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## An empirical analysis of financially distressed Australian companies: the application of survival analysis

Nongnit Chancharat  
*University of Wollongong*

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**AN EMPIRICAL ANALYSIS OF FINANCIALLY DISTRESSED AUSTRALIAN  
COMPANIES: THE APPLICATION OF SURVIVAL ANALYSIS**

A thesis submitted in fulfilment of the requirements for the  
award of the degree of

**DOCTOR OF PHILOSOPHY**

from

**UNIVERSITY OF WOLLONGONG**

by

**NONGNIT CHANCHARAT**

B.B.A. (Finance) First Class Honours, Khon Kaen University, Thailand  
M.S. (Applied Statistics), National Institute of Development Administration, Thailand

**SCHOOL OF ACCOUNTING AND FINANCE**

**2008**

## **CERTIFICATION**

I, Nongnit Chancharat, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Accounting and Finance, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Nongnit Chancharat

26 September 2008

*To my dear parents, my husband and my son*

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## **LIST OF ABBREVIATIONS**

AFT	Accelerated Failure Time Model
AGE	Age of Company
ANN	Artificial Neural Network
ASIC	Australian Securities and Investments Commission
ASX	Australian Stock Exchange
BACK	Underwriter Backing
BD_INDP	Percentage of Independent Directors
BD_SIZE	Board Size
BE/ME	Book to Market Equity Ratio
BIG5	Auditor Reputation
CEO	Chief Executive Officer
CM_DUAL	Dual Leadership Structure
CM_NEXC	Non-Executive Chairman
CPT	Capital Turnover
CUR	Current Ratio
C_SIZE	Size of IPO Company
DET	Debt Ratio
EBIT	Earnings Before Interest and Taxes
EBT	EBIT Margin
EXR	Excess Returns
GICS	Global Industry Classification Standard
GNP	Gross National Product
IIA	Independent of Irrelevant Alternatives Assumption
IID	Independent and Identically Distributed Assumption

IPOs	Initial Public Offerings
IPO_9900	A Company that Issued Stock Between 1999 and April 2000
ITSA	Insolvency and Trustee Service Australia
MDA	Multivariate Discriminant Analysis
MSCI	Morgan Stanley Capital International
NUM_RISK	Number of Risk Factors in the Prospectus
OF_AGE	Offering Age
OF_PRICE	Offering Price
OF_SIZE	Offering Size
QUK	Quick Ratio
RETAIN	Retained Ownership
ROA	Return on Assets
ROE	Return on Equity
RPA	Recursive Partitioning Analysis
SIZE	Size of Company
SIZE2	Squared Size of Company
TAT	Total Assets Turnover
TOP20	Top 20 Shareholders
WCA	Working Capital to Total Assets Ratio

## **ABSTRACT**

This thesis provides an empirical analysis of financially distressed companies in the Australian context using survival analysis techniques. Three main assays are developed and presented in the thesis.

The first assay explores the effect of financial ratios and other variables on corporate financial distress and identifies the probability of corporate survival in a given time frame. The four main categories of financial ratios are profitability, liquidity, leverage and activity ratios and control variables which are a market-based variable and company-specific variables; for example, company age, company size and squared size are employed in the analysis. The Cox proportional hazards model was estimated using time-varying variables based on a sample of 1,117 publicly listed Australian companies over the period 1989 to 2005. Empirical results found that financially distressed companies have higher leverage measured by debt ratio, lower past excess returns and larger size compared to active companies.

Researchers argue that a company may exit the market in several different ways, such as through merger, acquisition, voluntary liquidation and bankruptcy and each type of exit is likely to be affected by different factors. Consequently, the second assay investigates the determinants of multiple states of financial distress by applying a competing risks Cox proportional hazards model. The unordered three-state financial distress model is defined as follows: state 0: active companies, state 1: distressed external administration companies and state 2: distressed takeover, merger or acquisition companies. The effect of financial ratios, market-based variable and company-specific variables including company age, company size and squared size on three different states of corporate financial distress are investigated based on a sample of 1,081 publicly listed Australian companies over the period 1989 to 2005.

The results indicate that it is important to distinguish between the different financial distress states. Additionally, the results suggest that distressed external administration companies have higher leverage, lower past excess returns and a larger size while distressed takeover, merger or acquisition companies have lower leverage, higher capital utilization efficiency and a bigger size compared to active companies.

In addition to examining financial ratios as the main variables, this thesis further explores the effect of corporate governance attributes on IPO companies' survival focusing on a particular sector. Accordingly, the third essay examines the influence of corporate governance mechanisms on the survival of 127 new economy IPO companies listed on the ASX between 1994 and 2002. In addition to the three main categories of corporate governance attributes include board size, board independence and ownership concentration; control variables, for example, offering characteristics, financial ratios and company-specific variables, are also included in the model.

The Cox proportional hazards model estimation results found ownership concentration significantly negative related to the survival of new economy IPO companies. For offering characteristics variables, the offering size and the underwriter backing are a significant variable in explaining IPO companies' survival; however, the estimated signs are in contrast to the expectations. Specifically, those IPO companies with a larger offering size are less likely to survive than are those that offer a smaller size. Furthermore, the results found that the hazard of financial distress for companies with an offer that is underwritten is greater than the hazard for those for which the offer is not underwritten. For financial ratios, the results indicate that the debt ratio is statistically significant in explaining IPO firms' survival. In particular, IPO companies with a low total debts to total assets ratio are less likely to fail.

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