

# Relationship Between Financial Ratios & Share Prices And Prediction Of Financial Failure: Evidence From Sri Lanka

R.M.D.S Rajapaksha, Roshan D. Yapa

**Abstract:** in this paper, a thorough analysis regarding the listed companies on Colombo Stock Exchange is conducted. The main objective of this study is to determine a relationship between share price and financial ratios of the companies which are listed on the Colombo Stock Exchange for the period 2011 to 2013 using an econometric model called panel data regression. Then a group of companies are categorized by their share price using factor analysis. Finally the financial failure of companies is predicted using k-nearest neighbor discriminant analysis. The results of the study showed that there is a high positive relationship between the share price and Earnings per share (EPS). At the same time there is a moderate positive relationship between share price and Dividends per share (DPS). Also there are significant low positive associations between share price and Return on Equity (ROE), Return on Assets (ROA), Asset Turnover, Price to Book (PB) and Net profit Margin (NP margin) respectively. Using panel data regression analysis, a feasible generalized least squares (FGLS) model is fitted to determine the share price using the variables DPS, EPS, ROE, PB Ratio and NP Margin. Then using factor analysis, hidden relationships are examined by considering 10 stocks which are listed one Colombo Stock Exchange. Using the analysis, three factors are found. They are general market component, multinational company component and diversified component. Finally the financial failure of companies is predicted using k-nearest neighbor discriminant analysis. The predicted financial failure is compared with the results that were obtained using Altman Z score. It is found that the percentage of classifying, a successful company and an unsuccessful company correctly are 65% and 95% respectively.

**Index Terms:** Econometrics, Financial Failure, Financial Ratios, Panel Data, Share price,

## 1 INTRODUCTION

Each day people are willing to take risk by invest in a stock market. For some of the investors, their only source of income is the returns that generated via financial securities. Investors use some sophisticated models or rely on publicly available data in order to earn a better reward. Due to the volatile economic conditions especially in countries like Sri Lanka, it is very difficult to predict the stock movements based on publicly available data and those models. So it is very important to identify any suitable alternative solution. Such kind of alternative is to use of financial ratios. The financial ratios which quoted based on the annual reports can use to evaluate different dimensions of a particular company's performance. These different dimensions will definitely reflects in the future stock prices. So use of financial ratios to predict the stock prices will be an effective option to use. The main objective of this study is to identify a relationship between share prices and the financial ratios. By identifying that, a model is to be developed to predict the future share prices using financial ratios. The next objective is to categorize a group of companies based on the share price. The Final objective is to predict the financial failure using financial ratios.

## 2 Methodology

To determine the relationship stock prices and financial ratios, first panel data regression models were fitted. Then model diagnostic tests are carried out to check the model assumptions. Ultimately a generalized least squares model was obtained which satisfies the model assumptions. Then a factor analysis was carried out based on the share prices of 10 companies. Finally the financial failure of companies are predicted using k-nearest neighbor discriminant analysis.

## 3 Results and Discussion

As the first step in panel data regression, a fixed effect model is fitted to identify whether the fixed effects are needed or not using the following hypothesis.

$$H_0 : \mu_1 = \mu_2 = \dots = \mu_N$$

vs

$$H_1 : \text{At least one } \mu_i \text{ is different.}$$

Since the p-value of the F statistic is zero, it can be determined that the null hypothesis  $H_0 : \mu_1 = \mu_2 = \dots = \mu_N$  is rejected at 5% significance level. So it can be concluded that there is a significant fixed effect and the fixed effect model is better than the pooled OLS. Then a random effect model was fitted and the following hypothesis was checked.

$H_0: \sigma_\mu^2 = 0$  vs  $H_1: \sigma_\mu^2 \neq 0$ . According to the above table, it can be determined that the Wald statistic is significant at 5% significance level as the p-value of the test is zero. So the null hypothesis  $H_0: \sigma_\mu^2 = 0$  is rejected at 5% significance level.

Hence the model is preferable than the conventional OLS regression model. Relevant tests were conducted in order to find the suitable model and for the purpose of checking model diagnostics. Following results were obtained.

**Table 1**  
Results obtained for respective tests.

Test	Test statistic	p-value	Decision
Hausman's Specificatiuon test	361.64	0.00	Fixed effects model preferred
Checking time fixed effects	4.12	0.61	No time fixed effects
Checking Heteroskedasticity	5.436	0.00	Heteroskedasticity presented
Cross Sectional Dependency	20.61	0.00	Cross Sectional Dependency presented
Checking Serial Correlation	3.10	0.08	No serial correlation

According to the above table, Hausman's specification test implies that fixed effects model is preferred compare to the random effects model. Then the resultant fixed effects model is presented with heteroskedasticity and cross sectional dependency. In order to fit a suitable model which remove heteroskedasticity and cross sectional dependency,

generalized least squares (GLS) transformation was done. Hence a GLS model is was obtained.

**Table 2**  
Results obtained for the GLS model.

	Estimates	Std. Error	z-value	p-value
EPS	4.93	0.42	11.71	0.00
DPS	7.95	.96	8.21	0.00
ROE	-112.26	22.57	-4.97	0.00
PB ratio	15.94	1.37	11.65	0.00
Constant	26.60	3.33	7.98	0.00
Wald statistic : chi-squared (4) 669.95 p-value : 0.00				

In this model, the overall Wald statistic is significant as the p-value is zero. Also the individual parameter estimates are also significant. Therefore the final fitted model is,

**Share price= 26.60 + 4.93(EPS) + 7.95(DPS) -112.26(ROE) + 15.94(PB ratio)**

A factor analysis is conducted in order to determine the hidden factors of 10 companies which are listed in Colombo Stock Exchange based on the share price. The following output was obtained.

**Table 3**  
Estimated factor loadings

variable	Estimated factor loadings			Rotated factor loadings			Specific variances
	F1	F2	F3	F1*	F2*	F3*	
JKH	0.79	0.38	0.30	0.84	0.10	0.40	0.13
Ceylon tobacco	-0.72	0.39	0.54	-0.11	-0.96	-0.18	0.04
Nestle	-0.74	0.41	0.51	-0.11	-0.95	-0.22	0.03
Commercial	0.89	0.01	-0.20	0.56	0.66	0.29	0.17
Carson's	0.86	-0.02	0.31	0.57	0.29	0.65	0.17
Dialog	0.89	0.24	0.21	0.78	0.28	0.46	0.10
SLT	0.42	0.79	-0.32	0.84	0.16	-0.43	0.92
Bukit darah	0.69	-0.52	0.44	0.43	0.29	0.92	0.06
Distilleries	0.57	0.73	0.03	0.92	0.03	-0.08	0.15
Atiken	0.41	-0.75	0.15	-0.28	0.43	0.70	0.25

According to the first factor (F1) the companies which have a positive correlation belongs to all sectors which represent the above 10 companies. So the first factor can be treated as the general market component. The second factor can be considered as the multinational component using the high negative correlations of Ceylon tobacco and Nestle. The third factor can be treated as the diversified component due to the high positive correlations. Some companies which are not officially listed in the diversified holdings are also included in this component. The Bukit Darah PLC which is listed in the oil palm sector is a subsidiary of Carsons. So due to the subsidiary effect of Carsons it is included in the diversified component. At the same time the Dialog Axiata PLC which is listed in the telecommunication sector, has expanded its operations in the form of related diversification. So Dialog can also be treated as a diversified company. In order to predict the financial prediction, k-nearest neighbor method was used. Using the financial ratios of companies during 2012, the

Altman Z-score is predicted. According to the K-nearest neighbor discriminant method, the successfulness or unsuccessfulness is predicted. The following output is obtained.

**Table 4**  
Confusion matrix of testing data for prediction of financial failure

	Successful	Unsuccessful	total
Successful	49	26	75
Unsuccessful	2	38	40
Total	49	66	115

So using the above table it can be determined that 95% of the time, an unsuccessful company has classified correctly. The percentage of correctly classifying a successful company is 65%. The percentage of correctly classifying a successful company is 65%. The model has able to predict unsuccessful companies with a 95% accuracy.

## 4 CONCLUSION

The Hausman test statistics identified that the fixed effects model is the most preferred model. Then it is found that the respective fixed effects model has no time fixed effects and serial correlation. But the fixed effects model is affected by cross sectional dependency and heteroskedasticity. So a generalizd least square model (GLS) is fitted to remove those by using GLS transformation. Using the factor analysis, three underlying hidden factors are identified. They are general market component, multinational component and diversified component. Finally the financial failures of companies are predicted using financial ratios. According to the result it is found that the percentage of classifying a successful company correctly is 65%. And the percentage of classifying an unsuccessful company correctly is 95%.The financial ratios which chose in this study are the general financial ratios which can be applicable to any sector. But there are some specific financial ratios form those it can be measure the performance of companies which belongs to specific sector. As an example there are some specific ratios which measure the performance of companies which are on the finance sector. So in future it is better to conduct the study by considering only a one sector of the Colombo Stock Exchange or combination of sectors using sector specific ratios.

## 5 REFERENCES

- [1] Baltagi H.B (2005). *Econometric Analysis of Panel Data* (Third edition). Sussex: John Wiley & Sons,Ltd.