

## Survival Analysis of Initial Public Offerings in Malaysia

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### ABSTRACT

This study presents a survival analysis on both existing public listed companies in Bursa Malaysia and future initial public offering (IPO) companies in Malaysia. The analyses includes both types of explanatory variable: financial information and non-financial information within the prospectuses of IPOs. Initially, we validate the proportional hazards assumptions through the Schoenfeld residual test and Kaplan-Meier survival curves. It then is followed by the univariate analyses wherein we use Wald test for continuous explanatory variables, and both Chi-square test and Fisher's exact test for categorical explanatory variables. We then conduct the multivariate analysis by applying the Cox proportional hazards model for investigating the influence of potential factors on the survival of IPOs in the context of Malaysia. The best-fitted Cox proportional hazards model is obtained via stepwise model selection. The results indicate that the ratio of working capital to gross proceeds, ratio of listing expenses to gross proceeds, return on equity, debt ratio and debt to equity ratio are significantly influence the survival of IPOs in Malaysia.

**Keywords:** IPOs, Survival, Cox proportional hazards model

### INTRODUCTION

An initial public offering (IPO) is a first-time sale of company shares by a private company to the public (Baluja and Singh, 2016). The company will raise additional capital through IPO at certain level of its development. After the process of initial public offering, the company can be developed into one of three basic conditions: survivor, non-survivor and get acquired. Here survivors are referred to the companies that continue to be traded on stock exchange or transfer their listing to another market, while non-survivors are defined as delisted companies due to merger or acquisition, suspension, or liquidation (Espenlaub et al., 2012). Furthermore, the get acquired company is the existing public company, private company or converted into a private entity (Jain and Kini, 1999).

In Malaysia, the companies that fail to comply any or all requirements specified under provision of Practice Note 17/2005 and Guidance Note 3 of the listing requirements are classified as PN17 companies and GN3 companies, respectively. Generally, both PN17 and GN3 companies usually have some financial difficulties. Both types of companies have the obligations to regularise its conditions to fulfil the listing requirements. These companies may be suspended or delisted if the companies fail to regulate its conditions.

According to Lamberto and Rath (2008), the failure rate among companies that listed on stock exchange is relatively high even though the management teams of the unlisted companies have careful consideration before they list the companies on stock exchange. Owners of listed companies concern about the listing performance after public offerings and survival of the companies to maximize their shares in the company. The survival of a company is an indicator of its long-term performance and whether it has performed well enough to survive and maintain its

corporate identity. Hence, the identification of the influence factors that contribute to the IPO's survival is crucial. According to the literature of survival of initial public offerings, there are many factors influence the survival of initial public offerings such as corporate governance of the companies, financial performance of the companies, economic environment and risks related to the business. A review of literature shows that the company characteristics play an important role in the survival of initial public offerings (Jain and Kini, 1999; Yang and Sheu, 2006; Kooli and Meknassi; 2007; Espenlaub et al., 2012; Baluja and Singh, 2016; Hensler et al. 1997; Lamberto and Rath, 2008; Chancharat et al., 2012).

In this study, we aim to identify the significant factors in predicting the survival of initial public offerings in Malaysia based on available information contained in the IPO's prospectuses. The paper is organized as follows: the description of the used data and the methodology details are presented in the next section; the results of both univariate and multivariate analyses then are discussed in detail in the following sections: the conclusions are given in the final section. Perhaps the findings of this study may provide a guidance for those investors who are interest to invest in Malaysia.

## METHODOLOGY

The data used in this study consist of 248 IPO companies which are listed on Bursa Malaysia from 2004 until 2011, as presented in Table 1. The variables we consider for the analyses are defined as Table 2.

**Table 1:** Maximum absolute errors with respect to number of integration steps.

Year	Number of IPOs	Percentage (%)
2004	56	22.58
2005	66	26.61
2006	33	13.31
2007	20	8.06
2008	19	7.66
2009	9	3.63
2010	22	8.87
2011	23	9.27
Total	248	100.00

**Table 2:** Definitions of explanatory variables.

Variables	Definition
BSIZE	Number of directors.
PID	Ratio of independent directors to number of directors.
NOU	Number of underwriters.
PRICE	Issue price of the IPO.
LOGOSIZE	Log of public issue size.
LOGNTA	Log of net tangible asset.
NTAPS	Net tangible asset per share.
LOGMKTCAP	Log of market capitalization.
RISK	Number of risk factors.
AGE	Age of the company.
LOGCASSET	Log of current assets of the company.
LOGCLIA	Log of current liabilities of the company.
LOGSHAREEQ	Log of shareholders' equity of the company.

TRATIO1	Ratio of working capital to gross proceeds.
TRATIO2	Ratio of listing expenses to gross proceeds.
CRATIO	Current ratio.
ROA	Return on assets.
ROE	Return on equity.
ATURN	Asset turnover.
DEBTRATIO	Debt ratio.
DERATIO	Debt to equity ratio.
NONEXCH	Non-executive chairman. Dummy variable taking 1 if the chairman is non-executive chairman, zero otherwise.
DIVIDEND	Dividend forecast. Dummy variable taking 1 if the IPO has dividend forecast, zero otherwise.
MKT	Market of Bursa Malaysia. Dummy variable taking 1 if the IPO listed on Main Market, zero otherwise.
BIG4	Big four audit firm. Dummy variable taking 1 if the auditors are from big four audit firm, zero otherwise.
TRADSERV	Trading or services sector. Dummy variable taking 1 if the IPO from trading or services sector, zero otherwise.
FINANCE	Finance sector. Dummy variable taking 1 if the IPO from finance sector, zero otherwise.
INDPROD	Industrial products sector. Dummy variable taking 1 if the IPO from industrial products sector, zero otherwise.
TECH	Technology sector. Dummy variable taking 1 if the IPO from technology sector, zero otherwise.
CONSTRUCT	Construction sector. Dummy variable taking 1 if the IPO from construction sector, zero otherwise.
CONSUMER	Consumer sector. Dummy variable taking 1 if the IPO from consumer sector, zero otherwise.
PROP	Property sector. Dummy variable taking 1 if the IPO from property sector, zero otherwise.
PLANT	Plantation sector. Dummy variable taking 1 if the IPO from plantation sector, zero otherwise.
TIME	Survival time (months).
SURVIVE	Dummy variable taking 1 if the IPO is survivor, zero otherwise.

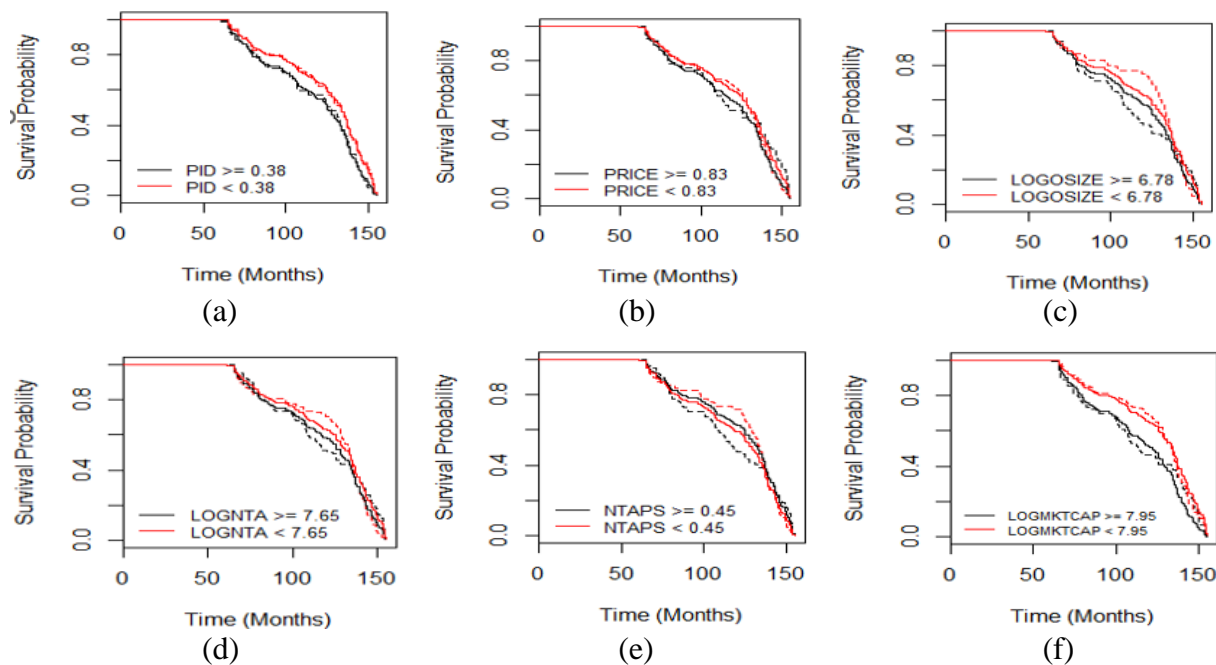
In this study, we propose a Cox proportional hazards model for fitting the data set we consider. Hence, we initially validate the proportional hazard assumptions through the Schoenfeld residual test and Kaplan-Meier survival curves. It then is followed by the univariate analyses wherein we use Wald test for continuous explanatory variables, and both Chi-square test and Fisher's exact test for categorical explanatory variables. Furthermore, we proceed to the multivariate analysis by applying the Cox proportional hazards model for assessing the impact of the significance potential factors on the survival of IPOs simultaneously, in the context of Malaysia. The factor involved is significant when the  $p$ -value less than 0.05. The best-fitted Cox proportional hazards model then can be obtained via stepwise model selection.

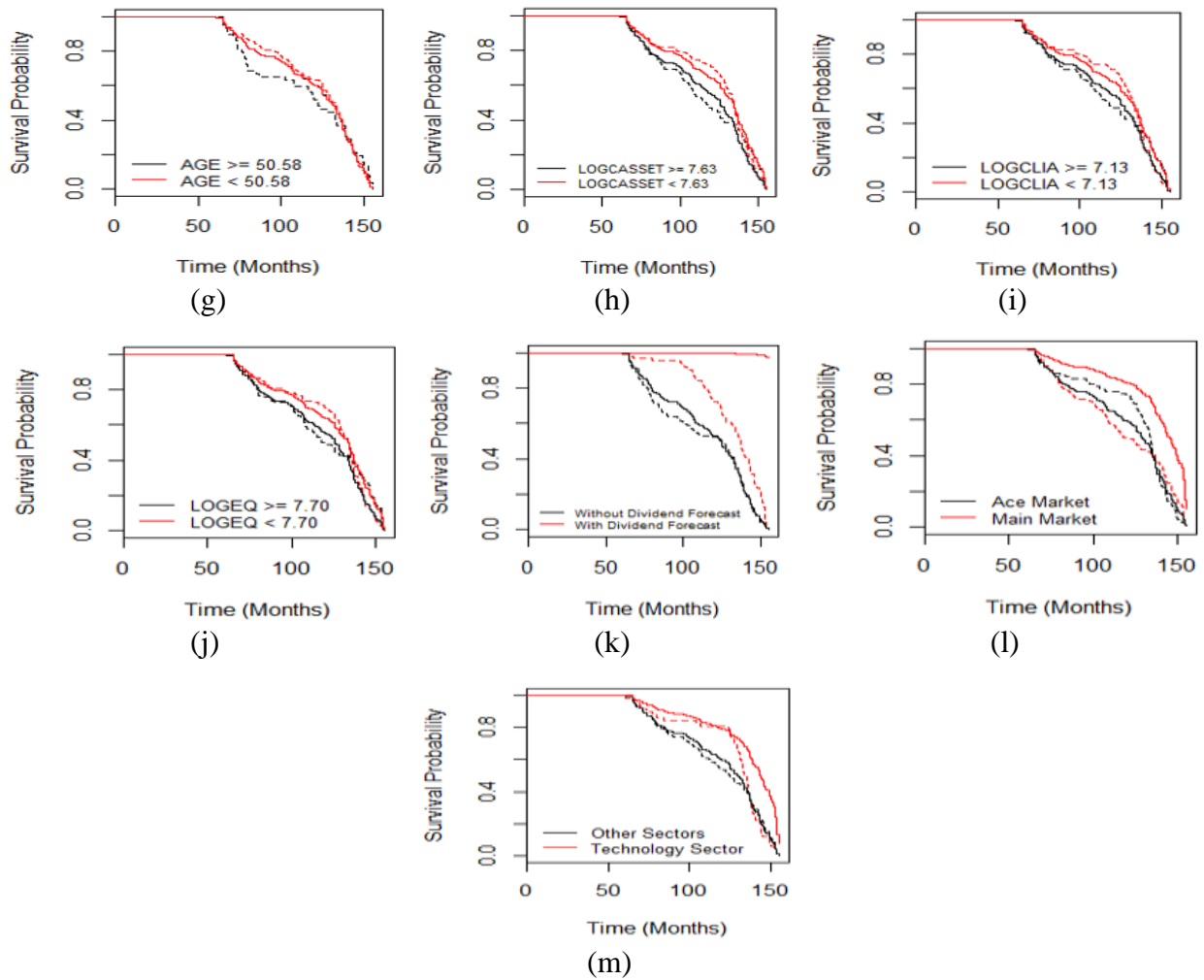
## RESULTS

The results of Schoenfeld residuals test show that the proportional hazard assumption is violated for the ratio of independent director, issue price, offering size, net tangible asset, net tangible asset per share, log of market capitalization, age of the company, current assets, current liabilities, shareholder's equity, dividend forecast, market and technology sectors, respectively. The Kaplan-Meier survival curves for these validated variables are presented in Figure 1(a)-1(m).

In univariate analysis, Wald test, Chi-square test and Fisher's exact test are carried out for determining the significance potential factors on the survival of IPOs in Malaysia. Refer to Table 3, at the significance level of 0.10, the results of Wald test show that the number of underwriters (NOU), ratio of working capital to gross proceeds (TRATIO1), ratio of listing expenses to gross proceeds (TRATIO2), return on assets (ROA), return on equity (ROE), asset turnover (ATURN), debt ratio (DEBTRATIO) and debt to equity ratio (DERATIO) are statistically significant potential factors on the survival of IPOs. Meanwhile, as presented in Table 4 and 5, the results of Chi-square test and Fisher's exact test indicate that none of the categorical explanatory variables we consider significantly influence the survival of IPOs in Malaysia.

Using the Cox proportional hazards model, all the potential factors in the previous univariate tests are considered for assessing the impact of the significant potential factors on the survival of IPOs in Malaysia simultaneously. The best-fitted model then is obtained via stepwise model selection. The results in Table 6 show that the ratio of working capital to gross proceeds (TRATIO1), ratio of listing expenses to gross proceeds (TRATIO2), return on equity (ROE), debt ratio (DEBTRATIO) and debt to equity ratio (DERATIO) are the significantly influence the survival of IPOs in Malaysia at the significance level of 0.05.





**Figure 1:** Kaplan-Meier Survival Plots for All Validated Variables

**Table 3:** Significance of potential factors on the survival of IPOs using Wald Test

Explanatory Variable	Regression coefficient	Hazard ratio	<i>p</i> -value
BSIZE	-0.023	0.977	0.528
NOU	-0.120	0.887	0.076*
RISK	0.017	1.017	0.287
TRATIO1	-0.971	0.379	0.008**
TRATIO2	1.691	5.423	0.063*
CRATIO	0.000	1.000	0.537
ROA	0.021	1.021	0.002**
ROE	0.016	1.016	0.028**
ATURN	0.003	1.003	0.002**
DEBTRATIO	0.004	1.004	0.001**
DERATIO	0.220	1.246	0.060*

\* significant level = 0.10; \*\* significant level = 0.05

**Table 4:** Significance of potential factors on the survival of IPOs using Chi-square Test

Explanatory Variable	<i>p</i> -value
NONEXCH	0.378
BIG4	0.422
TRADSERV	0.403
INDPROD	0.641

**Table 5:** Significance of potential factors on the survival of IPOs using Fisher Exact Test

Explanatory Variable	<i>p</i> -value
FINANCE	1.000
CONSTRUCT	1.000
CONSUMER	0.186
PROP	1.000
PLANT	1.000

**Table 6:** Summary of the Best-fitted Cox Proportional Hazards Model

Explanatory Variable	Regression coefficient	Hazard ratio	<i>p</i> -value
TRATIO1	-1.016	0.362	0.006**
TRATIO2	1.808	6.100	0.044**
ROE	0.026	1.026	0.011**
ATURN	-0.004	0.996	0.102
DEBTRATIO	0.009	1.009	0.002**
DERATIO	0.238	1.268	0.042**

\*\* significant level = 0.05

## CONCLUSION

In this study, a Cox proportional hazards model for accessing the influence of potential factors on the survival of IPOs in Malaysia. We firstly investigate the association of all considered potential factors on the survival of IPOs by using Wald test, Fisher Exact test, and Chi-square test. Those associated covariates in the univariate analysis then are used in fitting the Cox proportional hazards model for assessing the impact of the significance factors of survival of IPOs simultaneously. Finally, the best-fitted Cox proportional hazards model is obtained through stepwise model selection approach. It is observed that that the ratio of working capital to gross proceeds (TRATIO1), ratio of listing expenses to gross proceeds (TRATIO2), return on equity (ROE), debt ratio (DEBTRATIO) and debt to equity ratio (DERATIO) are the significant factors of survival of IPOs in Malaysia. Perhaps the results of this study may contribute to predict the survival of IPOs in Malaysia in future.

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