

# **Do Investment and Financing Decisions Impact the Performance and Value of Indonesian Shipping Companies?**

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## **Abstract**

This paper analyses the impact of investment and financing decisions on the performance and value of Indonesian shipping companies. We use Economic Value Added (EVA) as the proxy to measure the company's performance and Tobin's Q (TOBIN-Q) to measure the company's value. This paper uses annual audited financial reports of all Indonesian shipping companies listed on the Indonesian Stock Exchange from the year 2016 to 2020. The data are analysed using panel data regression and the main findings are further confirmed through online interviews with three decision-makers from three listed Indonesian shipping companies. The statistical description shows that Indonesian shipping companies rely on bank loans as their primary financing source. We find that investment decisions, as measured with Fixed Asset Growth (FAG), have a significantly positive relationship with the company's performance and value. We also find a significantly negative relationship between the company's Weighted Average Cost of Capital (WACC) and its performance and value.

**Keywords:** Shipping Companies, Investment Decision, Financing Decision, Performance, Value

## **1. Introduction**

Since 1978, the shipping industry has been one of the most advantageous industries due to the increase in international trade traffic (Huang et al., 2020). For the last 50 years, the record shows that 80-90% of international trade volume is transported by sea. The domination of sea transportation stands out even more in developing countries where interregional trade volume is relatively low, leaving limited space for land and air transportation (UNCTAD, 2018). In the year 2020, 98.92% of the export volume and 99.27% of the import volume of Indonesia were transported by sea (BPS, 2021). Furthermore, since the year 2008, the Indonesian government has imposed a cabotage law that required domestic sea transportation services to be undertaken by national carriers, ship operators, and crews. With such visible needs for international trade and foreign entry barriers into the local market, Indonesian shipping companies have had plenty of growth opportunities, both domestically and internationally. However, in the period 2018-2020, approximately 70% of Indonesian shipping companies that were listed on the Indonesian Stock Exchange (IDX) recorded Price to Book Value below 1, signalling poor value and performance in which the market values of the companies were actually below their respective book values.

The shipping industry has been known as one of the most capital-intensive industries that operate assets with high commercial value. Additionally, it has been one industry that has required sufficient funding to finance its investments. Thus, financial decisions made by a shipping company are crucial for its cash flow generation and value creation (Alexandridis et al., 2018). Financial decisions are usually comprised of three major parts; capital budgeting, capital structure, and working capital management (Ross et al., 2019). Capital budgeting decisions, referred to as investment decisions, are usually reflected in additional fixed assets or the Fixed Asset Growth (FAG) of the company. On the other hand, capital structure decisions, referred to as financing decisions, are measured by many proxies including the company's capital cost, also referred to as Weighted Average Cost of Capital (WACC).

Previous studies have considered the importance of investment decisions in the shipping industry (see Cullinane & Panayides, 2000; Haider & Yip, 2011; Rau & Spinler, 2016; Kang et al., 2016; Yeo, 2018). Theoretically, the company's investments positively relate to its performance and value. However, Kang et al. (2016) do not find sufficient evidence that the company's investment decisions relating to its performance and value. As a result, this paper aims to fill this gap on whether financial decisions made by the management of shipping companies in Indonesia impact the companies' performance and value significantly. Economic Value Added (EVA) and Tobin's Q Ratio (TOBIN-Q) are two value-based performance measures commonly used to calculate the performance and value of a company. Furthermore, these two methods are perceived to be able to measure the performance and value of shipping companies, both from the shareholders and management's perspectives (Kang et al., 2016). Thus, this study aims to analyse the impact of FAG (as an investment decision proxy) and WACC (as a financing decision proxy) on the Indonesian shipping companies' EVA (as a company's performance proxy) and TOBIN-Q (as a company's value proxy). This paper's main contribution is to provide insights to the Indonesian shipping stakeholders regarding shipping investment and financing decisions and their impacts on performance and value to encourage industry growth in the long run.

## 2. Literature Review

### 2.1 Investment and Financing Decisions

Asset growth is one corporate financial measure to achieve the objectives of the company (Kang et al., 2016). One of the objectives of the company is to maximize value for its shareholders. Thus, the investment decisions of a shipping company will be reflected in its additional fixed assets or Fixed Asset Growth (FAG).

$$\text{FAG} = (\text{FA}_1 - \text{FA}_0) / \text{FA}_0 \times 100\% \quad (1)$$

Where:

- FAG = Fixed Asset Growth
- FA<sub>1</sub> = The book value of fixed assets in the current year
- FA<sub>0</sub> = The book value of fixed assets in the previous year

Dominant factors that influence most shipping companies' investment decisions are freight rate, fleet supply, and charter demand (Haider & Yip, 2011). The number of competitors and rivalry intensity also influence investment decisions (Rau & Spinler, 2016). There are many external and internal factors, financial and non-financial, that affect the investment decisions of shipping companies. Most larger corporates consider customer relations, market positioning, long-term renewal of the fleet, the risk attached to the project, strategic fit into the long-term strategy of the company, and competitors' strategy, while family-owned businesses normally consider availability and cost of finance, tax allowances, vessel specification, and employment prospects (Cullinane & Panayides, 2000). Indonesia is still predominated by family-owned businesses (Haron, 2018), including the shipping industry, which means availability and cost of finance are factors that will be considered by a shipping company before making investment decisions.

Moreover, to avoid their ownership being diluted, Indonesian family-owned businesses prefer to use debt financing compares to equity financing (Haron, 2018). The research supports the pecking order theory that claims most companies use internal cash flow to finance their investments through retained earnings. When the internal cash flow is insufficient, companies usually prefer to use debt financing rather than equity financing such that equity financing from private equities normally is the last resort in the absence of other financing options (Drobetz et al., 2013). Previous research finds that bank financing is the primary source of third-party financing sought by shipping companies (Laura & Gaudio, 2018). It is also found that the shipping industry had higher financial leverage compared to other manufacturing industries (Drobetz et al., 2013). However, after the 2008 financial crisis, banks have become more prudent in loan assessment to shipping companies. There are three main criteria assessed with their respective sub-criteria and weights, corporate recourse 47.1% consists of financial strength 27.1%, track record in shipping 11.1% and bank-firm relationship 8.9%, a asset cash flow 39.3% consists of charterer's credit 24.9%, debt service coverage ratio 8.5% and market outlook 5.9%, and asset value 13.6% consists of loan to value 7.4%, vessel class 4.2% and construction shipyard 2.0% (Lee et al., 2018).

A combination of debt, predominantly from banks, and equity, predominantly from shareholders and retained earnings, are the most common capital structures found in Indonesian shipping companies. The company, however, has to pay for every financing decision made. It has to pay the cost of debt for debt financing, and/or the cost of equity for equity financing. Together, the weighted average forms the cost of capital, which is also known as WACC (Ross et al., 2019). Thus, the financing decisions of a shipping company are reflected in its WACC.

$$WACC = [(S/(S+B)) \times R_s] + [(B/(S+B)) \times R_b \times (1-T_c)] \quad (2)$$

Where:

- WACC = Weighted Average Cost of Capital
- S = Equity value
- B = Debt value
- R<sub>s</sub> = Cost of equity
- R<sub>b</sub> = Cost of debt
- T<sub>c</sub> = Corporate tax rate

## 2.2 Value-Based Performance Measures

Economic Value Added (EVA) is one of the value-based performance measures often used to calculate a company's performance. It is in the form of residual earnings after subtracting a company's cost of capital by its net operating profit after tax. If EVA is positive, there will be an incentive enjoyed by the company's shareholders. However, if EVA is negative, the shareholders' wealth will be decreased (Singla & Prakash, 2021).

$$EVA = NOPAT - (CE \times WACC) \quad (3)$$

Where:

- EVA = Economic Value Added
- NOPAT = Net Operating Profit After Tax
- CE = Capital Employed
- WACC = Weighted Average Cost of Capital

Another measure is Tobin's Q (TOBIN-Q). TOBIN-Q is often used to calculate a company's value. It is the most used value-based performance measure in literature. TOBIN-Q calculates a company's total market value of debt and equity compared to its replacement cost. If TOBIN-Q > 1, the company will have an incentive to invest more due to the efficient utilization of assets. On the other hand, if TOBIN-Q < 1, the company will rather utilize its existing assets more efficiently than invest (Singla & Prakash, 2021).

$$Q = (MVE + PS + D) / TA \quad (4)$$

Where:

- Q = Tobin's Q Ratio
- MVE = Market Value of Equity
- PS = Book Value of Preferred Stock
- D = Book Value of Debt
- TA = Book Value of Total Assets

Alexandridis et al. (2018) argue that financial decisions are crucial for shipping companies' performance and value creation. However, Kang et al. (2016) do not find enough evidence that the shipping investment decisions relating to its performance and value. Here we propose that there is a positive relationship between additional invested fixed assets with the performance and value of the company, and a negative relationship between financing costs with the performance and value of the company. The more fixed assets the company invests in, the higher the performance and value of the company. The more financing costs the company has to pay, the lower the performance and value of the company. Based on those assumptions, the hypotheses of this research are as follows.

- H1: FAG has a significantly positive relationship with EVA
- H2: WACC has a significantly negative relationship with EVA
- H3: FAG has a significantly positive relationship with TOBIN-Q
- H4: WACC has a significantly negative relationship with TOBIN-Q

## 3. Methodology

First, the quantitative research method was adopted to run statistical analysis on the data gathered. The statistical analysis employed panel data regression using Stata to test the hypotheses of this research. Following this, a qualitative approach

was used to confirm the findings found during the statistical analysis. Online interviews with three decision-makers from three Indonesian shipping companies were undertaken for this purpose. Finally, the interpretations and conclusions were drawn. This study aimed to make initial conclusions based on the statistical data and confirm them further along with explanations from the experts in the industry.

The two models of this study were as follows.

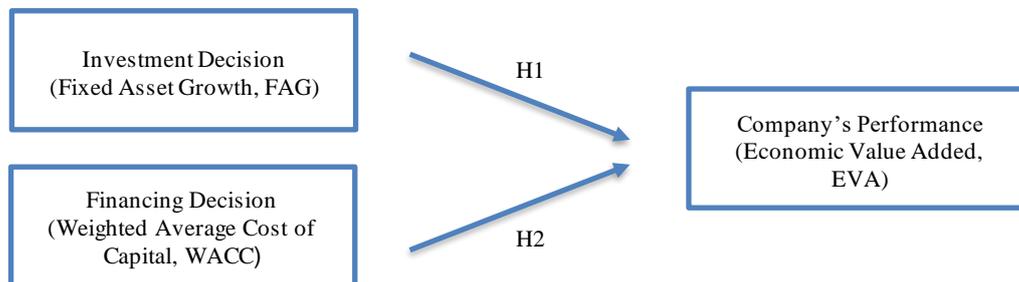


Fig. 1 Research Model One

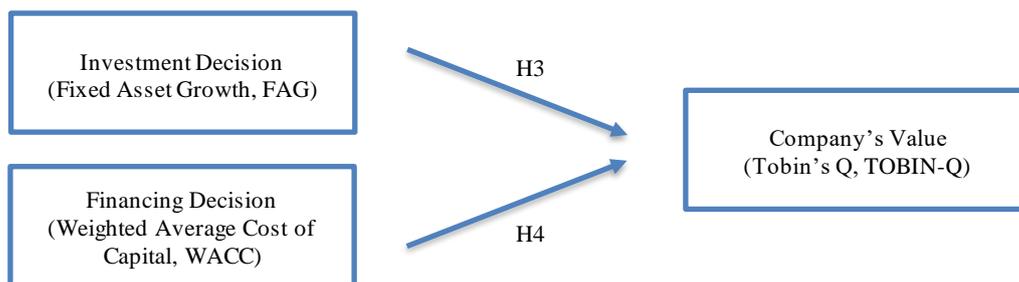


Fig. 2 Research Model Two

Investment and financing decisions were the independent variables (IVs) in this research, represented by FAG and WACC respectively. The company's performance and value were the dependent variables (DVs), represented by EVA in Model One and TOBIN-Q in Model Two. Model One was used to test hypotheses H1 and H2, while Model Two was used to test hypotheses H3 and H4. Linear regression equations that were used in this research were as follows.

$$\text{Model One: } \text{EVA} = \alpha + \beta_1 \text{ FAG} + \beta_2 \text{ WACC} + \mu e \quad (5)$$

$$\text{Model Two: } \text{TOBIN-Q} = \alpha + \beta_1 \text{ FAG} + \beta_2 \text{ WACC} + \mu e \quad (6)$$

Where:

- $\alpha$  = The constant
- $\beta$  = The coefficient
- $\mu e$  = Random error term

The main statistical data used in this research were obtained from annual audited financial reports of all Indonesian shipping companies listed on the Indonesian Stock Exchange (IDX) from years 2016 to 2020. There were a total of 20 companies used. Furthermore, this paper also used secondary data from other eligible and reputable sources, such as the Wall Street Journal for 10-Y Indonesian Government Bond as a risk-free rate, Pemeringkat Efek Indonesia (Pefindo) for the beta of the stocks, and Prof. Aswath Damodaran for a market risk premium. For the beta of stocks that were not rated by Pefindo, this paper assumed that the risk of the stocks was equal to that of the market, and the beta was equal to one. Those secondary data were then used to calculate the cost of equity (Rs) using the Capital Asset Pricing Model (CAPM) approach for the computation of WACC, one of the IVs in the two models.

An adjustment was made to the formula of TOBIN-Q in which the denominator was changed from Book Value of Total Assets (TA) to Book Value of Fixed Assets (FA). Demsetz & Villalonga (2001) argues the weakness of the TOBIN-Q formula is that the numerator in the formula considers companies' intangible assets, which should not be the case as the difference is the value creation recorded from the efficient utilization of fixed assets. Thus, the denominator was adjusted to the book value of fixed assets only to overcome this problem. After the adjustment, the data were then processed with

statistical calculation to compute the values of each variable (IVs – FAG and WACC, DVs – EVA and TOBIN-Q) employed in this research using Microsoft Excel.

After the initial data processing, the IVs and DVs were ready to be analysed quantitatively with panel data regression. Panel data regression was adopted because the data analysed were a combination of both cross-sectional and time-series data, thus, panel data regression was the best fit for such data. Before running the regression test, the model selection test and classic assumption test were completed in advance.

The empirical findings from the statistical analysis were further confirmed through online interviews with three decision-makers from three Indonesian shipping companies. Other extra qualitative findings were also confirmed during the interview sessions. The interviews took approximately 117 minutes in total. The interview sessions were recorded and translated into a transcript. The transcript was compiled, disassembled, and reassembled to structure the interview results. Afterward, interpretations and conclusions from both research (quantitative and qualitative) were drawn.

#### 4. Result

The Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test were conducted to estimate the best model for Model One and Model Two of this research. The results of the tests were below.

- For Model One in which EVA was the dependent variable, the fixed effect was the best model
- For Model Two in which TOBIN-Q was the dependent variable, the random effect was the best model

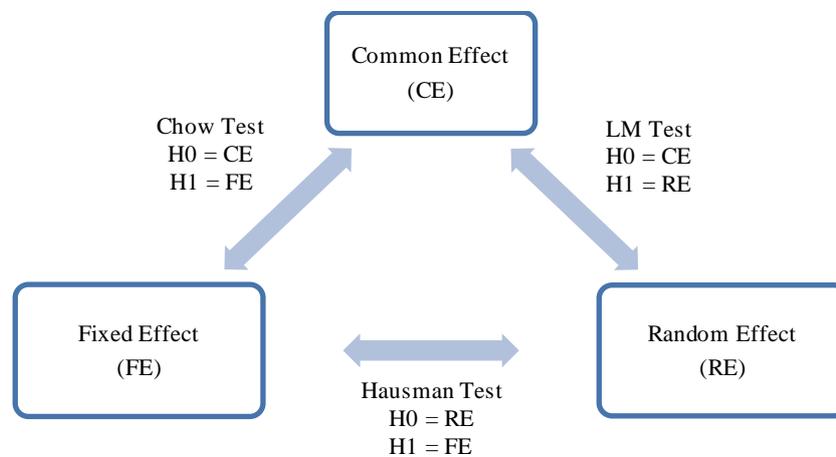


Fig. 3 Estimation Model Selection

After selecting the model for regression, the classic assumption tests were done. There was no multicollinearity issue found in both models (0.0764, probability < 0.9). However, the heteroscedasticity issue was found in both models (0.0000, probability < 0.05). Autocorrelation was found in Model Two (0.0000, probability < 0.05), but not in Model One (0.0913, probability > 0.05).

Ordinary Least Square (OLS) with Panel-Corrected Standard Error (PCSE) treatment was done to Model One to treat the heteroscedasticity issue. Generalized Least Squares (GLS) was done to Model Two to treat both heteroscedasticity and autocorrelation issues. After these treatments, the two models passed all the classic assumption tests (no multicollinearity, no heteroscedasticity, and no autocorrelation).

The following table described the results of the panel data regression.

Table 1: Regression Summary

	Model One (EVA as DV)		Model Two (TOBIN-Q as DV)	
R Squared	0.3468		0.3650	
Adjusted R Squared	0.3232		0.3420	
F-Statistic	40.5500		29.7300	
Probability (F-statistic)	0.0000		0.0000	
	Coefficient ( $\beta$ )	p-value	Coefficient ( $\beta$ )	p-value
Constant ( $\alpha$ )	251359.8	0.000	1.525119	0.000
FAG	152876.6	0.001	0.523527	0.001
WACC	-3968398.0	0.000	-6.838182	0.000

Panel data regression results showed that each IV (FAG and WACC) impacted the DV in both models (EVA and TOBIN-Q) significantly. All hypotheses in this research were accepted. Values of the p-value for both models were within the range allowed for H1, H2, H3, and H4 to be accepted, p-value < 0.05. At first, the p-value of WACC in Model Two was 0.350 (not significant). However, after outliers were treated, the panel data regression result showed a p-value of 0.000 (significant). Hence, each IV impacted the DV significantly in both models. Values of probability (F-statistic) were 0.0000 for both models. Therefore, all the IVs simultaneously impacted the DV significantly in both models.

There was a significantly positive relationship between FAG with EVA in Model One and TOBIN-Q in Model Two, shown by its respective positive coefficients ( $\beta$ ) of 152876.6 and 0.523527. On the other hand, the results confirmed a significantly negative relationship between WACC and EVA in Model One, also TOBIN-Q in Model Two, shown by its respective negative coefficients ( $\beta$ ) of -3968398.0 and -6.838182.

The quantitative results were further confirmed through online interviews with three decision-makers from three public listed Indonesian shipping companies. The interview confirmation results were convergence. All interviewees confirmed that investment and financing decisions impacted the performance and value of the company significantly. This result supports Alexandridis et al. (2018).

As extra findings, the analysis also found that the primary third-party debt financing used by Indonesian shipping companies was long-term bank loans. The majority of the long-term bank loans were 5 years in tenure and were in United States Dollar (USD) currency. It was found that the average long-term financial leverage was low. Fixed assets were 41.49% financed by a long-term loan and 58.51% financed by equity. Finally, within the five years, companies did not invest much but rather divested their existing vessels.

## 5. Discussion

Though the Indonesian shipping company's performance and value were impacted by its investment and financing decisions significantly, other factors also influenced it. Those factors included other financial factors such as cost structure and cash flow, as well as non-financial factors such as marketing, operation, and human resource. Though this research did not test the significance of those other factors empirically, it was found that both FAG and WACC only described 34.68% of EVA in Model One and 36.50% of TOBIN-Q in Model Two, showed in the respective R Squared values in Table 1. It was confirmed that the dependent variables in this research, EVA and TOBIN-Q were also described by factors other than FAG and WACC.

Apart from the discussion about the main research, there were also discussions on the extra qualitative findings found during the quantitative research. The extra findings were explored and confirmed during online interviews as well. Though there are not enough empirical data to support the confirmations in the Indonesian context, the discussions could provide a valuable contribution to future empirical research. The discussions are as paragraphs below.

Indonesian shipping companies were found to use long-term bank loans primarily due to the loan nature that would amortize along with the asset value and match the asset cash flow. Bonds were found to be more suitable for one-shot huge investments with low to no asset cash flow at the beginning that would need bullet payment for the principal at its maturity. Moreover, the cost efficiency for issuing bonds was found to be insignificant compared to the interest paid if the companies were to apply for a bank loan. Banks would also require less sophistication due to good long-term bank-firm relationships.

However, many shipping companies were found to still have hard financial access to the bank. This confirmation supports Lee et al. (2018).

Banks were found to limit the investment capability of Indonesian shipping companies. The maximum tenure of 5 years for a long-term bank loan was found to be the industry norm. Companies invested mostly in second-hand vessels due to (1) low investment cost to have a shorter payback period and (2) immediate asset cash flow since the vessels could be operated immediately. If the payback period were longer, the company would refinance the loan before its maturity or use other asset cash flow to repay the loan. Banks also required the companies to comply with financial covenants stated in the loan agreement, one of them was the Debt-to-Equity Ratio (DER). This compliance, along with management conservatism, has led most Indonesian shipping companies to have low financial leverage. This confirmation does not support Drobotz et al. (2013) that find the shipping industry to have higher financial leverage compared to other manufacturing industries.

Since most Indonesian shipping companies operated domestically, the revenue was in the Indonesian Rupiah (IDR). With most long-term bank loans in the United States Dollar (USD), it exposed them to foreign exchange risk. However, companies mitigated it by quoting their sales contracts in USD, so the IDR received would be the equivalent of USD upon payment. This method would hedge the company's position naturally. Besides, USD also matched the currency of investment, disposal, and a part of the company's cost structure i.e. fuel and insurance.

The decision whether to invest or divest depended on the asset life cycle and the demand-supply curve. Companies would divest for renewal of the fleet when the existing fleet was aged, inefficient, and no longer suitable for the market. This type of divestment typically would be followed by investment, though the time frame was not necessarily happened at the same time due to the availability and price of the vessels in the market, also the availability of financing. Companies would also divest along with the fall of charter demand and the excess fleet in the market. These confirmations support Cullinane & Panayides (2000) and Haider & Yip (2011). Not many investments made during the period analysed was because of management conservatism and the incapability to predict the boom period that would happen in the future.

## **6. Conclusion**

There are three main conclusions to be drawn from this research. First, investment decisions (FAG) and financing decisions (WACC), both independently and simultaneously, impact the performance (EVA) and value (TOBIN-Q) of Indonesian shipping companies significantly. Second, FAG has a significantly positive relationship with both EVA and TOBIN-Q. Third, WACC has a significantly negative relationship with both EVA and TOBIN-Q.

As an additional contribution, this paper strongly indicates that Indonesian shipping companies align their investment decisions with their financing sources. This paper also finds that long-term bank loan is the primary third-party debt financing used by Indonesian shipping companies. However, the terms and conditions set by the banks might have restricted the companies' ability to invest. Furthermore, a company's decision, whether to invest or divest, is influenced by the asset life cycle and the supply-demand curve. Further empirical research is needed to test these qualitative findings.

This paper recommends that Indonesian shipping companies make their investment and financing decisions carefully, since the decisions may improve or destroy the performance and value of the companies. Furthermore, the Indonesian government, banks, and the industry regulatory board should consider formulating regulations and financing structure that matches the needs of the shipping companies. The main contribution of this paper is limited to the factors analysed empirically in the research. For future research, this paper suggests exploring the extra findings found during the research which are also valuable additional contributions to this paper.

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