



## Application of Dupont-factor analysis to financial performance and market measurement of the southeast Asian hotel industry

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### Abstract

The study aimed to explore the critical factors impacting the sustainability and growth of the hotel business in the Southeast Asian market. The study covered observations from the second quarter of 2010 to the first quarter of 2022 quarterly reports of 28 listed hotels out of 85 listed in the Southeast Asia markets. By adopting the Dupont equation's overall business activities measurement, the study tested industrial growth, instability, and market performance in terms relevant to the operating, investing, and financing activities of hotel companies. It was found that fundamental business activities do explain the growth of the hotel industry, with leverage most significantly impacting industrial growth. Industrial instability and market measurement present weak relevance and irrelevance to fundamental accounting measurements of hotel business activities, respectively.

## 1. Introduction

Mandal and Vong (2015) elaborate on the significant role of the hospitality industry given the rapid changes in economic and social development in Southeast Asia and proposed a decision-making model for the industry in the future. If the hotel industry requires a development decision-making model, performance analysis and market measurement should serve as the foundation for both capital market efficiency and public policy recommendations. Specifically, as emerging markets, Alan, Wan, and Ong (2000) express that the hotel industry in Southeast Asia is confronting numerous factors that impact the sustainability and development of the hotel industry, from economic crisis to hotel management. One of the important problems that needs to be addressed is how to effectively understand and manage the industry.

Financial performance has been considered an important business measurement target for intrinsic corporate valuation and optimal portfolio management. Effective measurement of financial performance facilitates the equity valuation process for wise investment decision-making. From the perspective of economic growth, optimal market capital allocation to the most effective and efficient corporations is definitely one of the determinant conditions. In addition, the capital must be channelled to good-performing business entities so that innovative businesses can consistently receive appropriate capital investment, and the sustainability of economic growth can be maintained.

There is a multitude of research studies studying corporate performance from diverse perspectives. The hotel industry's performance has been studied for equity valuation, portfolio management, and economic sustainability. However, research on hotel performance, especially in the emerging markets, has been limited. There are two ways to increase firm value, including generating positive cash flows and decreasing the variability of the cash flows (Hua, Dalbor, Lee, & Guchait, 2016). Chen and Kim (2009) applied seven hotel-valuation techniques to evaluate the value of a state-owned hotel in China, adopting cash flows and other

financial measurements. [Ide \(1996\)](#) addressed the importance of evaluating fundamental financial performance for stock valuation in Japan. When one applies financial fundamentals for performance valuation, the financial statements may not reflect the true productivity and may have window-dressing effects. Although the aforementioned studies utilized the fundamentals effectively, the accounting measurements are more or less causing certain issues. [Cornell and Landsman \(2003\)](#) argued that there is no consistent preference for one measure of performance over other methods. According to [Jiao \(2011\)](#), disclosure is highly correlated with firm value. Therefore, it is not guaranteed that financial fundamentals intrinsically imply the valuation of hotels' equity. Consequently, there is a research gap regarding the contribution of financial fundamentals to the valuation of hotel equity.

The hotel industry possesses a high level of sensitivity to economic cycles and macro instability. Although numerous research studies aim at marketing strategies and business intelligence of the hotel industry, there is a lack of studies on hotel companies' association between performance stability and equity valuation of the market. There is a lack of studies incorporating performance and market valuation of the hotel industry confronting instability and riskiness. To fill this research gap, this study chooses the largest listed companies in the hotel industry in the hotspot of the global hospitality and tourism region, Southeast Asia, to explore the creative understanding between, firms' different aspects of performance, growth instability, and market valuation.

In fact, the overall performance of the hotel industry can be affected by a variety of factors. Some factors are controllable for the hotel, such as operational activities, while others are partially uncontrollable, such as the financial cost of the hotel. The financial cost is uncontrollable because it is affected by decisions related to capital structure and the interest rate of raising capital. [Botta \(2018\)](#) investigated the existence of an optimal capital structure for small and medium-sized enterprises (SMEs) in the hotel industry by examining the relationship between financing decisions and financial performance in Italy. The study concluded that SME hotels deviate from optimal leverage due to the availability of internal funds. While an individual cannot control the market interest rates, they can change the capital cost by adjusting the level of debt and equity financing. Regarding controllable business activities, it primarily implies that operating performance can be improved by firms' enforcement or innovation in operational effectiveness and efficiency. For instance, a hotel can increase its sales by increasing the occupancy rate of hotel rooms, and it can adjust the prices to maximize the turnover fixed assets invested in hotel facilities. [Kazemian, Djajadikerta, Mat Roni, Trireksani, and Mohd-Sanus \(2021\)](#) concluded that customer orientation can influence the performance of tourism industry. In addition, [Campo, Díaz, and Yagüe \(2014\)](#) demonstrated that the tendency of a hotel to innovate improves performance in the medium and long term. Therefore, performance analysis should be divided into different groups of measurements or factors to investigate the inherent issues that the hotel industry is facing and to identify the determinant factor(s) that impact the hotel industry's value.

While there have been studies on hotel performance, there has been insufficient decomposed analysis on different aspects of the hotel business. Therefore, the study's first purpose is to dissect the hotel performance into different groups of fundamentals for effective analysis. The study aims to explore the heterogeneous effects of performance on the key interest results of the hotel industry.

However, performance evaluation is not the sole determinant for capital investment in the hotel industry. According to the hotel equity valuation techniques proposed by [Rushmore and deRoos \(1999\)](#), one of the most important evaluation methods is the discounted cash flows method, in which the future opportunity for growth and stability of earnings are crucial determinants for corporate value. [Chi and Su \(2017\)](#) discovered that firms progressively investing in growth opportunities is followed by converging of book value and market value. [Sandvik, Duhan, and Sandvik \(2014\)](#) also addressed this using innovativeness and sales growth as mediators for profitability. Besides the growth requirement, stability is also crucial for valuation. [Noel \(2022\)](#) states that a business's ability to adapt to pandemic risk determines its risk of failure. In addition, [Kim and Kim \(2008\)](#) demonstrated significant differences between financial derivativeness users and non-users in hotel Real Estate Investment Trusts (REITs), in terms of cash flow volatility and earning volatility. The study aims to test the relationship between growth opportunity and stability as both present significant influences on valuations. The first two objectives of the study are to test the relationship between hotels' performance and profit growth and to test the association between hotels' performance and earning stability.

Furthermore, it is an optimistic expectation that market valuation or measurement efficiently reflects all or partial available fundamental information, according to efficient market theory. [Zhang and Deng \(2009\)](#) examined the return patterns of hotel stocks, and past earnings surprise is one of the variables that can predict the future mean return of hotel real estate stocks. [Lee, O'Neill, and McGinley \(2016\)](#) state the significant effect of economic conditions on hotel sale prices and introduced economic conditions as a new determinant for hotel market value into Automated Valuation Models (AVMs). Both studies demonstrate supportive evidence regarding the relationship between market measurement and firms' performance. As a result, the third objective of the study is to test the implications power of hotels' performance in market measurements, to explore whether market measurements efficiently reflect fundamental performance measured by accounting-based indications.

Thus, one of the primary goals of this study is to fill a research gap and contribute to the question of the relationship between three important determinants of hotel equity valuation, namely performance, growth, and risk/stability. Additionally, the study aims to investigate the extent to which market measurement incorporates

accounting-based performance measurement in the hotel industry in Southeast Asia. To respond to the questions, the objectives of this study include: (1) Is hotels' performance in Southeast Asia impacting the earning growth of the industry? If so, from which perspective of performance is it more significant? (2) Is there a significant relationship between hotels' performance in Southeast Asia and the earning stability of the industry? If so, from which perspective of performance is it more significant? (3) Is the stock market measurement of the hotel industry significantly influenced by the accounting-based measurement of the hotels' performance? If so, which perspective of performance demonstrates material impact?

## **2. Literature Review**

The stock return performance of the hotel industry is subject to macroeconomic volatility, including demand and supply shocks. Furthermore, [Chen \(2007\)](#) investigated the impact of demand and supply shocks on US hospitality index returns, as well as the significant effects of growth rates, oil prices, labor wages, and monetary policy. In addition, [Chen \(2013\)](#) studied the impact of demand and supply shocks on US hospitality index returns and addressed the significant effects of growth rates, of oil prices, labor wages, and monetary policy. [Mucharreira, Antunes, Abranja, Justino, and Quirós \(2019\)](#) studied the macroeconomic context as an important factor for the growth of hotels and revenues. Although [Chen, Zhao, Wang, and Lv \(2018\)](#) studied merely the momentum effect in the hotel stock, the aforementioned macroeconomic studies mostly demonstrated the systematic effect on hotels' revenue and expenses in operation. There is a strong linkage between macroeconomic factors, hotels' operation efficiency, and hotel stock valuation. [Boz, Menéndez-Plans, and Orgaz-Guerrero \(2014\)](#) demonstrated an association between macroeconomics variables and accounting variables of operation by showing that Gross Domestic Product (GDP), exchange rate variation, and profitability of the Dow Jones Industrial Average (DJIA) have a high explanatory power to predict the variation of a firm's stock risk.

Systematic risk does have a strong impact on the operation of the hotel industry. The information derived from accounting measurements of hotel business activities, therefore, integrates both macro impact and the hotels' ability to survive under systematic influences. [Rushmore and deRoos \(1999\)](#) studied the financial ratios and discovered that room revenue is the strongest driver of department expenses. [Burja and Mărginean \(2014\)](#) applied the Dupont Model to the furniture industry and found positive correlations between turnover and net income. In addition, the fundamental accounting measurements of business activities facilitate the risk assessments of the hotel industry in terms of stability and survival ability during a crisis. The key risks to the hospitality industry have been identified by [Bharwani and Mathews \(2012\)](#) in a generic model and address areas of risk management for the hotel industry, including competition, seasonality, and customer preferences. Furthermore, [Drobyazko, Barwinska-Malajowicz, Slusarczyk, Chubukova, and Bielialov \(2020\)](#) proposed a control map for modelling the assessment of the financial stability of service enterprises. Regarding the hospitality firms' performance during a crisis, [Clark, Mauck, and Pruitt \(2021\)](#) analyzed the abnormal stock returns of hospitality firms around COVID-19 and suggested that hospitality firms with strong balance sheets and income statements were characterized by low leverage ratios and higher P/E ratios. [Dewally, Shao, and Singer \(2013\)](#) stated that capital-intensive hospitality firms responded to the 2008 liquidity crisis by increasing financial leverage.

In addition, [Al-Wattar, Almagtome, and Al-Shafeay \(2019\)](#) investigated the role of the accounting information system and sustainability reporting and demonstrated that the interaction between the accounting information system and hotel sustainability reporting improves financial performance results. In comparison, [Alvarez, Sensini, Bello, and Vazquez \(2021\)](#) demonstrated that management accounting systems' impacts on business performance were significant and addressed the significant relationships between management accounting and hotel business performance. Furthermore, [Turegun \(2019\)](#) adopted factor analysis on the financial ratios of companies in the hospitality industry and revealed the importance of cash, return on equity, accounts receivable, inventory turnover, liquidity, receivables, and turnover ratios. [Tabash, Al-Homaidi, Ahmad, and Farhan \(2020\)](#) studied the factors that influence the financial performance of Indian listed companies by applying return on assets (ROA), return on equity (ROE), profit after tax (PAT), and earnings per share (EPS). It revealed that the leverage ratio, liquidity ratio, size of the company, and company age have a significant and positive influence on the financial performance of Indian listed companies. From the perspective of capital structure, [Alabdullah \(2018\)](#) demonstrated that managerial ownership has a positive impact on performance, but company size has no impact on firm performance.

In spite of the aforementioned studies on accounting information reflecting firms' financial performance and capital structure, numerous studies have analysed the systematic influences on the performance of the hospitality industry. [Anguera-Torrell, Aznar-Alarcón, and Vives-Perez \(2021\)](#) highlighted the importance for hotel industry stakeholders to assess the economic impact attributable to the COVID-19 pandemic's evolution with the effect of economic policies. More specifically, the study stated that hotel stock prices are positively correlated to economic policies due to the public budget. Nevertheless, liquidity provisions or financial assistance have a less direct impact on the industry. In addition, [Ersan, Akron, and Demir \(2019\)](#) evaluated the impact of economic policy uncertainty (EPU) on the Travel & Leisure Price Index and revealed that both the European and global EPU have significant negative effects on the stock returns of travel and leisure companies. From a different

perspective, Hadi, Irani, and Gökmenoğlu (2022) explored the effects of industrial production, exchange rate, commercial and industrial loans, and international tourist arrivals on the stock prices of U.S. tourism, travel, and leisure firms and stated a long-run equilibrium relationship among the variables.

From the Asian market, Hang, Nhung, Huy, Hung, and Pham (2020) studied the volatility of market risk in the Vietnam hospitality industry in a low inflation environment and demonstrated the highest market risk level of the entertainment industry and airline & tourism industries. In addition, Lee, Lee, and Wu (2021) assessed the dynamic relationship among the COVID-19 outbreak, macroeconomic fluctuations, and hospitality stock returns in China and demonstrated that an unanticipated positive change from the COVID-19 explosion triggers a reduction in the stock market and hospitality industry returns.

Therefore, the market performance of the hotel industry is impacted by the combination of macroeconomic factors or systematic risk and fundamental business activities measured by accounting indications. On the other hand, accounting measurements of hotels' business activities facilitate risk assessment, indicating instability, and also reflect hotels' long-term growth opportunities. The study aims to close the research gap between the two linkages. One is the linkage between accounting measurements of business activities and the market performance of hotel stocks; the other is the linkage between accounting measurements of business activities and hotel industrial growth and stability. The purpose of the first linkage study is to understand whether accounting measurements of hotel business have been significantly implied in the market performance of hotel stocks for efficient capital allocation. The purpose of the second linkage study is to explore whether the hotel's accounting measurements of fundamental business activities possess explanatory power for hotel industrial long-term growth and stability.

### 3. Methodology

#### 3.1. Data

The data consisted of observations from the second quarter of 2010 to the first quarter of 2022, which were quarterly reports of hotels listed in Southeast Asia (ASEAN) markets. There were a total of 48 quarters of financial reports in total from 28 listed hotels out of 85. Among the 25 hotels listed in ASEAN markets, they had complete records for 48 quarters, making them the most updated available. In this study, we were interested in exploring the contribution of major business activities to industrial growth and instabilities, as well as how market measurement reflects these fundamental business activities of the hotel industry.

#### 3.2. Methodology

To study whether hotels' business activities, including operation, investing, and financing activities, contribute to return growth and instability, and to determine which activity category has the strongest influencing power, the study establishes ordinary least square (OLS) linear regression models. Return on equity (ROE) growth and instability in ROE are defined according to Hunter and Coggin (1983). The study adopted ROE as the replacement for profit because the corporate goal is to maximize shareholders' wealth, and profit measurement has limitations in achieving this maximization goal. Therefore, the growth of ROE and instabilities of ROE are measured based on the following Equations 1 and 2.

$$Growth_{ROE_i} = \left(\frac{b}{ROE}\right) \times 100 \tag{1}$$

$$Instabilities_{ROE_i} = (\delta_{ROE_i} \sqrt{1 - R^2}) / ROE \tag{2}$$

Where ROE presents the return on equity of the hotel, b is the raw score regression coefficient from the simple linear ROE trend regression, is the arithmetic mean of ROE, R<sup>2</sup> is the coefficient of determination from the simple linear ROE trend regression, and is the standard deviation of ROE.

Theoretically, a hotel's performance result measured, as measured by ROE, is the outcome of combined business activities, including operating, investing, and financing. As a result, the growth of ROE and the instability of ROE are determined by these aforementioned business activities of the hotel. The study aims at exploring the major determinants of performance and the extent to which these effects are significant. The following equations demonstrate the association between the three dimensions of business activities and the outcomes of growth and instability in the hotel industry.

$$Growth_{ROE_i} = b_0 + b_1PM_i + b_2AT_i + b_3EM_i + \varepsilon_{2i} \tag{3}$$

$$Instabilities_{ROE_i} = a_0 + a_1PM_i + a_2AT_i + a_3EM_i + \varepsilon_{1i} \tag{4}$$

Where PM represents the profit margin measured by dividing total sales by net income, AT is the asset turnover ratio calculated by dividing sales by total assets, EM is the equity multiplier representing the firm's financing activity, and ε is the error term. These three exogenous variables represent the three components of business activity measurements, that are, operating activities, investing activities, and financing activities. The

growth of the hotel industry may depend on operational efficiency, investment effectiveness, or the availability of financing. The same applies to instabilities of ROE, which can be caused by the individual or combined effects of these business activities.

However, accounting measurements, as information channeled into the capital market, only provide a partial valuation of equity. The valuation of equity is not solely driven by market perception and confidence in accounting performance. The study aims to explore the extent to which the accounting measurement of performance is reflected in market performance measurement. Therefore, the following Equations 5 and 6 were constructed based on the Sharp ratio.

$$SI_{r_i} = c_0 + c_1PM_i + c_2AT_i + c_3EM_i + \varepsilon_i \tag{5}$$

$$SI_i = \frac{R_p}{\delta_i} = (R_i - R_f)/\delta_i \tag{6}$$

Where Sharp Ratio (SI) represents the sharp ratio, which is calculated based on formula (6). The Sharp ratio incorporated both systematic and non-systematic risk into performance measurement. The extent to which the Sharp ratio reflects accounting performance measurements depend on market efficiency, the quality of accounting information, and macro systematic dynamics.

The study expects a comparison of the results between Equations 3 and 4 and Equations 5 and 6. If the three categories of hotel business activities explain the growth and stability of the hotel industry to a greater or lesser extent, as indicated by Equations 3 and 4, but Equations 5 and 6 do not materially reflect the association between market measurement and business activities. It implies inefficient capital allocation in the hotel industry or an amplification of the impact of systematic risk over the fundamental performance of the hotel industry. Conversely, if the three categories of hotel business activities are not relevant to the growth and stability of the hotel industry, as indicated by Equations 3 and 4, but Equations 5 and 6 reveal an association between market measurement and business activities. The contradiction between accounting measurements and market measurement implies that capital allocation strategies aim for short-term rather than long-term horizons, which is also detrimental to the long-term development of the hotel industry.

**Table 1. Descriptive statistics.**

<b>N=28; 48 quarters from the second quarter of the 2010 to the first quarter of the 2022</b>		
<b>Measurements</b>	<b>Mean</b>	<b>S.T.D.</b>
Growth index	2	14.3177
Instabilities index	-2.1824	12.8069
Sharpe ratio	0.2761	0.8496
Profit margin	-0.1278	0.1767
Asset turnover	0.0564	0.0403
Equity multiplier	2.3655	1.2365

**Table 2. OLS regression results.**

<b>Measurements</b>	<b>Coefficient</b>	<b>T-statistics</b>	<b>P-value</b>	<b>R square</b>
Profit margin	-0.014	-2.77	0.01	0.52
Asset turnover	0.08	0.16	0.88	
Equity multiplier	0.03	2.36	0.03	
<b>Measurements</b>	<b>Coefficient</b>	<b>T-statistics</b>	<b>P-value</b>	<b>R square</b>
Profit margin	-0.01	-1.91	0.07	0.21
Asset turnover	0.57	-1.04	0.31	
Equity multiplier	0.00	0.07	0.95	
<b>Measurements</b>	<b>Coefficient</b>	<b>T-statistics</b>	<b>P-value</b>	<b>R square</b>
Profit margin	-0.06	-0.09	0.93	0.00
Asset turnover	-2.67	-0.04	0.97	
Equity multiplier	0.39	0.22	0.82	

#### **4. Result and Discussion**

Table 1 presents the descriptive statistics of all variables for 28 hotels with complete data from the second quarter of 2010 to the first quarter of 2022. During the COVID-19 crisis period, both profit margin and instability showed negative signs. The study was not solely conducted to test the normal market environment but rather the one with systematic risk, in order to inclusively test the link between accounting performance, stock market performance, growth, and instability. Although the performance measurement ROE presented instability over time, the growth of the industry is clearly demonstrated. It is worth noting that the profit margin of the hotel industry over the sample period was negatively affected by the extraordinary impact of the COVID-19. In addition, the equity multiplier is relatively high, which implies the hotel industry in the Southeast Asia market has a high level of leverage.

The study employed a two-tailed test and assumed a null hypothesis stating that the expected coefficient equals zero. Three independent multiple regressions were conducted using cross sectional, data, and the results are presented in [Table 2](#). The first OLS model's results, based on [Equation 3](#), are shown in the first part of [Table 2](#). Approximately 52% of the variations in industrial growth were explained by the expected model, while other factors held constant. However, the operational performance of the hotel industry was not well explained by the profit margin, as the coefficient was weak. Nevertheless, the explanatory power of profit margin was statistically significant, as indicated by both t-statistics and p-value. The impact of financing leverage, measured by equity multiplier, on the growth of the hotel industry was relatively significant, underscoring the importance of financial leverage for industrial growth. Although the coefficient for asset turnover is relatively larger than others in the model, it is statistically insignificant at 95% confidence level. The second part of the results in [Table 2](#) explains the second regression from [Equation 4](#), where instability is the dependent variable. The results show that all expected coefficients are statistically insignificant, suggesting an irrelevant relationship between industrial instability and business performance. Finally, the explanation power of accounting measurements on market performance is presented in the third part of [Table 2](#). Similar to the estimation model of [Equation 4](#), accounting measurements were not well reflected in the market performance of the hotel industry in Southeast Asia.

Both the expected models of [Equations 3](#) and [4](#) illustrate a high percentage of variations in the dependent variables explained by the accounting measurements of business activities, including operating activities, investing activities, and financing activities. This implies that a combination of business activities is linked to industrial growth and instability. However, when other factors are held constant, most accounting measurements have limited explanatory power for industrial growth and instability. Only one independent variable, the equity multiplier, showed significant explanatory power over industrial growth. The instability test model of [Equation 4](#) presented 21% explanatory power, indicating that many non-accounting factors have an impact on industrial stability. It is plausible that the stability of the hotel industry was disturbed by various systematical and macroeconomic contexts, making the business activities of the hotel itself insignificant in these models.

The final regression of the Sharp ratio demonstrated statistically insignificant results in terms of both the combination of independent variables and each independent variable. All accounting measurements of business activities were found to be irrelevant to the market measurement of the Sharp ratio. It could be attributed to the high volatility dilution of the risk-reward measurement of hotel stocks. It is also possible that market returns did not fully reflect the fundamental performance of the hotel business, aligning with the weak market efficiency hypothesis. When the market measurement of return does not reflect the accounting measurements of business performance, the market equity value may deviate from the intrinsic value of the hotel business, resulting in suboptimal capital allocation in the hotel industry.

Therefore, on the one hand, from a long-run perspective, it is essential to observe a significant correlation between the accounting performances of the hospitality industry and its growth and stability. This correlation ensures that such performance is sustainable and efficient in evaluating the intrinsic value of hospitality firms. In addition, from a short-term perspective, accounting performances must be associated with risk-adjusted market performance measurement. This association serves the purpose of not only mitigating short-term market risk but also supporting long-term equity market financing.

## **5. Conclusion**

The study collected data from 28 of the largest hotels listed in Southeast Asian stock markets and conducted cross-sectional data regression analysis. Three independent models were established to test the relationship between accounting measurements of the fundamental performance of the hotel industry and growth, instability, and market measurement. The results show that financial leverage plays a key role in explaining the industrial growth of hotel businesses. However, the fundamental performance of hotel companies weakly explains the industrial. Similarly, market measurements of hotel stock are not relevant to the business activities of the industry.

This suggests that the industrial growth of the hotel business in Southeast Asia relies more on leverage support than on the efficient operating activities of the hotels themselves. However, Leverage support is beneficial mainly for the initial stages of industrial development and is not sustainable in the long term. To achieve long-term sustainable growth, the key determinant should be improvements in operational efficiency triggered by creative business innovation and strategies. In addition, the study reveals a weak linkage between market performance and fundamental accounting performance. Achieving optimal capital allocation to the hotels that can maximize shareholder wealth becomes difficult if the market does not or weakly reflect the fundamental performance of the hotel business.

Instability is another issue for the hotel industry, representing the combined impact of micro and macro factors on the industry. This highlights the high sensitivity of the hotel industry to various factors in the system, necessitating the implementation of wise risk management strategies in operating, investing, and financing decisions. The key recommendations for hotel business operators are to focus on industry growth by improving

fundamental operational effectiveness and efficiency instead of relying on heavy leverage. Additionally, strategic risk management policies should be implemented to stabilize the industry.

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