that random effects model should be appropriate for this study as compared to Pooled OLS model. Our dependent variable is the debt ratio expressed as total debt

divided by total assets. According to the results, there is a negative relation between the debt ratio of the firms and their tangible fixed assets, their growth opportunities, their profitability, their liquidity ratio and their business risks. Size and interest expense ratio appears to maintain a positive relation. It may be concluded that Vietnam SEASCRs firm's capital structure is mainly determined by firm size, tangible fixed assets, growth opportunities, profitability, liquidity, business risks and interest expense level. According to the dummy variable there is a differentiation in the capital structure among the SEASCRs with a debt ratio greater than 57.39 per cent and those with a debt ratio lower than 57.39 per cent. In addition, this study also findings the differences in capital structure among SEASCRs with different types of ownership and the differences about the capital structure of seafood processing enterprises in various regions. Our findings are consistent with the Trade off theory and Pecking order theory. The information from this research can increase understanding of capital structure choice in Vietnam SEASCRs firms. Furthermore, it may be used by corporate decision makers to make a better capital structure decision, thus will help firms to maximize value of the firm and lowering cost of capital. Financial statements of most unlisted Seafood Processing Enterprises in the South Central region of Vietnam are not audited. Only the financial statements of listed firms have to be externally audited. Therefore, the quality of financial information is less than optimal. The availability and reliability of financial data was a major limitation for this research.

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