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Optimal Capital Structure of Listed Firms - A Structural Approach: Evidence from Vietnam

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Abstract

The paper attempts to investigate the optimal capital structure of Vietnamese listed firms based on a structural approach. Using the data from around 70 companies in the Consumer Staples sector listed on the Vietnamese Stock Exchange during the period 2018–2020, this study finds that the optimal capital structure of examined companies has a wide range of diversification. This can be explained by the various types of actual products for each typical firm within the chosen sector. The result also confirms that a large proportion of researched firms were actually overleveraged, which is consistent with the trade-off hypothesis that firms wish to take tax advantages while using more debt, which creates the benefits from tax-shield. Furthermore, the research highlights the reversed correlation, which suggests that the lower the company's risk (the lower the sigma of the assets), the greater the optimal capital structure is suggested. Another interesting finding is that almost all consumer staples companies have a better optimal capital structure under the Leland and Toft (1996) model than under the Leland (1994) model. Furthermore, there is a strong correlation of optimal financial leverage ratio between years. In other words, the optimal debt levels of the latter year are strongly dependent on the gearing levels of the previous years.

Keywords: Optimal Capital Structure, Structural Approach, Capital Market, Consumer Staples Sector, Vietnam

JEL Classification Code: G32, G33, G39

1. Introduction

Capital structure is always an essential part of corporate finance and has received much attention from researchers worldwide (Gul & CHO, 2019). In the market economy, the operation of enterprises mainly relies on two sources of capital: external funds and internal funds (Ali & Faisal, 2020). The most advantageous option, according to Azhagaiah and Gavoury (2011), is a combination of debt and equity. The relationship between capital structure, more specifically, the optimal mixture of bond and stock issuing, and the prices of shares.is an important topic for financial managers. According to Graham (2000), a typical corporation can raise its value by up to 7.3 percent just by issuing more debts until marginal tax benefits begin to decrease. As a result, the importance of capital structure is highlighted in this study, as well as how firms decide on optimal leverage to maximize the value generated by structural models.

This paper is conducted to examine the optimal gearing ratios calculated by a number of structural models. The research's purposes are defining the "endogenous default"; calculating the optimal leverage ratios for firms, following several famous static capital structure models, and finding the differences for the optimal gearing level among different models.

2. Literature Review

The combination of different components within the capital structure is always a controversial topic both theoretically and practically. Some research emphasis the optimal capital structure to maximize a firm's value and hence maximize its shareholders' value.

Regarded as the foundation of the modern theory of capital structure, Modigliani and Miller (1958) illustrated

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that under certain assumptions, the value of a firm and its overall cost of capital are invariant to leverage. When the assumption of the perfect market was modified, the present value of the tax shield made the value of the levered firm higher than the value of all-equity firms and the firm's optimal capital structure consisting of 100% debt (Modigliani & Miller, 1963). The tax benefits associated with borrowings reduce the firm's taxable income due to tax-deductible interest payments. Because the cost of debt is cheaper than the cost of equity, the increase in leverage results in the decline in WACC.

In the later research, Miller (1977) concluded that under the consideration of both personal and corporate taxes, an economy-wide leverage ratio can be determined, whereas individual companies are indifferent to capital structure. One particular theorem determining the economy-wide leverage ratio known as the 'clientele effect' implies that high tax bracket investors prefer capital gain than dividends payment will invest in no or low-leverage companies, and vice-versa.

Modern capital structure theories can be divided into two groups based on the foundation of MM. The first group, which includes trade-off theory, agency theory, and free cash flow theory, acknowledges the existence of an optimal leverage level, whereas the second (which includes pecking order theory and market timing theory) observed leverage in any direction (Abdeljawad et al., 2013). While the first group recognizes that firms alter their debt levels to meet an objective, the second group of theories fine-tunes the "observed leverage" based on the factors that determine the leverage level.

Structural models pioneered by Merton (1974) determine structural variables of firms to obtain the default barrier, for example, the asset value to quantify their default points (Benito, 2005). Structural models are a good indicator of distress and rating transitions. In such a framework, the default procedure of a firm is driven by the asset value and risk of default, linking to the variability in the value of the company's asset. Default occurs when the asset value is below the liabilities. With the assumption of a zero-coupon debt, the bondholders will receive the face value of the bond if the firm value is greater than the liabilities at maturity. Therefore, the shareholders will get nothing and the bondholders get back the market value of the company if the company declares bankruptcy. Following this initial perception, Merton (1974) obtained a formula for default risky bonds which can be applied to quantify the default probability. However, it is not possible to use it in companies that have confidential data regarding stock prices. Besides, many of their key assumptions are often violated, resulting in limited implementation in reality.

Alternatively, reduced-form (or intensity) models originated by Jarrow and Turnbull (1995) are distinguished from other forms by using the bond prices and credit derivative data. Moreover, structural models focus on endogenous default while reduced approaches attempt to examine exogenous default (Poulsen & Miltersen, 2014). Another distinction worth mentioning is that structural models focus on the capital structure based on a set of information available to managers, whereas reduced-form models concentrate on the price of corporate bonds.

Although the usefulness of structural models is still debatable, they have clearly provided valuable insight into factors that can affect the capital structure and debt value, which is the focus of our investigation. In addition, structural models appear to work well in a variety of applications.

Chen and Hammes (2004) analyzed factors influencing firm leverage. They used market capital ratio, book capital ratio, and book debt ratio as measures of leverage. They compared factors that influence firm leverage using unbalanced panel data of seven countries: Canada, Denmark, Germany, Italy, Sweden, the UK, and the US. They found that firm size, profitability, tangibility, and market-to-book ratio have a significant impact on the capital structure choices of firms. Tangibility is positively related to leverage, while profitability shows a negative significant relation to leverage across all seven countries. More profitable firms tend to borrow less. The size of the firm is positively and significantly related to firms' financial leverage. The impact of the market-to-book ratio varies in the book debt ratio model but shows a negative and significant relationship in the market leverage model for all countries except Denmark, which shows an insignificant parameter value. Evidence from the seven countries are consistent with the findings in conventional capital structure theories, for example, the pecking order theory and the static trade-off theory, i.e. risky firms borrow less

The optimal leverage was estimated by Leland (1994) model and Leland and Toft (1996) model. The findings interpreted that there is a negative relationship between optimal debt ratio and asset volatility. In other words, the higher the firm risk is, the lower the optimal debt level will be. Another intriguing conclusion from the study is that the optimal leverage for most Vietnamese property companies is higher than the actual debt level. The study largely contributes to the empirical investigation of structural models in the Vietnamese market.

3. Static Structural Models of Capital Structure

According to Suo and Wang (2005), equity and debt in structural models are considered as 'contingent claims' on the asset value of the firm, therefore, option pricing theories can be applied.

3.1. The Merton (1974) Model

This model assumes that a company's assets are entirely made up of equity and a small proportion of zero-coupon bonds. It is based on two prudish assumptions: asset trading occurs continuously over time, and the dynamics of the firm's value can be evolved over time by a diffusion-type stochastic process. The company defaults if the value of its assets is less than the promised debt repayment at maturity. Under this assumption, equity of the firm is considered as a European call option on the assets and thus the Merton (1974) model permits the application of the Black-Scholes pricing theory to value risky debts (Black & Scholes, 1973).

The model can be used to calculate the risk-neutral probability of the company defaulting or the debt credit spread. According to Benito (2005), a company would declare bankruptcy if the value of its assets is insufficient to repay its outstanding debts when payments are due, implying that default can only occur at maturity.

One shortcoming of the model is that it considers only the case when the firm issue zero-coupon bonds while in reality, the firm's debt structure contains various types of issuance at different maturities, coupons, etc. One practical solution to relax this assumption is introduced in the KMV model, which seeks to replace a complex debt structure with an equivalent zero-coupon one. KMV model states that the equivalent zero-coupon debt structure consists of all short-term liabilities and half the face value of long-term liabilities after witnessing that more often than not, firms would not declare bankruptcy when their market value of assets falls to book value of all liabilities but a lower critical point being above the book value of short-term debts. As the popular KMV model appears to do well in practice, we decide to apply the model to quantify the level of debts.

3.2. The Leland (1994) Model

Extending the works by Merton (1974), Leland (1994) derived a model to determine the optimal capital structure with the introduction of corporate taxes and deadweight bankruptcy costs. Defaults will be triggered when firms are no longer able to issue more equity to pay coupon dues. As a result, equity value will be equal to 0 in case the firm value falls below the bankruptcy level and firms will have positive equity when their value is higher than V_B, implying a standard smooth-pasting condition, which stipulates that the equity value as a function of V is continuously differentiable at default threshold.

The Leland (1994) model introduced closed-form solutions to derive the optimal leverage levels for firms issuing securities that are contingent on the value of the firm but independent of time. Time independence can be described in two ways: either the debt has sufficient long maturity or finite debt is rolled over at a fixed interest rate, similar to revolving credit agreements. This is a key assumption that allows us to derive closed-form solutions for the optimal capital structure problem.

Existing debt holders will be distressed if the additional debt is issued, so it is allocated under bond covenants. Debt repurchase, on the other hand, upsets existing shareholders, although tender offers for large debt repurchases with low financing costs may be advantageous in some situations. Companies will be discouraged from changing the principal amount of debts, even if there are no financing costs, due to the concerns of debt holders and equity holders. On another note, firms' debts are coupon-bearing and firms will always benefit fully from the tax-deductibility of coupon payments as long as the firm remains solvent. In case bankruptcy occurs, bondholders, for this model, are assumed to receive a level of asset value V_B less a fraction lost due to default costs. Shareholders, similar to the previous model by Merton (1974), get nothing in the extreme case.

First, we examine the optimal leverage for unprotected debts. Here, Leland (1994) introduced the concept of endogenous default, which means shareholders will try to set a boundary at which firms will optimally default and the value of the firm is maximized. If the company declares bankruptcy, debt holders will receive whatever is left after the bankruptcy costs are deducted, while shareholders will receive nothing.

The Leland (2004) model suggests that companies can obtain the default boundary optimally to maximize the equity value. The optimal bankruptcy level can be determined by the face value and maturity of debt, the firm's risk, the payout rate, the bankruptcy cost, and the corporate tax. When the firm cannot fulfill the required coupon payments by offering additional shares, insolvency will be triggered. That is, when the value of equity falls to zero, the firm's value falls below the default level, and the equity value is positive, with the firm's value above the bankruptcy level.

Leland (1994) also found the solution of the optimal capital structure for protected debts (debts with protective covenants). Presume that when supplying debt, the face value of debt, denoted as P, coincides with the market value of debt, D_0. In protected debts, the firm would trigger default when its asset value is below the face value of debt, resulting in $D_0 = V_B$. The optimal bankruptcy level is the same for both protected and unprotected debts.

In conclusion, the Leland (1994) model has demonstrated the closed-form solution for exogenous default with zero bankruptcy expenses. Nevertheless, the model has not yet solved the problem when bankruptcy costs are positive. Moreover, boundless debt is still limited when working in this model.

3.3. The Leland and Toft (1996) Model

The Leland and Toft (1996) model is an extension of the Merton (1974) model with an endogenous bankruptcy barrier where stockholders maximize their own interests by obtaining the optimal bankruptcy position through finite debt exploration. The stationary debt level results in the stable value of bankruptcy, V_B (Dao & Lai, 2018). The company unceasingly offers new bonds with the same face value and maturity T each time an already outstanding bond retires. Therefore, the total face value of total outstanding debts P is unchanged with constantly time-independent coupon C regardless of single finite maturity debt annually. This model (Leland & Toft, 1996) assumes a firm with perpetual debts whereas Leland (1994) analyzed a company with finite maturity. As a consequence, bonds in the former model are not the same in terms of remaining time to maturity, while those in the latter one are identical in every aspect.

4. Optimal Capital Structure for Consumer Staples Firms

This research estimates the optimal leverage ratios for the Vietnamese listed firms in the consumer staples sector. The Black-Scholes model and geometric Brownian motion are used to make the assumptions. The mean, standard deviation, bankruptcy costs, which specify the deviation of values upon default, and the tax rate are all needed parameters. Other parameters must be computed when the corporate tax rate and risk-free interest rate are available on the market. As all the firms in the sample are listed, firm-specific parameters can be instantaneously derived from the times series of market prices. Accounting figures on specific reporting dates are used and market prices on such dates will also be collected.

There are some essential assumptions. First, arbitrage opportunities are eliminated due to intensive government regulations on the market. Furthermore, we need to check the random behavior or the log normal returns of stock prices to confirm the correctness of the models. In geometric Brownian motion, the drift μ and volatility σ of the stocks are assumed to be known and constant. These two parameters can firstly be drawn from the daily stock returns, from which the annualized figures are implied. For the conditions of Brownian motion, a normality test will be conducted.

4.1. Data Collection

The paper attempts to study the optimal capital structure for listed companies in the Consumer Staples sector, as classified by Global Industry Classification Standard (GICS). There are a total of 68 listed firms being examined in 2018, 2 additional listed firms in 2019 raise the total number this year to 70 and in 2020, the number of firms listed in this sector was 71. The paper seeks to examine the optimal capital structure levels through these 3 years.

The research aims to empirically test the above-mentioned models, hence choosing a sample of organizations with capital structures that are sufficiently close to the models' assumptions is essential. Based on the assumptions, we should choose firms that issue solely zero-coupon bonds under the debt structure when using the Merton (1974) model or those with perpetual debts when using the Leland (1994) model. However, because such a "suitable" debt structure is not always available in the market, this study focuses on publicly traded companies in the specified sectors that have a large amount of publicly available information and immediate access to stock information.

To calculate the stock returns, the stock prices of all of these companies are collected on a daily basis for a period of three years. These stock returns are crucial in estimating stock volatility and drift, which are subsequently utilized to calculate asset volatility and drift. For closed-form models with optimal capital structure, asset volatility and drift are essential components.

On a daily basis, the stock returns are expressed in percentage. The normality of the distribution of the returns of the consumer staples companies was checked using histograms. Stock returns appear to be normally distributed in general, with some equities having a high standard deviation. Because the data is collected on a daily basis, it's reasonable to infer that observations are chosen on a continuous basis.

4.2. Parameter Estimation: Return and Volatility

The optimal capital structure is based on closed-form models, thus, the stock volatility σ and the expected annual rate of returns or the drift μ are important inputs for calculation. In this section, they are empirically estimated from historical stock prices for a period of one year. Specifically, the implied stock volatility and drift for previously chosen consumer staples stocks were obtained with respect to the time interval of corresponding years. Table 1 illustrates the statistic description for estimated stock volatility and drift.

In comparison to prior years, the year 2020 displayed a relatively high yearly drift. The annualized stock volatility did not show a significant difference over time. It can be shown that CAD - Cadovimex Seafood Import-Export and Processing JSC had the largest stock volatility in 2020, at 179.41 percent, and also had the highest predicted rate of return, at 212.02 percent. In a static structural approach, these values are required when determining the optimal capital structure.

Table 1: Descriptive Analysis of Drift and Stock Volatility

	2020		2019		2018	
	Annualized Stock Volatility	Drift μ	Annualized Stock Volatility	Drift μ	Annualized Stock Volatility	Drift μ
Mean	27.44%	30.78%	28.10%	1.15%	26.27%	1.62%
Median	14.76%	27.65%	18.27%	–1.56%	15.36%	–1.05%
Minimum	2.90%	–107.10%	3.20%	–124.32%	4.45%	–126.70%
Maximum	179.41%	212.02%	142.42%	86.35%	96.07%	145.64%
Standard Deviation	29.12%	50.06%	25.51%	43.29%	22.75%	55.92%

4.3. Optimal Capital Structure Estimation

From the above data and estimated parameters, we are going to create a model to calculate the optimal gearing level. According to the KMV Model, the asset volatility can be estimated from annualized stock volatility and drift in support of the optimal capital structure calculation (Table 2).

The Merton (1974) model does not provide a complete solution for estimating the optimal capital gearing level, as stated in the previous section. As a result, it does not focus on the analysis. In addition, we are not going to include the Leland (1994) model for protected debts in our research here due to the existence of the unrealistic assumption that there are no bankruptcy costs. Instead, we'll look at the Leland and Toft (1996) model since, in this model, protected debts and roll-over debts are compatible in a number of ways that have been mentioned before.

4.3.1. The Leland (1994) Model

Overall, a wide range of optimal capital structures for consumer staples companies has been seen, ranging from practically 0% debt to up to 3/4th of the asset level. This can be explained by the fact that any typical firm has a wide range of actual products. (Table 3).

One aspect to note is that Masan Group Corp, the largest firm by total assets during the last three years, has a low leverage ratio of around 25% at a level of asset risk of more or less than 15%. In addition, the average leverage ratio for 30 firms listed on HNX is the lowest for all of 3 years at around 20%. These numbers for the 30 examined firms traded on Hochiminh Stock Exchange are slightly higher at 21.9% for 2018 and 2019 and increase to 23.1% in 2020. Meanwhile, the optimal debt ratio for 11 UPCOM listed companies is more than 30% in all 3 years.

During this time, about 70% of the enterprises studied were genuinely overleveraged in their capital structure. Understandably, such businesses wanted to take advantage of tax relief by taking on more debt, but they also had to deal with the spike in financial distress costs. PAN Group JSC, Hoang Anh Gia Lai JSC, and Ngo Quyen Processing Export JSC were among the enterprises with the lowest asset volatility. On the other hand, more than 30% of the firm experienced a debt level lower than the optimal capital level suggested by the model in 2018 and 2020. This figure was reduced in 2019 to 25%. The above finding shows the weakness of not only the Leland (1994) model but also of most static capital structure models, which do not enable companies to refinance more than one time (Dao & Lai, 2018).

Table 3 indicates the descriptive evaluation of the optimal capital structure of consumer staples companies by the Leland (1994) model. There was a slight decrease from 0.0095% – 76.3592% in 2018 to 0.0050% – 72.5932%

Table 2: Descriptive Analysis of Implied Firm's Asset Volatility from KMV Model

	2020	2019	2018
Mean	14.32%	12.17%	13.13%
Median	10.98%	8.05%	9.59%
Minimum	2.07%	2.98%	2.84%
Maximum	87.36%	75.80%	73.66%
Standard Deviation	12.91%	12.03%	12.80%

Table 3: Descriptive Analysis of Leland (1994) Optimal Capital Structure

	2020	2019	2018
Mean	22.81%	23.21%	22.97%
Median	19.06%	19.31%	19.74%
Minimum	0.00%	0.00%	0.01%
Maximum	72.45%	72.59%	76.36%
Standard Deviation	18.32%	18.12%	17.43%

and to 0.0022%–72.4525% in 2020. In contrast, the mean of optimized leverage showed an opposite trend. The year 2019 represented an increase in the average value of optimal leverage to 23.22%, followed by a drop to 22.81% the following year.

Companies try to gain from higher tax (deductible interest disbursements) by raising the level of debt in their capital structure, as discussed above. As a result, the optimal leverage increases with the corporate tax rate. Furthermore, an increase in bankruptcy expenses leads to a decrease in default, as well as a decreased likelihood of insolvency. The effect of a high risk-free rate contributes to the optimal capital structure, despite the fact that businesses are discouraged from using debts when borrowing costs are high. Because the optimal capital structure changes positively with the asset value initially set for calculation, the capital value does not matter even though it is an important input to evaluate.

4.3.2. The Leland and Toft (1996) Model

Leland and Toft (1996) also use endogenous border and calculated asset volatility to determine the optimal leverage to maximize firm value under endogenous conditions that allow firms to declare defaults in the best interests of equity holders. The opposite correlation is highlighted by Leland and Toft (1996), who states that the lower the company's risk (lower sigma), the higher the optimal capital structure and default levels, which is consistent with the risk return trade-off scenario.

Similar to the results from Leland (1994) model, the optimal leverage ratios for consumer staples firms in the chosen list experienced significant fluctuation through the years. Generally in 2018, optimal gearing levels are in the range of 2.4% – 83.8%. Saigon Beer Alcohol Beverage Corp is suggested to borrow the least of all, with the debt ratio at 2.4% (maybe because of its high level of asset volatility at roughly 58.7%), while Vinh Long Cereal and Food Corp is recommended to finance high debt level at 83.8%. In 2019, Vinh Long Cereal and Food Corp continues to be the top debt finance firm suggested by the model at 80.7%, while this figure slightly goes down to the third position at 75.7% in 2020.

Table 3 and Table 4 show that due to the difference in debt structure evaluated in the two models, it may be stated that consumer staples firms have a greater optimal capital structure under the Leland and Toft (1996) model than under the Leland (1994) model.

The descriptive survey of Leland and Toft (1996) optimal gearing levels is summarized in Table 4. In 2018, the average optimum level ranked first for the third year in a row, with the smallest standard deviation. In most cases, companies implement lower debt levels than estimated. It's a clear signal to the market that they're running a side business and need to save money to fund future ventures.

Table 4: Descriptive Analysis of Leland and Toft (1996) Optimal Capital Structure

	2020	2019	2018
Mean	25.49%	25.64%	28.17%
Median	19.45%	22.69%	25.27%
Minimum	1.72%	2.24%	2.41%
Maximum	88.61%	80.70%	83.83%
Standard Deviation	20.46%	17.74%	16.11%

Besides, Leland and Toft (1996) present the payout ratio as another input in estimating the target level of debt. In addition, the payout ratio is used in Leland and Toft's (1996) approach to estimate the target debt level. Although the payout rate is assumed to be constant and is dependent on capital structure in this model, the firm's leverage is relatively sensitive to its fluctuation. Companies with lesser asset volatility are more susceptible to changes in payout ratios than companies with higher asset volatility. The model's optimum debt-to-equity ratio decreases as the payout amount increase, according to the analysis.

All of the structural methods assume that the corporate tax rate is fixed. Nonetheless, the findings reveal that when the regulatory tax percentage was reduced, the optimal capital structure showed a positive trend. This could be explained by the fact that lowering taxable income reduces the ability to take advantage of tax benefits while simultaneously lowering the value of liabilities and assets. The target debt level in the capital structure will decline proportionally if the downward movement in the firm value does not exceed the variation in the debt value. One of the reasons that organizations with different optimal capital structures are subject to different tax laws is because of the influence of corporate tax rates.

When it comes to investment decisions, default expenses are indicators of a company's riskiness. When a company's default costs are high, managers are motivated to reduce liabilities and raise asset value through coupons. As a company's debt levels decline, so do its default rate and long-term profitability. On the other hand, the value of an asset might be offset by taking advantage of longer discounted bankruptcy expenses and tax benefits from higher liabilities. When the negative effect outweighs the second offset, the asset value drops in response to rising bankruptcy expenses.

In general, companies with high asset certainty are at a higher risk of going bankrupt. As a result, the asset value decreases due to a lack of tax benefits (due to low liability availability) and high default expenses. Therefore, the intended capital structure is reduced. However, there is another point worth highlighting from Leland and Toft (1996). As previously indicated, bankruptcy occurs when the endogenous bankruptcy precipitate value exceeds the firm value. Companies may declare default owing to predicted capital growth, according to Leland and Toft (1996), even if the asset value exceeds the face value of debt.

Finally, the disadvantage of both applicable methodologies is the presence of some undefined and unbiased values. The imperfect market is one probable reason for estimated parameters. Therefore, two models have presumed market simplifications that prevent them from accurately determining the leverage tested for factual values, limiting their experimentation.

4.3.3. Hypothesis Testing: Leverage versus Parameters

The relationship between capital structure and input parameters can be expressed as an equation: where: OptLev = $\beta_1 + \beta_2 \mu + \beta_3 \sigma + \varepsilon$ (1) denotes optimal capital structure in the form of D*/A*, μ and σ are the drift and assets volatility, respectively. β_1, β_2, β_3 are the estimators of the least squared line, and ε is regarded as the error term.

Tables 5 and 6 represent the panel least squares method given by the regression. Under the Leland (1994) model's optimal capital structure, drift is positively correlated to the optimal capital structure while volatility is negatively correlated to the optimal capital structure. In the model of Leland and Toft (1996), drift has a negative association, although volatility has a positive association with the optimal capital structure. Some previous empirical studies, such as Bradley, et al. (1984), Nguyen, et al. (2021) and Titman and Wessels (1988), showed that high volatility and low recovery rates upon default result in low leverage ratios.

AR(1) from both models implies great statistical significance with extremely high coefficients of 93 percent and 98 percent, respectively, in Leland (1994) and Leland and Toft (1996) models, respectively. It is shown that the optimal capital structure between years has a strong relationship with each other. In other words, the optimal debt levels of the latter year are strongly dependent on the gearing levels of the previous years. In addition, R^2 is a reasonable value, expressing a possibility that the equation fits the model. Appropriate R^2 coupled with the insignificant coefficient for drift and volatility may indicate that optimal capital structure is particularly dependent on historical data than on the market data. Furthermore, the regression may suggest that heteroscedasticity exists.

To summarize, the static structural methods benefit from the simplicity of the formulas used to calculate drift and volatility from market stock prices. However, the optimal gearing level is influenced not only by drift and volatility but also by additional variables not included in the models discussed above. Structured approaches, on the

Table 5: Regression Results for (1) with Optimal Capital Structure-Based Leland (1994) Model

Dependent Variable: OptLev				
Variables	**Coefficient**	**Std. Error**	***t*-statistic**	**Prob.**
C	0.2248*	0.1048	2.1445	0.0338
μ	0.0048*	0.0091	0.5233	0.6016
σ	–0.1425*	0.0764	–1.8649	0.0644
AR(1)	0.9342	0.0381	24.5120	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.8238	Mean dependent var	0.2287	
Adjusted *R*-squared	0.8198	S.D. dependent var	0.1817	
S.E. of regression	0.0771	Akaike info criterion	–2.2579	
Sum squared resid	0.7974	Schwarz criterion	–2.1730	
Log–likelihood	159.7925	Hannan-Quinn criter.	–2.2234	
F-statistic	208.7920***	Durbin-Watson stat	2.4284	
Prob(*F*-statistic)	0.0000			

Note: ***, **, and * represent the statistical significance at 1, 5, and 10% levels, respectively.

Table 6: Regression Results for (1) with Optimal Capital Structure-Based Leland andToft (1996) Model

Dependent Variable: OptLev				
Variables	**Coefficient**	**Std. Error**	***t*-statistic**	**Prob.**
C	–0.6085*	2.6946	–0.2258	0.8217
μ	–0.0034*	0.0108	–0.3153	0.7530
σ	0.0139*	0.0924	0.1504	0.8807
AR(1)	0.9842	0.0477	20.6497	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.7622	Mean dependent var		0.2546
Adjusted *R*-squared	0.7569	S.D. dependent var		0.1913
S.E. of regression	0.0943	Akaike info criterion		–1.8556
Sum squared resid	1.1922	Schwarz criterion		–1.7708
Log-likelihood	132.0382	Hannan-Quinn criter.		–1.8211
F-statistic	143.1813***	Durbin-Watson stat		2.1020
Prob(*F*-statistic)	0.0000			

Note: ***, **, and * represent the statistical significance at 1, 5, and 10% levels, respectively.

other hand, do not focus on direct relationships and have significant drawbacks. One of the main limitations of the model is the assumption where drift and volatility, which are the key parameters for the models, are assumed to be constant over time. For very short periods of time, they may remain constant; however, financial researchers assert that drift and volatility, in reality, change over time.

5. Conclusion

This report provides a thorough understanding of financial decisions in the consumer staples sector from 2018 to 2020. Hypotheses were based on estimating common parameters, such as stock volatility and drift, from which the volatility and return of assets were inferred, and an analysis was conducted to arrive at target gearing ratio values.

Managing leverage is seen as an equilibrating performance in general. The most important consideration in determining the level of leverage is a firm's trade-off between tax benefits and bankruptcy costs. Furthermore, the study emphasizes the link between corporate tax rates and debt costs, as well as business leverage. As previously discussed, the target capital structure fluctuates inversely with loan costs and changes according to the tax percentage due to tax benefits (deductible interest payments) (default and financial distress costs).

Because this experiment focuses on the largest publicly traded corporations in terms of total assets, differences in optimal leverage between large and small enterprises are not discernible. However, studies have shown that larger organizations have such predictable and consistent cash flows, as well as the ability to resolve nonpermanent liquidity concerns, that they borrow more frequently. Furthermore, any costs associated with large-scale debt financing do not outweigh the need for flexibility. Meanwhile, small firms should refrain from taking out additional loans due to the risk of defaulting on payments due to a lack of flexibility in their funding sources. As a result, they can make flexible use of investment possibilities or deal with opposing phenomena.

From the structural models on capital structure, we can see the influence of traditional elements on the selection of the company's debt-to-equity ratio. In other words, the optimized gearing figure is sensitive to transformed risk-free rate by the authority. Nevertheless, it is complicated to make an assertion about the debt level response because the impact of this variable put two models together, emphasizing how complex capital structure is in the presumption. Companies in the Leland (1994) model have the desire to borrow more when the government raises the risk-free interest rate, whereas companies in the Leland and Toft (1996) model are completely unaffected. In contrast, changes in corporate income taxes have a clear impact on the business's leverage. Because businesses pay a higher tax rate, they primarily control their cash flow by issuing debts.

References

Abdeljawad, I., Abdul Rahim, R., Ibrahim, I., & Nor, F. (2013). Dynamic capital structure trade-off theory: Evidence from Malaysia. *International Review of Business Research Papers*, *9*(6), 102–111. https://doi.org/10.1186/s40497-019-0152-8

Ali, A., & Faisal, S. (2020). Capital structure and financial performance: A Case of Saudi Petrochemical Industry. *The Journal of Asian Finance, Economics, and Business, 7*(7), 105–112. https://doi.org/10.13106/jafeb.2020.vol7.no7.105

Azhagaiah, R., & Gavoury, C. (2011). The impact of capital structure on profitability with special reference to IT Industry in India, *Managing Global Transitions: International Research Journal*, *9*, 371–392. https://core.ac.uk/download/pdf/6428696.pdf

Benito, M. J. (2005). Synovial tissue inflammation in early and late osteoarthritis. *Annals of the Rheumatic Diseases*, *64*(9), 1263–1267. https://doi.org/10.1136/ard.2004.025270

Black, F., & Scholes, M. (1973). The pricing of options and corporate liabilities. *Journal of Political Economy*, *81*(3), 637–654. https://doi.org/10.1086/260062

Bradley, M., Jarrell, G. A., & Kim, E. H. (1984). On the existence of an optimal capital structure: Theory and evidence. *The Journal of Finance*, *39*(3), 857–878. https://doi.org/10.2307/2327950

Chen, Y. H., & Hammes, K. (2004b). Capital structure theories and empirical results: A panel data analysis. *SSRN Journal, 1*(2), 56–89. Published. https://doi.org/10.2139/ssrn.535782

Dao, B., & Lai, P. (2018). A study on the optimal capital structure of Vietnamese real estate listed firms. *Journal of Economics and Development*, *15*, 45–70. https://doi.org/10.33301/jed-p-2018-20-03-04

Graham, J. R. (2000). How big are the tax benefits of debt? *The Journal of Finance*, *55*(5), 1901–1941. https://doi.org/10.1111/0022-1082.00277

Gul, S., & Cho, H. R. (2019). Capital structure and default risk: Evidence from Korean stock market. *The Journal of Asian Finance, Economics, and Business, 6*(2), 15–24. https://doi. org/10.13106/jafeb.2019.vol6.no2.15

Jarrow, R. A., & Turnbull, S. M. (1995). Pricing derivatives on financial securities subject to credit risk. *The Journal of Finance*, *50*(1), 53–85. https://doi.org/10.1111/j.1540-6261.1995.tb05167.x

Leland, H. E. (1994). Corporate debt value, bond covenants, and optimal capital structure. *The Journal of Finance*, *49*(4), 1213–1252. https://doi.org/10.1111/j.1540-6261.1994.tb02452.x

Leland, H. E., & Toft, K. B. (1996). Optimal capital structure, endogenous bankruptcy, and the term structure of credit spreads. *The Journal of Finance*, *51*(3), 987–1019. https://doi.org/10.1111/j.1540-6261.1996.tb02714.x

Merton, R. C. (1974). On the pricing of corporate debt: the risk structure of interest rates. *The Journal of Finance*, *29*(2), 449–470. https://doi.org/10.1111/j.1540-6261.1974.tb03058.x

Miller, M. H. (1977b). Debt and taxes. *The Journal of Finance*, *32*(2), 261–275. https://doi.org/10.1111/j.1540-6261.1977.tb03267.x

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance, and the theory of investment. *The American Economic Review*, *48*(3), 261–297. http://www.jstor.org/stable/1809766

Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of capital: A correction. *The American Economic Review*, *53*(3), 433–443. http://www.jstor.org/stable/1809167

Nguyen, T. G., Nguyen, L., & Nguyen, T. D. (2021). Capital structure and its determinants: evidence from Vietnam. *The Journal of Asian Finance, Economics and Business, 8*(10), 1–10. https://doi.org/10.13106/jafeb.2021.vol8.no10.0001

Poulsen, T. K., & Miltersen, K. R. (2014). Dynamic capital structure: Debt rollover and funding liquidity. *Journal of Digital Marketing and Halal Industry*, *2*(1), 1. https://doi.org/10.21580/jdmhi.2020.2.1.5769

Suo, Z., & Wang, N. (2005). Long-distance propagation of forces in a cell. *Biochemical and Biophysical Research Communications*, *328*(4), 1133–1138. https://doi.org/10.1016/j.bbrc.2005.01.070

Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of Finance*, *43*(1), 1–19. https://doi.org/10.1111/j.1540-6261.1988.tb02585.x