

Mergers And Acquisitions In The Shipping Industry

Andreas G. Merikas, University of Piraeus, Greece

Dionysios Polemis, University of Piraeus, Greece

Anna Triantafyllou, Deree College, Greece

ABSTRACT

The purpose of our research is to analyze Acquired and Acquiring companies in the Maritime Transport sector in order to determine whether the two groups can be distinguished from each other based on their different financial characteristics. Although this area of research is considered as very fruitful by many academics, it was given less attention due to the rare sequence of such events and the difficulty to gain access to valuable data. The authors are not aware of any other papers that have examined the maritime transport sector in such a way in the past.

However, since many shipping companies have taken the opportunity to access stock markets around the world, in order to gain equity finance to upgrade or expand their merchant fleets, their financial statements became public. Moreover, the fact that over the last decades Mergers and Acquisitions are considered by many managers as very efficient method of company expansion, the view of the past that considered Mergers & Acquisitions in the maritime sector as a difficult area of research is starting to change.

The study will be based upon a sample of 60 companies, consisting of 37 targets (either through merger or acquisition), occurring during the calendar years from 1994 to 2009 and 23 acquirers (some of them multiple acquirers). In the analysis, ratios measuring different aspects of business activity will be investigated; such as profitability, liquidity, efficiency and leverage, with the utilization of multiple Logit Regression Analysis.

Keywords: logit regression; prediction; mergers and acquisitions; shipping

1. INTRODUCTION

*M*ergers and acquisitions continue to be a highly popular form of corporate development, Cartwright & Schoenberg (2006), as an alternative to internally generated corporate growth, Pamela (2006). The latter complex phenomenon attracted the attention of academic researchers from a broad range of management disciplines, such as, financial, operational, strategic and behavioral.

The maritime transport industry, as a result of increased demand for shipping services begun the new century with a large order book for new build vessels (Samitas & Kenourgios, 2007). The high freight rates, offered the shipowners large amounts of wealth and as the competition became steeper, some of them expanded their businesses utilizing M&As. Since this industry is highly capital intensive, shipping companies' intent to rationalize activities, create significant economies of scale, reduce costs and thus minimize financial risks. All of which, in order maritime corporations to meet customer demands, cope with worldwide demand for products and establish themselves as major market players, Meersman et al (1999).

The purpose of this study is to identify financial ratios that can be used to evaluate and predict mergers and acquisitions in publicly traded shipping firms quoted on capital markets based on historical accounting information. Using a database of all M&As involving marine transport corporations, on a global scale from January 1, 1994 to December 31, 2009. As far as the authors are aware, such prediction model has never been estimated for the

maritime industry. The paper contends that by developing predictive models, financial decision makers may have a larger spectrum of information to assist them in formulating their decisions.

The paper is organized as follows. In section 2, the related empirical literature is discussed. Section 3 describes the data and discusses the methodology. Sections 4 develop the main research hypotheses and present the empirical results. Finally, our conclusions and recommendations for future research appear in section 5.

2. LITERATURE ON M&AS

While a lot has been written about mergers and acquisitions in other industries, there is very little written about M&As in the maritime sector of transport. Therefore the literature review is split into two sections. In the first section we will examine the empirical work and the differences between the acquirers and targets in other industries and in the second section we will examine the phenomenon of mergers and acquisitions specifically in shipping.

2.1. International Literature On M&As

Mayers and Majluf (1984) study observed that projects with positive NPV values might not be easily undertaken by firms with insufficient financial slack¹. This problem could be easily overcome when a firm's surplus financial slack would be able to cover the other's financial slack deficiency, which is the case of merger. The target firm should partially or completely disclose its internal information to the acquiring firm during negotiations, or the acquirer instead of the target must take action. According to this study, firms having a surplus of financial slack ideally want candidates with limited financial slack, good investment opportunities and limited information by the investors. This is to achieve an offer by the acquirer which will be less than the potential value of the firm and higher than the value placed on the target firm by its own shareholders. This way, both parties can win despite the fact that neither of the two are aware of the actual value of the target firm. The latter is the explication of why most mergers are initiated by the acquirer, since a firm that actively seeks to be bought may be the cause of losing its value in the eyes of the outsiders.

Owen (1997) introduced the variable of the age of the firms that took part in this process, despite the fact that it had already been introduced by other means such as: the growth rate, investment opportunities and size over time by Evans (1987) and Kumar (1984). Age was the first variable that was proved to be significant in Owen's results as the acquiring firms were found to be significantly older than the takeover targets as well as non-involved firms. The age phenomenon is explained in the study of Mueller (1972) and Evans (1987). They state that mature companies are firms with low rates of growth, where conventional investments do not provide the necessary growth and lead to takeovers. According to Owen, the stock ratio was statistically significant as well, and it was negatively associated with the probability of an entity ending up as a target. Furthermore, Owen discovered that the ratio returns to shareholders equity was statistically significant but only for the target group, which identifies the fact that target firms experience lower profits than other firms. Moreover, she suggested that entities that pay high dividends do not become involved in takeovers, as her study found the dividend per share variable to be negative and highly significant for bidders as well as targets. Owen found the current ratio to be significant and negative and concluded that those firms with a lower current ratio are more unlikely to engage in takeover activity. Thus, targets are seen as sound investments that give the opportunity for bidders to maintain their development and growth; reinforcing the findings of Penrose (1995) who stated that it is hard to maintain growth as firms become larger and older over time.

The hypothesis of targets being underperformers was investigated by Agrawal and Jaffe (2003) and Camerlynck and Ooghe (2002). The first investigated the stock and operating returns before the acquisition of more than 2,000 targets during the period of 1926 to 1996 in the United States. The findings of Agrawal and Jaffe while measuring the stock or operating returns showed that the initial hypothesis had to be rejected as the acquired firms were not underperformers. Nevertheless, there was some sparse evidence of underperformance in certain sub-samples when the probability of the disciplinary motive for the acquired firm's management was considered high,

¹ The Financial Slack is the ability of a firm to have spare debt, cash or quick assets available that are needed for taking advantage of possible rising opportunities.

however, the authors concluded that there was not enough evidence supporting that the firms were actually underperformers.

Camerlynck and Ooghe focused in testing the hypothesis that acquiring firms are superior to target firms who are underperformers in terms of profit, solvency, liquidity, performance, failure risk and added value (measured as gross added value per employee and personnel expenses per employee). The study first compared the two groups' performance to the industry's average and secondly attempted to find matches between the acquirers and acquired groups' financial profiles. The findings showed that most of the takeover activity did not involve under-performance issues or financial problems. Instead, the acquired corporations were more profitable than their industry medians. Acquirers were found to be more profitable with lower failure risk in comparison to their industry average levels and acquired firms had lower long-term failure risk. Furthermore, while comparing the two groups, the acquirers were identified to implement high risk strategies² both in the short and long run when compared with the acquired firms. In terms of liquidity and solvency, the results showed that the acquiring firms had poor liquidity and solvency positions in contrast to the target firms, which were found to be highly liquid and less levered. Thus, the final results of this study point out the fact that larger targets - in terms of asset size - had higher short and long term failure risk compared to smaller targets. The acquirers are ideally interested in acquisition candidates, which complement them in terms of sales and growth; suggesting that companies with high growth and valuable investment opportunities that are lacking financial slack have the tendency to acquire low growth and financially slack-rich firms.

Black, Carnes, Jandik and Henderson (2007) investigated the long-term success of acquisitions, considering the post-merger abnormal returns to the acquirers. They attempted to identify whether international accounting diversity is associated with the level of long-term abnormal returns gained by successful acquirers. Their findings showed an inverse relationship between the value relevance of accounting information as well as abnormal returns, since acquired firms based in countries where the accounting information is less value relevant, experience higher cost of capital. This phenomenon is explained because it is more complicated for them to predict future earnings and cash-flows affecting in that way the premium paid by the acquirer over their economic value. The latter led Black et al to conclude that the accounting legislation and the procedures in the country where the target is based is a potentially significant characteristic that needs to be further investigated and incorporated in prediction models developed for international markets.

Camerlynck, Ooghe and De Langhe (2005) utilized accounting based data to investigate the pre-acquisition profile of the two targets, having as an aim to identify any discriminant pre-acquisition characteristics in their financial profiles. In the study, the groups were divided into two sub-groups, large and small firms in terms of their total assets, size and growth. The findings showed that the acquirers had significantly higher median growth and that they were larger in total assets and sales and number of employees. Finally, in contrast to Ravenscraft and Scherer (1987) who found that smaller acquired firms have faster growth rates in comparison to larger ones, Camerlynck et al showed that larger acquired firms had higher growth rates prior to the takeover than the smaller firms. The result however, may have risen due to the definition of a small firm used in the research. Camerlynck et al concluded that the acquirers appear to implement a takeover in order to solve their own resource imbalance. Their findings support Smith and Kim (1994) conclusions that stated that financially slack-poor, high growth firms with good investment opportunities tend to acquire slack-rich low growth firms.

2.2 Shipping Literature On M&As

Panayides and Gong (2002) provided a concise review of the phenomenon. They noted that consolidation had been taking place in all sectors of shipping, citing not only the well known mergers of liner companies, summarized by Brooks (2000b) and reported in Appendix 1, but also examples in the tanker sector (acquirers Frontline and Teekay Shipping), dry bulk (the merger of Coeclerici Shipping and Ceres Hellenic Shipping enterprises), the reefer trades (acquirer Star Reefers Inc. and its subsequent joint venture with NYK to form NYK Star Reefers), and third-party ship management (acquirer V. Ships). They agreed with Midoro and Pitto's (2003) conclusion that alliances have not been workable because of problems with allocation of responsibilities and instability, suggesting that M&As have been the preferred growth path of recent years.

² The failure scores were calculated with the logistic regression failure prediction model of Oogle, Joos and De Vos (1991).

Brooks (2000b) concluded, following detailed case studies of several M&As and alliances in shipping, air, and rail industries, that M&As offer strategic advantages quite different from alliances, and that both can create value for the players who choose these paths to growth over a "go-it-alone" organic growth strategy. It is not that one is better than the other; each offers unique benefits to managers seeking to create and sustain a competitive advantage for their company. However, Midoro and Pitto (2000, 39) concluded that "the current structure of strategic alliances in liner shipping is inherently inadequate to deliver the expected results which, in turn, greatly undermines their stability." They attributed this to increased complexity and intra-alliance competition, and expected, therefore, that mergers would be the growth path of choice for liner companies until more efficient and stable alliances could be built.

Heaver et al. (2000) explored the full range of relationships among shipping companies, ports, stevedoring companies, and inland transport companies. They positioned M&As against alliances and other cooperative agreements as the tools by which the players maximize profits, gain market share, or gain control over a broader scope of activities in the logistics chain. They provided examples of majority and minority investments in port and terminal operations by carriers, and concluded that the balance of power between the players has shifted in favor of carriers, questioning the future role of ports in the industry. Related and unrelated diversification moves are also possible as growth paths for any industry. However, in intermodal transport, over the past fifteen years, the nature of the buyer-seller relationship in container shipping services has become less transactional and more like a partnership (Brooks 1995, 2000a; Crum and Allen 1991; Gibson et al. 1993; Kleinsorge et al. 1991; and Phillips 1991) as supply chain management concerns have come to the fore for cargo owners. Since reliability is critical to the sale of container services, the building of trust between parties is essential to the success of a JIT strategy. Strategic alliances between some carriers and manufacturers along the supply chain have resulted (Brooks 1998; Brooks 2000a). Therefore, it is quite possible that some carriers will seek to secure competitive advantage by acquiring logistics services to add value to their offerings to customers, or that minority shareholdings between carriers and shippers, or between logistics service firms and carriers, may result. Participation in a slot charter and coordinated sailing arrangements can also reduce costs. Hence, like the airline industry and others where service production coordination can enhance the business capacity of both parties, one might expect to see substantial evidence of minority ownership to secure the alliance (see Brooks 2000b for further detail).

3. DATA AND METHODOLOGY

3.1. The Sample

For the purpose of this study, all mergers and acquisitions that occurred from 1995 to 2009 in the maritime transport industry worldwide were investigated. The initial sample contained 78 acquired firms along with their acquirers (some of which were multiple). However, the availability of data restricted the sample size to only those firms for which valuable accounting information was available. Due to this problem, the sample utilized in the analysis contains 37 target firms and 23 acquirers (some of them multiple acquirers). The published financial statements were collected from the Bloomberg database. The utilization of additional database, such as, DataStream was not undertaken due to the fact that similar accounting data are computed in different ways, causing misleading results. The latter information obtained included all financial statements, such as, Balance Sheet, Income Statement, Cash-flow Statement and key financial ratios (provided by the Bloomberg database). For each firm used in the sample, three year data were employed in the estimation of the model. The logic behind this was that an acquirer investigates its potential target, it negotiates with him and the whole process of the acquisition from building up the necessary funds till the completion of it takes more than a year. On the other hand the characteristics of a 'target' firm do not become evident suddenly, but they exist for a period.

3.2. The Financial Ratios

The financial ratios chosen for the analysis as good indicators able to discriminate takeover targets were selected after a careful review of the empirical literature and they can be categorized in the following categories:

- Profitability ratios: Firms with greater profitability ratios may end up as targets of acquisitions, since the potential acquirer will expect with the additional funds that he will provide to the target to increase the rate

of return. In the opposite scenario a low profitable firm may become a target of takeover, because in the eyes of the acquirer it has potential for improvement and by making some modifications he can transform it to a very profitable one.

- Efficiency ratios: These types of ratios are considered important because they provide a measure on how well a firm utilizes its resources in order to generate output. Hence when there are firms belonging in the same industry with similar asset size, the firm with greater efficiency will make the firm potential target for two reasons. The first because the potential acquirer believes that the potential target has high demand on the products/ services it provides, and second that by contributing additional funds the potential target will generate more net cash inflows. On the other hand, if the potential target depicts lower efficiency it can be perceived as a symptom of inefficient management, therefore an acquisition may result in better management and thus increase in profits.
- Liquidity ratios: Ratios belonging in this category are considered valuable because they provide information on a vital part of every firm. It is argued that the operating liquidity available to a firm may trigger a takeover, since the acquirer will add additional funds in the firm that will improve potential investment and thus improve profits. Moreover, it is also true that firms with high liquidity levels and no profitable investments opportunities have higher probability to become a target of an acquisition.
- Leverage ratios: The employment of such ratios in the analysis is considered crucial because high leveraged firms find it difficult to gain additional financing from external sources at low cost. Therefore an acquisition may be the only way to overcome this issue.

3.3. Methodology

In this section the methodologies used for the analysis and construction of a prediction model able to identify different financial characteristics of acquirers and targets will be reviewed. In this research, the statistical method employed was Logit regression.

Logit regression has the advantage of allowing sufficient flexibility in a model to deal with contingency-tables³ combinations of predictors and disaggregated data. The latter method derived its name from the natural logarithm of the odds, or the “log odds”, which indicate the probability of a variable of interest in falling in one of two categories. The logistic regression model for the log odds for any variable under investigation is:

$$\log \frac{\pi_i}{1 - \pi_i} = \log O_i = \alpha + \beta_1(P_i) + \beta_2(C_i) + \beta_3(R_i) \tag{1}$$

Where:

O_i = The conditional odds of the dependent variable, given the explanatory variables.

α = Coefficient

$\beta_1, \beta_2, \beta_3$ = The change in the log odds because of the unit increments in the values of predictors.

P_i, C_i, R_i = Explanatory variables.

The multiplicative version of the latter equation is obtained by exponentiating both sides of the equation:

$$O_i = e^\alpha e^{\beta_1(P_i)} e^{\beta_2(C_i)} e^{\beta_3(R_i)} \tag{2}$$

The parameters in the logistic regression are directly estimated using the maximum likelihood technique. Nevertheless, it is important to know the conditional distribution of the dependent variable, considering each covariate pattern, expressed in terms of the parameters. This distribution already obtained as the dependent variable is dichotomous, taking the value of $Y_i = 1$ if the firm is Target and $Y_i = 0$ if the firm is Acquirer.

³ Contingency tables are utilised to record and analyse the relationship between two or more variables that are usually categorical.

Then Y_i has at each covariance pattern a Bernoulli distribution, with mean = π_i and variance = $\pi_i(1 - \pi_i)$. To specify this distribution further as a function of alpha and betas, it is assumed that the relationship between π_i and the predictors take a logistic distribution function.

The estimation proceeds by computing estimates for the alpha and betas that maximize the resulting conditional distribution (or likelihood) function for the set of sample values $Y_1, Y_2, Y_3, \dots, Y_n$.

To obtain predicted probabilities of an event occurrence, given the covariate pattern of O_i which is the computed conditional odds of event occurrence of a logistic regression equation is:

$$\frac{\hat{O}_i}{1 + \hat{O}_i} = \left(\frac{\hat{\pi}_i}{1 - \hat{\pi}_i} \right) / \left(1 + \frac{\hat{\pi}_i}{1 - \hat{\pi}_i} \right) = \hat{\pi}_i . \tag{3}$$

Where π_i is the conditional probability, which is estimated as follows:

$$\pi_i = \frac{\exp[\alpha + \beta_1(P_i) + \beta_2(C_i) + \beta_3(R_i)]}{1 + \exp[\alpha + \beta_1(P_i) + \beta_2(C_i) + \beta_3(R_i)]} . \tag{4}$$

In order to overcome the ‘Stationarity problem’ and increase the predictability accuracy of the computed model, the hazard module procedure is employed. On the other hand, very influential hazard models are that of Shumway (2001) who argued that hazard models are more appropriate than single-period (static) models, because the latter models produce probabilities that are biased and inconsistent estimates of the probabilities that they approximate. The limitation of the static models arises from the nature of the issue in hand, since it occurs infrequently and forecasters utilize samples that span several years and use one set of explanatory variables in order to estimate their models. However, the characteristics of the companies investigated necessarily change from year to year.

There are several reasons supporting the notion that hazard models may be more preferable in analyzing the merger and acquisition phenomenon. The first reason is that when the sampling period is long, it is important to realize the fact that some companies become targets after years of being at the spot. The second reason is that hazard models encompass explanatory variables that change with time. They exploit each company’s time series data by incorporating annual observations as time-varying covariates. Finally, they generate more efficient out of sample forecasts by employing additional data. They can be considered as Binary Logit models that include each firm’s financial year as a separate observation. Since the sample utilized in the creation of prediction models has an average of 5 to 10 years of financial data per firm, then the data used in the estimation of the hazard model will be 5 or 10 times greater than that of a static model, leading to more precise parameter estimates and superior forecasts. This drawback of static models was also addressed by Queen and Roll (1987) and Theodossiou (1993), who developed dynamic forecasting models.

In favour of the hazard models approach were Hillgeist et al. (2004) whose arguments were put forward from the fact that there are several reasons to question the probabilities derived from models that are based on accounting data. These financial statements are designed to assess past performance and may not be appropriate in analyzing the future status of the firm, since they are formulated under the going-concern principle. Another important limitation of many accounting based financial prediction models is their failure to incorporate a measure of asset volatility. The competitiveness of the hazard model procedure in relation to previous models was also reinforced by the findings of Dewaelheyns and Van Hulle (2006).

Finally, in order to avoid multicollinearity, a phenomenon that appears because the ratios used in the analysis are computed from similar accounting data, we utilize correlation analysis. Multicollinearity can cause disturbance in the analysis of the data and provide misleading results. Thus the elimination of one of the two high

correlated ratios assists in the creation of a useful explanatory set of variables with little loss of information. On the other hand, if multicollinearity is not existent, then it is safe to assume that each variable in the analysis monitors different aspects of company performance. In more detail, the Pearson coefficient of correlation (r) is a measure of the strength of the linear relationship between two variables x and y. It is computed as follows:

$$r = \frac{SS_{xy}}{\sqrt{SS_{xx} SS_{yy}}} \tag{5}$$

4. ANALYSIS

After the utilisation of a general model containing all the explanatory variables using three year data for every firm in the sample and adopting an approach of eliminating step by step insignificant variables; from a list of fourteen potential significant variables (see Appendix 2) only five variables were found to be statistically significant to enter the computed Logit model. Those were:

- Return on Assets
- Gross Margin
- Enterprise Value
- Total Debt to Total Capital
- Total Debt to Market Cap

Correlation Analysis was performed to ensure that all the independent variables that were included in the estimated model were independent from each other. The results of the Correlations as depicted in Table 1 indicate that all variables utilised are independent and thus there is no correlation problem.

Table 1: Correlation Analysis Using 3-Year Data

Variable	Enterprise Value	Gross Margin	R O A	Total Debt/ Total Cap	Total Debt/ Market Cap
Enterprise Value	1,000				
Gross Margin	-0.113	1,000			
R O A	0.102	0.246	1,000		
Total Debt/Total Capital	-0.076	-0.101	-0.108	1,000	
Total Debt/Market Cap	0.019	0.093	-0.224	0.445	1,000

Descriptive statistics for the explanatory variables identified as significant in classifying a firm as acquirer or target of M&A and used in the Binary Logistic model were calculated using the SPSS 13 statistical programme and are reported in Table 2.

Table 2: Descriptive Statistics Of The Variables Used In The Discriminate Model

Variables	N Statistic	Min. Statistic	Max. Statistic	Mean	Median	Std. Deviation	Skewness	Kurtosis
Ent. Val	222	-1.77	59045.57	4048.48	677.61	9281.22	3.87	19.36
Gr. Mar	222	0	100	16.29	8.84	21.46	1.64	5.68
ROA	222	-25.61	40.19	4.69	3.88	7.43	0.42	7.80
T.D./T.C.	221	0	139.66	49.74	51.27	27.46	-0.05	2.99
T.D./M.C.	222	0	39.94	1.55	0.693	4.35	6.77	52.18

Note: N column reports the number of observations, the number of which varies due to missing values. Minimum and Maximum columns respectively report the lowest and the highest observations in the sample. Skewness and Kurtosis Column report respectively the symmetry and the peak of the distribution.

The first part of the estimation output given from EViews when running the Binary Logistic Analysis to identify acquisition is presented in Table 4.1. The header title provides basic information about the estimation technique, in this case Binary Logit Regression. The lower part of the estimation output, displays the variables used in the equation, coefficient estimates, asymptotic standard errors, z-statistics and corresponding p-values respectively. The row ‘variables’ are the five variables that were found to have significant discriminatory power.

Table 3: Model’s Equation

Method: ML - Logit				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
Constant	0.999043	0.388136	2.573954	0.0101
Ent. Value	-0.000577	0.000135	-4.283414	0.000
Gross Margin	-0.019253	0.007966	-2.416820	0.0157
ROA	-0.051237	0.026082	-1.964445	0.0495
T.Debt /T. Capital	0.016093	0.007383	2.179664	0.0293
T. Debt / Ma. Cap	-0.149841	0.061432	-2.439147	0.0147

Note: The variables used to estimate the model, are computed over a period of three years prior to the event. Each firm’s financial year is considered as a separate observation. Coefficient column depicts the regression coefficients. Coefficient (C) is the intercept and the remainder are slope coefficients. The positive square root of the variance is the Standard Error. The Z-score is calculated by subtracting from the data the set’s average from each member of the set, and then divide each member of the set by the set’s standard deviation. The probability column reports the significance level of the variables.

Looking at Table 3 the most influential variable in the equation is the ratio Enterprise Value, followed by Total Debt to Market Capitalization, the Gross Margin, Total Debt to Total Capital and finally Return on Assets. Considering the coefficients of the latter variables we can conclude that the less efficiently the assets of the company are utilised, the less profitable a company is relative to its assets (ROA), the more undervalued it becomes, increasing the probability of acquisition. Moreover, the higher the level of debt in relation to the company’s capital decreases the probability of acquisition. Furthermore, the probability of acquisition also decreases as the percentage of equity increases in relation to company’s debt.

The results indicate that most of the merger and acquisitions in the shipping sector have disciplinary role, since the acquiring companies realize that they are investing in an undervalued assets, thus buying cheap vessels, which with a more efficient management can produce higher profit margins.

The second part of the estimation output following the summary statistics of the dependent variable (in our case: target or acquirer), provides the additional statistics (see Table 4). The McFadden R squared that equals 0.335 is satisfactory, since it means that the explanatory variables that were added to the estimated equation, explain a large proportion of the variation in the dependent variable. The latter finding is reinforced by the Standard Error regression. Finally, the values of the Akaike and Schwartz criteria depict that the model do not experience overfitting of parameters.

Taking into consideration Table 5 the estimated model classifies observations as having predicted probabilities that are above or below the specified cut-off value, in this investigation is set to 0.5. The upper right hand table depicts the observations using probability, the sample proportion of y=1 (target) observations. The latter, which is constant across individuals, is the value computed from estimating a model that considers only the intercept term C.

Table 4: Model’s Equation Statistics

Mc Fadden R - Sqrd	0.334318	Mean Dep. Var.	0.497738
S.D dep. Var	0.501130	S.E of regr.	0.393319
Akaike info crit.	0.977117	Sum sqrd resid	33.26054
Schwarz crit	1.069374	Log likelihood	-101.9714
Hannan-Quinn crit	1.014369	Rests.log likel.	-153.1833
LR statistic	102.4238	Avg. log likel.	-0.461409
Prob(LR stat)	0.00000		
Obs with Dep=0	111	Total Observations	221
Obs with Dep=1	110		

The measure of the predictive ability of the estimated model is provided by the gain in the number of correct predictions obtained moving from the right hand side to the left hand side of the table. The gain measures are reported in absolute percentage increases and as a percentage of the incorrect classifications in the constant probability model.

Table 5: Classification Table

Method: Logit Model						
	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)≤C	74	12	86	111	110	221
P(Dep=1) >C	37	98	135	0	0	0
Total	111	110	221	111	110	221
Correct	74	98	172	61	0	61
% Correct	66.67	89.09	77.83	100.00	0.00	62.89
% Incorrect	33.33	10.91	22.17	0.00	100.00	37.11
Total Gain	-33.33	89.09	27.60			
Percent Gain**	NA	89.09	55.45			

Note: *Change in "% Correct" from default (constant probability) specification.

**Percent of incorrect (default) prediction corrected by equation.

Dep=1: Firm is classified as Target of M&A.

Dep=0: Firm is classified as Acquirer

The column Dep=0 shows the prediction ability of the model for the Acquirer Group. Thus, from a total of 111 observations 74 (or 66.67 %) were correctly classified by the model. The column labelled Dep=1 in the Estimation Equation Panel shows information for the target firms sub-sample. Of 110 observations categorised as acquired 98 cases (or 89.09%) were correctly classified. Taking these into account the model has 77.83 % prediction accuracy. The estimated model improves on the Dep=1 predictions by 89.09%, but does more poorly on the Dep=0 predictions (-33.33%). Nevertheless, the estimated equation is 55.45% more accurate than the constant probability model.

Finally in order to compare that the fitted expected values are not so different from the actual values of the group and thus reject the Ho hypothesis, as providing an insufficient fit to the data, we carried Goodness of Fit Test (Hosmer-Lomeshow, 1989). The columns of Table 6 labelled ‘Quantiles of Risk’ portray the high and low value of the predicted probability of each decile. In addition, the actual and expected number observations, as well as the contribution of each group are also illustrated. The results of the test indicate that the fitted expected values equal the actual values, therefore the Ho Hypothesis is not rejected.

Table 6: Goodness Of Fit Test

	Quantile of Risk		Dep=0		Dep=1		Total obs	H-L Value
	Low	High	Actual	Expected	Actual	Expected		
1	0.000	0.0053	22	21.9766	0	0.0234	22	0.0234
2	0.0072	0.0651	21	21.4130	1	0.5869	22	0.2985
3	0.0699	0.2775	20	18.050	2	3.950	22	1.1733
4	0.2930	0.5011	12	12.8422	10	9.1578	22	0.1326
5	0.5081	0.5807	12	9.9326	10	12.0674	22	0.7844
6	0.5848	0.6902	4	7.5455	18	14.4544	22	2.5357
7	0.6977	0.7297	5	6.2749	17	15.7251	22	0.3623
8	0.7309	0.7747	6	5.6452	16	16.3548	22	0.030
9	0.7774	0.8316	5	4.3548	17	17.6452	22	0.1191
10	0.8328	0.9369	4	2.9650	19	20.0349	23	0.4147
		Total	111	111.000	110	110.000	221	5.8745
H-L Statistic			11.3473	Prob Chi-Sq			0.1199	

5. CONCLUSION

Considering the results of the research what can be said is that the maritime transport sector does not present different pattern from other sectors. Mergers and Acquisitions have a disciplinary motivation, since low profitability, leverage and corporate efficiency were found to be statistically significant, similar to Tzoannos & Samuels (1972), Owen (1997), Trimbath et al (2001) and Dickerson et al (2002) who stated that targets are inefficient and less profitable firms in contrast to acquirers who are the more efficient and more profitable. The variables that were found to be highly discriminatory variables of the two groups in an industry so asset intensive indicates that acquired corporations are seen as good investment that enable bidders to maintain their growth and development. It has to be highlighted that the probability of acquisition is increasing when the market considers the target as undervalued reinforcing the findings of Myers and Majluf, (1984). On the other hand, the potential acquirers ignore potential targets whose debts are high in comparison to their capital or when the capital structure of the firm is based upon equity.

However, to have a better view of the demanding procedure of M&As we should also look at the strategic motives, not only from the side of the acquirer but also from the target. Synergies, fleet diversification, timing of acquisitions, all play a vital role in the process. For that reason we are in the process of expanding our dataset to create an econometric model able to identify potential targets and acquirers, using also the latter variables as 'dummies'.

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APPENDICES

Appendix 1: List of Corporations

Target	Acquirer	Years of Event
Quintana Maritime Ltd	Excel Maritime Carriers	2008
Stelmar Shipping Ltd	Overseas Shipholding Group	2004
Arlington Tankers	General Maritime Corporation	2008
Maritrans Inc	Overseas Shipholding Group	2006
CIE Marocaine De Navigation	CMA CGM	2007
Taiheyo Kaiun Co Ltd	Nippon Yusen	2009
Flex LNG Ltd	Kawasaki Kisen Kaisha Ltd	2008
Teekay Petrojarl ASA	TEEKAY Corporation	2006
Unghland Nordic Shipping ASA	TEEKAY Corporation	2001
Wilson ASA	CAIANO AS	2006
Hinode Kisen Co Ltd	Nippon Yusen	2000
Mosvold Shipping Ltd	Frontline Ltd	2001
Mermaid Maritime Plc	Thoresen Thai Agencies Plc	2005
LOKI ASA	First Olsen Ltd	2002
Canger Rolf ASA	Bonheur ASA	2008
Alam Maritime	Jaya Holdings Ltd	2003
Samudera Indonesia Singapore	Samudera Shipping Line Ltd	2003
Tokyo Senpaku Kaisha Ltd	Nippon Yusen	2002
Blue Star	Attica Group	2007
Navigazione Montainari SPA	CP Ships Ltd	2002
Royal P&O Nedlloyd NV	AP Moller-Maersk A/S	2005
Smit Internationale NV	KOninklijke-Boskalis Wes	2009
Brostrom AB	AP Moller-Maersk A/S	2008
Ocean RIG ASA	DryShips Inc	2008
Daibiru Corp	Mitsui OSK Lines Ltd	2004
Adstream Marine Ltd	AP Moller-Maersk A/S	2006
Bona Shipholding Ltd	TEEKAY Corporation	1999
Gabot Chemical Tankers	Ampal American Israel	2008
Navix Line	Mitsui OSK Lines Ltd	1998
Cheng Lie Navigation Co	CMA CGM SA	2007
Jaya Holdings Ltd	Kumpulan Sime Darby Bh	2004
Showa Line	Nippon Yusen	1998
Smedvig Tankships Ltd	Bona Shipholding	1995
Kansai Kisen KK	Mitsui OSK Lines Ltd	2009
Utoc Corporation	Mitsui OSK Lines Ltd	2006
ICB Shipping AB	Frontline Ltd	2006
Tokyo Sen Paiv	Nippon Yusen	2003

Appendix 2: List of Ratios

1	Equity Ratio
2	Enterprise Value
3	Gross Margin
4	Profit Margin
5	Return on Assets
6	Return on Capital Employed
7	Cash Ratio
8	Quick Ratio
9	Current Ratio
10	Enterprise Value/ EBITDA
11	Total Debt/ Total Capital
12	Total Debt/ Total Assets
13	Total Debt / Market Cap
14	EBITDA/Total Interest Expense