รายงานวิจัยฉบับสมบูรณ์

โครงการ: ผลกระทบของปัจจัยด้านบรรษัทภิบาลต่อความอยู่รอดของบริษัท IPOs: กรณีศึกษาของประเทศไทย

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สัญญาเลขที่ MRG5280056

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สนับสนุนโดยสำนักงานคณะกรรมการการอุดมศึกษา และ
สำนักงานกองทุนสนับสนุนการวิจัย

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บทคัดย่อ

งานวิจัยนี้ทำการวิเคราะห์ความสัมพันธ์ระหว่างปัจจัยด้านบรรษัทภิบาลและโอกาสในการอยู่รอดของบริษัท IPOs ในประเทศไทย โดยใช้กลุ่มตัวอย่าง IPOs ซึ่งจดทะเบียนกับตลาดหลักทรัพย์แห่งประเทศไทยในช่วงปี 2535-2550 และพิจารณาสถานะสถานะของบริษัท อันได้แก่ อยู่ในตลาด (trading) และออกจากตลาด (delisted) จนถึงวันที่ 31 ธันวาคม 2552 ข้อมูลที่ใช้ในการศึกษาครั้งนี้เก็บรวบรวมจาก ฐานข้อมูลของสำนักงานคณะกรรมการกำกับหลักทรัพย์และตลาดหลักทรัพย์ สำหรับบริษัทที่มีข้อมูลไม่ครบถ้วนจะถูกตัดออก โดยกลุ่มตัวอย่างที่ใช้ในการศึกษามีจำนวนทั้งสิ้น 166 บริษัท แบ่งเป็น 20 บริษัทที่เลิกกิจการ (failed) และ 146 บริษัทที่ยังดำเนินการอยู่ (non-failed) ทั้งนี้กลุ่มตัวอย่างดังกล่าวได้ถูกแบ่งออกเป็น 2 กลุ่มย่อย คือ กลุ่มตัวอย่างสำหรับใช้สร้างตัวแบบ (111 บริษัท) และกลุ่มตัวอย่างสำหรับใช้ทดสอบความถูกต้องในการพยากรณ์ของตัวแบบ (55 บริษัท) โดยแบบจำลองที่ใช้ในการวิเคราะห์ความสัมพันธ์ดังกล่าว คือ แบบจำลองถดถอยโลจิสติก

ผลการศึกษา พบว่า ความน่าจะเป็นในการอยู่รอดของ IPOs ของไทยไม่สัมพันธ์กับปัจจัยด้านบรรษัทภิบาลอย่างมีนัยสำคัญทางสถิติ โดยปัจจัยด้านบรรษัทภิบาลนั้นประกอบด้วย จำนวนกรรมการ (board size) ความเป็นอิสระของกรรมการ (board independent) การดำรงตำแหน่งบริหารมากกว่า 1 ตำแหน่ง (dual leadership) อัตราส่วนการถือครองหุ้นของผู้ถือหุ้นหลัก (ownership concentration) อายุของบริษัท (age) และสินทรัพย์รวม (total asset) อย่างไรก็ตาม ผู้วิจัยได้ทำการวิเคราะห์ความถูกต้องของการพยากรณ์ของแบบจำลองถดถอยโลจิสติกที่ได้ประมาณการขึ้น โดยใช้กลุ่มตัวอย่างที่ใช้สร้างตัวแบบ พบว่า ตัวแบบสามารถพยากรณ์สถานะของ IPOs ถูกต้องร้อยละ 87.39 โดยมีค่าความคลาดเคลื่อนประเภทที่ 1 และประเภทที่ 2 ร้อยละ 0 และ 12.61 ตามลำดับ ส่วนในกรณีที่ใช้กับกลุ่มตัวอย่างสำหรับใช้ทดสอบความถูกต้องในการพยากรณ์ของตัวแบบนั้น พบว่าตัวแบบพยากรณ์สถานะของ IPOs ถูกต้องร้อยละ 89.09 โดยมีค่าความคลาดเคลื่อนประเภทที่ 1 และประเภทที่ 2 ร้อยละ 0 และ 10.98 ตามลำดับ ซึ่งผลการศึกษาดังกล่าวนี้ช่วยยืนยันความน่าเชื่อถือของตัวแบบ

ABSTRACT

The aim of the study is to examine the relationship between corporate governance attributes and the probability of survival of IPOs in Thailand. To achieve this objective, the sample of IPOs companies which listed on the Stock Exchange of Thailand between 1992 and 2007 are tracked until 31 December 2009 to identify the companies status include trading and delisted. The data were obtained from the Capital Market Information Center, the Securities and Exchange Commission. The sample consists of 166 IPOs include 20 failed and 146 non-failed IPOs which then are equally divided into training sample (111 IPOs) and hold-out sample (55 IPOs) for building the model and evaluating the predicting accuracy of the estimated model, respectively. The logistic regression model is then employed to identify the probability of survival of a company after IPOs.

The empirical results found that IPOs failure or survival in Thailand is not significantly related to corporate governance attributes, including board size, board independent, dual leadership, ownership concentration and firm characteristics such as age and total asset. However, to evaluate the predictive ability of the model we divided the sample into two subsets namely training sample and hold-out sample. The classification accuracy of the estimated logistic regression model is explored using hold-out sample. Based on training sample, the results found that the model is correctly classified at 87.39 percent with the type I and type II error are 0 and 12.61 percent, respectively while the predictive accuracy using holdout sample are that the model is correctly predicted at 89.09 percent with type I and type II error are 0 and 10.91 percent, respectively. These results confirm high predictive ability of the model.

EXECUTIVE SUMMARY

ชื่อโครงการวิจัยการ: ผลกระทบของปัจจัยด้านบรรษัทภิบาลต่อความอยู่รอดของบริษัท IPOs: กรณีศึกษาของประเทศไทย

Influences of corporate governance mechanisms on IPOs survival: Evidence from Thailand

หัวหน้าโครงการวิจัย: สุรชัย จันทร์จรัส

การสนับสนุนทุนวิจัย: ทุนพัฒนาศักยภาพในการทำงานวิจัยของอาจารย์รุ่นใหม่ ประจำปีงบประมาณ พ.ศ. 2552 สำนักงานคณะกรรมการการอุดมศึกษาและสำนักงานกองทุนสนับสนุนการวิจัย

1. Statement of the problem and motivation of the study

Interest in corporate financial distress prediction or corporate survival analysis has grown rapidly in recent years with the global increase in the number of corporate collapses such as the Asian financial crisis in 1997, HIH Insurance Australia in 2001, the Enron and WorldCom collapse in the USA in 2001 and 2002, respectively.

These collapses often result significant direct and indirect costs to many stakeholders including shareholders, managers, employees, creditors, investors, stockholders, auditors, suppliers, customers and community. For example, the collapse of HIH entailed huge individual and social costs, as the HIH group comprises several insurance companies and was a major provider of all types of insurance in Australia (Leung and Cooper, 2003). The deficiency of the group was estimated to be between $3.6 billion and $5.3 billion, 200 permanently disabled people were left with

no regular income payments, retirees with superannuation in HIH shares saw their investment disappear and several non-profit organizations were liquidated by the collapse (Commonwealth of Australia, 2003).

It can be seen that the failure companies entail significant direct and indirect costs to many stakeholders. Many of the costs may be avoided if ones can identify the factors and the survival probability of the company after Initial Public Offerings (IPOs).

Therefore, this research study will focus on examining survival likelihood of IPOs companies listed on SET based on the corporate governance characteristics. Early identification of potential failure in companies could provide the party concerned with early sign of problem companies for better decision-making. An early warning system enables the management to can take action to prevent corporate bankruptcy or failure and to mitigate or reduce the failure-induced costs.

2. Objectives of the study

The purpose of this paper is to extensively explore the corporate governance attributes that influence the likelihood of survival of IPOs companies. Three areas of corporate governance structures include the board size, board independence, CEO quality and ownership concentration are employed in the analysis.

3. Research methodology

Logistic regression model will be employed in this study to examine the influence of corporate governance variables on IPOs company survival likelihood and to identify the probability of survival of a company after IPOs.

Logistic regression analysis emphasizes the probability of a particular outcome for each case. Compare to Multivariate Discriminant Analysis (MDA) introduced by Altman (1968) in predicting corporate bankruptcy, logistic model is more flexible than MDA because the model has no assumptions about the distributions of explanatory variables. In particular, in logistic model, the explanatory variables do not have to be normally distributed, linearly related or equal variance within each group (Tabachnick and Fidell, 2001).

Many studies have utilized logistic regression analysis in financial failure or bankruptcy prediction analysis. For example, Ohlson (1980) pioneered in using logit analysis to compute the probability of failure of 105 failed firms and 2,058 non-failed firms during the period 1970 to 1976. By constructing nine variables in firm failure prediction model, the predictability of the model was high at 96 % for a one year prior to the event.

In addition, Flagg, Giroux and Wiggins (1991) developed a failure prediction model using logistic regression model and found that the model reached 94% for overall accuracy prediction. Other studies employed logit analysis e.g. Zmijewski (1984), Johnson and Melicher (1994), Platt, Platt and Pedersen (1994), Ward and Foster (1997), Mainkamnurd (1999), Tirapat and Nittayagasetwat (1999) and Nikitin (2003).

4. Data and sample

During the period from 1992 and 2007, about 333 firms went public in the Stock Exchange of Thailand. After excluding banks, finance companies and missing data, the final sample consists of 166 IPOs (Securities and Exchange Commission, 2007;

Stock Exchange of Thailand, 2011). For each IPO firm, the study collected individual data from IPO prospectuses, along with publicly available information from on-line data sources including the Capital Market Information Center, the Securities and Exchange Commission (SEC). Since the start of the SEC, 20 firms have been delisted.

Analysis undertaken in this study comprises both outcome model estimation and prediction tasks. To enhance the robustness of the testing procedures and to ensure non-spurious interpretations of results, this final sample of 166 firms is divided into separate estimation and prediction (hold-out) samples. The random estimation sample was formed from the random number of 111 listed observations from the 166 total observations, with the unselected observations forming the hold-out sample used for testing the predictive accuracy of the model. The study records the board size, percent of independent directors, non-executive chairman, dual leadership and ownership concentration, as well as firm characteristics such as age and total asset.

5. Summary and discussion

The empirical results found that IPOs failure or survival in Thailand is not significantly related to corporate governance attributes, including board size, board independent, dual leadership, ownership concentration and firm characteristics such as age and total asset. For board size variable, the result is consistent with Yermack (1996), Parker, Peters and Turetsky (2002b), Elsayed (2007) and Lamberto and Rath (2008) which also found that board size has insignificant effect on survival. For board independence, Hermalin and Weisbach (1991), Yermack (1996) and Klein (1998) also found a negative relationship between the proportion of outside directors and corporate performance.

Considering the result regarding non-executive chairman, the study found consistent result to Weir and Laing (2001) that a company with the presence of independent chairman is more likely to pursue the interests of the shareholders and effectively monitor the management. For CEO duality leadership structure, the result is consistent with the finding in Chaganti, Mahajan and Sharma (1985) and Elsayed (2007) which also found that CEO duality has no impact on corporate governance.

For ownership concentration, the result is inconsistent with some studies which suggested that more concentrated the ownership, the higher profitability and labor productivity *e.g.* Claessens and Djankov (1999) and Bai *et al*. (2004). For company size variable, the result is consistent to the expectation and the finding in Goktan, Kieschnick and Moussawi (2006). Finally, the results found company age is negatively associated with the probability of IPOs failure. The result is consistent to the finding in Jovanovic (1982), Chen and Lee (1993), Lensberg, Eilifsen and McKee (2004), Rommer (2004), Li, Zhang and Zhou (2005), Rommer (2005), Hensher, Jones and Greene (2007) suggest the importance of company age in explaining financial failure.

To evaluate the predictive ability of the model we divided the sample into two subsets namely training sample and hold-out sample. The classification accuracy of the estimated logistic regression model is explored using hold-out sample. Based on training sample, the results found that the model is correctly classified at 87.39 percent with the type I and type II error are 0 and 12.61 percent, respectively while the predictive accuracy using holdout sample are that the model is correctly predicted at 89.09 percent with type I and type II error are 0 and 10.91 percent, respectively. These results confirm high predictive ability of the model.

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LIST OF ABBREVIATIONS

AIC	Akaike Info Criterion
ANN	Artificial Neural Networks
BOT	Bank of Thailand
CEO	Chief Executive Officer
IPO	Initial Public Offering
MDA	Multivariate Discriminant Analysis
SEC	Securities and Exchange Commission
SET	Stock Exchange of Thailand
TA	Total Asset

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND AND MOTIVATION OF THE STUDY

The prediction of firm's financial distress or corporate survival analysis has been of considerable interest to accountants and financial economists over the last three decades. Since financial distress affects a firm's entire existence and results in a huge cost to the firms, the society and the country's economy, prediction of firm's financial distress is crucial for all those involve; owners or shareholders, managers, employees, lenders, suppliers, clients, the community and the government. Interest in corporate financial distress prediction or corporate survival analysis has grown rapidly in recent years with the global increase in the number of corporate collapses such as the Asian financial crisis in 1997, HIH Insurance Australia in 2001, the Enron and WorldCom collapse in the US in 2001 and 2002, respectively.

These collapses often result significant direct and indirect costs to many stakeholders including shareholders, managers, employees, creditors, investors, stockholders, auditors, suppliers, customers and community. For example, the collapse of HIH entailed huge individual and social costs, as the HIH group comprises several insurance companies and was a major provider of all types of insurance in Australia (Leung and Cooper, 2003). The deficiency of the group was estimated to be between $3.6 billion and $5.3 billion, 200 permanently disabled people were left with no regular income payments, retirees with superannuation in HIH shares saw their investment disappear and several non-profit organizations were liquidated by the collapse (Commonwealth of Australia, 2003).

When company entered into financial distress, the significant costs including direct and indirect cost have occurred (Altman and Hotchkiss, 2006). The impact of such events on owners, shareholders, managers, employees, lenders, suppliers, clients, the community and the government is horrendous. According to Altman (1983), financial distress can cause direct and indirect costs to the firm. Direct costs are the tangible, out of pocket expense of either liquidity or attempting a reorganization of the ailing enterprise. These include bankruptcy filing fees and legal, accountants' fee and other professional service costs such as lawyers' fee.

The primary indirect cost is the lost sales and profits of the firm due to the perceived potential bankruptcy. These losses are primarily from customer reluctance. Customers often need assurance that firms are sufficiently stable to deliver on promises and will be reluctance to buy from a firm that may fail. Similarly, the potential of financial distress of firms will affect the relationship between the firm and the suppliers. Suppliers providing goods and services on credit are likely to reduce the generosity of credit terms or even stop supplying. In financial distress situation, employees may become demotivated as job insecurity perception. Furthermore, the high potential staff will start to move to another safer enterprise. The additional indirect cost is the lost of managerial time and opportunity cost. The management has to spend daily time in dealing with liquidity problems and focusing on short term cash flow rather than long term shareholder wealth.

In addition to the economic costs result from corporate failure, there exist the social costs relating corporate collapse. Argenti (1976) pointed that corporate collapse has always brought fearful mental pain to proprietors, entrepreneurs, managers and their families. Failure ruins lives, destroys the health of its victims, pushes the victims

into the edge of suicide and beyond. It can be seen that the failure companies entail significant direct and indirect costs to many stakeholders. Many of the costs may be avoided if ones can identify the factors and the survival probability of the company after Initial Public Offering (IPO).

Therefore, this research study will focus on examining survival likelihood of IPO companies listed on SET based on the corporate governance characteristics. Early identification of potential failure in companies could provide the party concerned with early sign of problem companies for better decision-making. An early warning system enables the management to can take action to prevent corporate bankruptcy or failure and to mitigate or reduce the failure-induced costs.

The reason why firms succeed or fail is perhaps the central question of strategy (Porter, 1991). Since corporate governance is the system by which companies are directed and controlled and board of directors are responsible for the governance of the companies and develop firm's strategy (Pass, 2004), then it is expected that corporate performance and survival is affected by corporate governance attributes.

The Asian financial crisis in 1997 highlighted the importance of good corporate governance for the long-term survival of companies. The recent economic crisis of Thailand has been claimed to be connected to the poor quality of corporate governance and the crony economy (Alba, Claessens and Djankov, 1998; Dhnadirek and Tang, 2003; Limpaphayom and Connelly, 2004).

The 1997 financial crisis result in the government shuttered fifty-six finance firms. Several banks closed, either taken over by the government or merged into larger rivals. Several of remaining banks were forced to seek strategic foreign investors to speed their recovery. The weak of corporate governance practices played

a major role in these difficulties (Limpaphayom and Connelly, 2004). Consistently, Johnson *et al.*(2000) pointed that in the countries with weak corporate governance, worse economic prospects result in more expropriation by managers and thus a larger fall in asset prices. The Bangkok Bank of Commerce is a well-documented example of expropriation by managers that worsened as the bank's financial troubles deepened.

In Thailand, however, there is a lack of corporate governance studies focusing on long-term survival of the company. Rather than examining the survival likelihood of a company, most of previous corporate governance studies in Thai context have focused on examining the corporate performance issue. These studies such as Alba, Claessens and Djankov (1998), Suehiro (2001), Wiwattanakantang (2001), Dhnadirek and Tang (2003), Sukcharoensin (2003), Connelly and Limpaphayom (2004), Kim, Kitsabunnarat and Nofsinger (2004) and Yammeesri, Lodh and Herath (2006).

Existing studies have explored the relationship between corporate governance attributes with corporate performance in various countries *e.g.* in Australia (Balatbat, Taylor and Walter, 2004), China (Claessens and Djankov, 1999; Xu and Wang, 1999; Hovey, Li and Naughton, 2003; Bai *et al*., 2004; Li and Naughton, 2007) and U.K. (Weir and Laing, 2001).

There exist a number of studies explored the influence of corporate governance attributes on corporate performance and suggested that the corporate governance variables significantly influence the performance of a company in Thailand. The significant corporate governance attributes suggested by previous studies affect corporate performance such as ownership concentration (Alba, Claessens and Djankov, 1998; Dhnadirek and Tang, 2003), family-controlled characteristics (Suehiro, 2001; Wiwattanakantang, 2001), board composition

(Connelly and Limpaphayom, 2004) and managerial ownership (Kim, Kitsabunnarat and Nofsinger, 2004).

If corporate governance influences corporate performance, then it is expected that corporate governance attributes affect the likelihood of corporate survival (Goktan, Kieschnick and Moussawi, 2006). In Thailand, however, there is a lack of corporate governance studies focusing on long-term survival of the company. Accordingly, this study will explore the influences of corporate governance structures on IPOs company survival in Thai context. Corporate governance has become a prominent topic over at least the last two decades. One of the reasons for this prominence is the events of a series of recent USA scandals and corporate failures of the late 1990s (Becht, Bolton and Roell, 2002).

Prior literature suggests that many corporate governance structures are associated with corporate survival. For example, Parker, Peters and Turetsky (2002a) reported that the auditor is less likely to issue a going concern modification to the company in the presence of employee audit committee members, greater insider ownership and blockholder ownership. By investigating 176 financially distressed firms, Parker, Peters and Turetsky (2002b) suggested firms that replaced their Chief Executive Officer (CEO) with an outsider were more than twice as likely to experience bankruptcy. Furthermore, the results suggested positive relationship between likelihood of firm survival and larger levels of blockholder and insider ownership.

To achieve this objective, the sample of IPOs companies which listed on the Stock Exchange of Thailand (SET) between 1992 and 2007 are tracked until 31 December 2009 to identify the companies status include trading and delisted. The

logistic regression model is then employed to identify the probability of survival of a company after IPOs.

To our best knowledge, there is no prior study has explored the survival of IPO companies in Thai context. Kim, Kitsabunnarat and Nofsinger (2004) is the first study examining IPO companies in Thailand but the study's main focus is on exploring managerial ownership on the IPO firms performance. In addition, Mainkamnurd (1999) and Jaikengkit (2004) is only two studies examined the relationship between corporate governance variables and financial distress in Thai context.

In examining firm's financial distress, although Mainkamnurd (1999) focused on exploring managerial determinants rather than focused mainly on corporate governance variables, it should be noted that some variables used in the study *e.g.* ownership structure, management turnover and quality and creditworthiness of financial information could be categorized as corporate governance variables. Accordingly, Jaikengkit (2004) is the only study which focus mainly on examining the relationship between corporate governance variables and financial distress in Thai context.

Comparing to Jaikengkit (2004), our study is different in at least two aspects. Firstly, Jaikengkit (2004) explored financial distress problem in established companies while our study focuses on IPOs companies sample. As a change in corporate governance *e.g.* ownership structure is one of the major changes that take place when a firm goes public (Kim, Kitsabunnarat and Nofsinger, 2004), therefore, it remain the open question that whether these changes in corporate governance mechanisms affect the survival of IPOs companies.

Secondly, contrast to Jaikengkit (2004) which focused the study on financial institution, our study explores non-financial companies. Inclusion the companies from non-financial sectors will present the larger proportion of companies on SET and enables the larger sample size and reliable estimation results.

1.2 OBJECTIVES OF THE STUDY

The purpose of this paper is to extensively explore the corporate governance attributes that influence the likelihood of survival of IPOs companies. Three areas of corporate governance structures include the board size, board independence and ownership concentration are employed in the analysis.

1.3 SCOPE OF THE STUDY

The company which listed on SET during 1992 to 2007 will be included in the analysis. These companies are tracked until 31 December 2009 to identify the companies' status include trading and delisted. Failed company is defined as a company which is delisted from the Stock Exchange of Thailand (SET). A company which still trading on SET is then defined as active or survival company.

The IPOs company's prospectus and financial statements will obtain from the Exchange Commission and the Stock Exchange of Thailand databases. The study excludes the companies from financial sector because of different financial statements structure.

1.4 RESEARCH HYPOTHESES

The research hypotheses in this research are set as follows:

Research hypothesis #1: Board size is significantly related to the likelihood of IPOs company survival.

Research hypothesis #2: Board independence is significantly related to the likelihood of IPOs company survival.

Research hypothesis #2.1: Percentage of independent directors is significantly related to the likelihood of IPOs company survival.

Research hypothesis #2.2: Presence of non-executive chairman is significantly related to the likelihood of IPOs company survival.

Research hypothesis #2.3: Presence of CEO duality structure is significantly related to the likelihood of IPOs company survival.

Research hypothesis #3: Ownership concentration is significantly related to the likelihood of IPOs company survival.

Research hypothesis #4: IPOs size significantly affects the likelihood of IPOs company survival.

Research hypothesis #5: IPOs age significantly affects the likelihood of IPOs company survival.

1.5 CONTRIBUTION OF THE STUDY

By examining extensive corporate governance attributes as the predictor of IPOs company survival in Thailand, this study will add the contribution regarding corporate IPOs company survival and corporate governance literature in Thai context. Understanding the significant corporate governance factors that influence the likelihood of IPOs survival may assist involved parties improving the decision making for example, IPOs company administrators who may improve their policy

related corporate governance attributes in order to prevent financial difficulties. Government agencies may use this research's findings to develop the related corporate governance policy for supporting IPOs. Furthermore, the researchers could conduct further researches relating IPOs survival or failure prediction upon the findings of this study.

1.6 STRUCTURE OF THE STUDY

The study is organized into five chapters. A brief summary of each chapter is set out below.

Chapter 1 Introduction: The chapter provides an introduction to the study, beginning with a statement of the problem and the motivation of the study. Next, the research objectives and research question are defined as this improves understanding of the specific questions that the researchers need to answer. Furthermore, research hypotheses needed to be tested have been set in this chapter. These hypotheses are draw upon the relevant literature and theories and link to research questions. Then, the scope of the study is set and the significance of the study is discussed. This chapter ends with the organization of the study.

Chapter 2 Literature Review: This chapter contains a comprehensive review of the roles of IPOs in the economy. To obtain the knowledge about the IPOs survival studies, we also review previous studies focusing IPOs or corporate survival. In addition, the background, employed methodology and the empirical results in previous studies are presented. Finally, the chapter concluded the corporate governance attributes and its popularities in previous failure or bankruptcy prediction literature.

Chapter 3 Research Methodology: The chapter discusses the data, sample and empirical methodology used in the study. This chapter starts with the discussion of the categories of the methodologies included the advantages and disadvantages employed in previous studies relating the bankruptcy or financial distress or failure prediction. Then, the details of logistic regression model used to estimate the predicting company failure model will be described.

Chapter 4 Empirical Results: This chapter reports the empirical results of the study both in univariate and multivariate analysis context. The chapter begins with univariate analysis results include the descriptive statistics to discuss the overall characteristics of the data employed. Then the correlation coefficients will be reported and examined followed by the multivariate analysis namely, the estimated logistic regression. The empirical results regarding the logistic regression will be presented and the economic interpretation relating the model will be discussed.

Chapter 5 Summary and Conclusion: The chapter summarizes the overall picture of the study and discusses the empirical results. The policy implications that are derived from the findings are also presented. The chapter ends by proposing suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

As mentioned in the first chapter, the failure of business unit causes significant direct and indirect costs especially IPOs which are the business unit that plays significant roles in the economy. The model that could be used as an early earning signal of failure is essential. Therefore, this research focuses on examining the determinants of IPO surviving. Previous literature have been employed various methodologies using various categories of variables in predicting or examining bankruptcy of failure. The main purpose of this chapter is to review the literature on the empirical methodologies utilized in bankruptcy prediction and the potential predictors of firm surviving.

The chapter is divided into six sections start with the introduction. The following section presents the IPO's role in the Thai economy. Section 2.3 provides capital market situation in Thailand. The previous literature on corporate governance and corporate performance or survival will be discussed in Section 2.4. Then, Section 2.5 discusses the theoretical framework and hypothesis development. Finally, Section 2.7 provides the conclusions.

2.2 ROLES OF IPOs IN THE ECONOMY

Stock markets are markets where stocks are sold and bought. Stocks (or shares) are issued by companies and sold to investors in order to raise capital. In contrast to debt, capital collected via issuance of shares does not ever need to be returned. Stockholders (or shareholders) are co-owners of the company, and have the right to

influence corporate decision-making by exercising their votes at shareholders' meetings, the right to collect dividends (a part of company profits paid out to shareholders), and in case of the company going bankrupt, the right to obtain a share of proceeds from the sale of corporate assets left over after the repayment of debts. In addition to common stocks (ordinary shares), which give owners one vote each and identical dividend rights, companies can issue preferred shares, with multiple votes and/or special dividend rights. When stocks are bought from the company that issues them, we refer to such transactions as the primary stock market. Shares sold and bought between investors and traders themselves constitute secondary stock markets (Mishkin, 2007)

Primary stock markets cannot survive without secondary markets, where investors trade shares and thus modify their investment portfolios. Trading can take place directly between investors, on an over–the-counter (OTC) market, but an overwhelming share of it became centralized in meeting places of professional stock traders, who collect orders from investors or trade on their own account. The concentration of trading in space and time, making it easier for traders to find a counterpart, judge their reputation and exchange information, led to the creation of stock exchanges, with lists of stocks being traded and trading rules established. Firms listing their shares on a stock exchange for the first time are referred to as going public, a process mostly combined with the issuance of new shares known as the initial public offering (IPO). It is widely believed that a vibrant market for IPOs is an asset of the economy. Black and Gilson (1998) and many others argue that the existence of such a market plays a critical role in facilitating entrepreneurship and venture capital in the economy. This view permeates corporate finance textbooks.

The law and finance literature shows that IPO activity depends on country-level laws and governance institutions. It also shows that IPO activity is higher in common law countries compared to countries with other legal origins. From this perspective, IPO activity has been vibrant in the economy because of better laws and better governance institutions.

2.3 CAPITAL MARKET IN THAILAND

The development of the country's capital market is considered to be an important source of funds for medium to long-term investment. It enables entrepreneurs who are in need of capital for their business operations to mobilize funds directly from the public by issuing and offering diversity of securities. Public issuance and offering of various securities allows businesses to raise funds at lower cost than the conventional medium through loans from domestic and foreign financial intermediaries. The development of the capital market thus plays a crucial role in enhancing as well as fortifying the stability of the overall economic system.

Introduction the modern Thai capital market traces its origins back to the early 1960s. In 1961 Thailand implemented its first five-year National Economic and Social Development Plan to support the promotion of economic growth and stability as well as to develop the Kingdom's standard of living. Following upon this, the Second National Economic and Social Development Plan (1967-1971) then proposed for the first time that an orderly securities market be established in order to mobilize additional capital for national economic development.

The creation of Thailand's first officially sanctioned and regulated securities market was initially proposed as part of the Second National Economic and Social

Development Plan (1967-1971). In outlining its proposal for the creation of a supervised securities market, the Second National Development Plan stressed that the market's most important role would be to mobilize funds to support Thailand's industrialization and economic development. The modern Thai capital market can essentially be divided into two phases, beginning with "The Bangkok Stock Exchange" which was privately owned, followed by the establishment of "The Securities Exchange of Thailand" (Stock Exchange of Thailand, 2009).

The inception of the Thai stock market began as far back as July 1962, when a private group established an organized stock exchange as a limited partnership. The group later became a limited company and changed its name to the "Bangkok Stock Exchange Co., Ltd." (BSE) in 1963. Despite its well-intended foundation the BSE was rather inactive. Annual turnover value consisted of only 160 million baht in 1968, and 114 million baht in 1969. Trading volumes continued to fall sharply thereafter to 46 million baht in 1970, and then 28 million baht in 1971. The turnover in debentures reached 87 million baht in 1972, but stocks continued to perform poorly, with turnover hitting an all time low of only 26 million baht. The BSE finally ceased operations in the early 1970s. It is generally accepted that the BSE failed to succeed because of a lack of official government support and a limited investor understanding of the equity market.

2.3.1 Establishment of the Stock Exchange of Thailand

Despite the failure of the BSE, the concept of an orderly, officially supported securities market in Thailand had by then attracted considerable attention. In this regard, the Second National Economic and Social Development Plan (1967-1971)

proposed, for the first time, a plan for the establishment of such a market, with appropriate facilities and procedures for securities trading.

In 1969, as recommended by the World Bank, the government acquired the services of Professor Sidney M. Robbins from Columbia University to study the development channels of the Thai capital market. Professor Robbins had previously served as Chief Economist at the United States Securities and Exchange Commission. The same year proved an eventful one for the Thai capital market, as the Bank of Thailand also formed a Working Group on Capital Market Development, which was assigned the task of establishing the stock market. A year later, in 1970, Professor Robbins produced a comprehensive report entitled "A Capital Market in Thailand". This report became the master plan for the future development of the Thai capital market.

In 1972 the Government took a further step in this direction by amending the "Announcement of the Executive Council No. 58 on the Control of Commercial Undertakings Affecting Public Safety and Welfare". The changes extended government control and regulation over the operations of finance and securities companies, which until then had operated fairly freely. Following these amendments, in May 1974, long-awaited legislation establishing "The Securities Exchange of Thailand" (SET) was enacted. This was followed by revisions to the Revenue Code at the end of the year, allowing the investment of savings in the capital market. By 1975 the basic legislative framework was in place and on April 30, 1975, "The Securities Exchange of Thailand" officially started trading. On January 1, 1991 its name was formally changed to "The Stock Exchange of Thailand" (SET).

2.3.2 Regulatory framework of the capital market

Despite the fact that the Thai capital market plays such a crucial role in the country's economic system, in the past, the supervision and development of the Thai capital market was governed under various laws and regulations. To initiate a new legal framework and mark a new era for the Thai capital market, on March 16, 1992, the Securities and Exchange Act of 1992 (SEA) was promulgated and came into force on May 16, 1992 so as to reinforce the unity, consistency, and efficiency in supervision and development of the market. The enactment of the SEA empowered the Securities and Exchange Commission (SEC), Thailand to be established as an independent state agency with responsibility for supervision and development of the capital market under the direction and guidance of the Board of the SEC (Securities and Exchange Commission, 2009).

The SEA stipulates the SEC, a single unified supervisory agency, as the regulator of the Thai Capital Market. While the SEC oversees the development of the Kingdom's capital market, the Bank of Thailand (BOT) is responsible for the country's money market. The SEA also provides a clear separation between the primary and the secondary markets to facilitate their successful development. Both primary and secondary markets are regulated by the SEC.

The SEC oversees and regulates the primary market. In this regard, a company wishing to issue new securities, carry out an IPO or offer additional securities to the public must first apply for SEC approval and comply with its filing requirements. The SEC is then required to carefully review the financial status and operations of the company before allowing the firm to issue securities to the public. Following the IPO,

securities may be traded in the secondary market once the issuer has applied for and been granted approval by the SET.

2.3.3 Statistics on Initial Public Offerings

Table 1 shows the market size of IPOs in the population and distribution by year of offering. Size of IPOs is presented as market capitalization which is the offering price multiplied by number of new shares issued. The unit is million Baht.

Table 1: New Listed Companies

Year	Number of IPOs			Issued Size (M. Baht)	Market Capital (M. Baht)
	SET	mai	Total		
2003	21	6	27	23,265.50	103,763.36
2004	36	14	50	77,340.81	233,195.01
2005	35	14	49	29,860.78	110,222.43
2006	12	6	18	37,617.08	96,599.05
2007	7	6	13	11,552.10	105,081.73
2008	9	3	12	18,764.30	70,490.53
2009	7	11	18	6,168.62	30,264.60
2010	4	7	11	6,716.56	52,461.02

Source: Stock Exchange of Thailand (2011).
Notes: 1) Market for Alternative Investment (mai) has been established under the SEA. The objective is to create new fund-raising opportunities for innovative business with high potential growth as well as provide a greater range of investment alternatives for investors. 2) Market Capital as of first listing date. 3) Issued Size calculated from total common stocks sold to public (included new issued shares, existing shares and greenshoe) and ESOP

2.4 PREVIOUS LITERATURE ON CORPORATE GOVERNANCE

Corporate governance is the system by which companies are directed and managed. It influences how the objectives of the company are set and achieved, how risk is monitored and assessed and how performance is optimized. Good corporate governance structures encourage companies to create value through entrepreneurism, innovation, development and exploration and provide accountability and control systems commensurate with the risks involved (ASX, March 2003).

Corporate governance has become a prominent topic over at least the last two decades. The reason for this prominence are a number of events such as the worldwide wave of privatization of the past two decades, pension fund reform and the growth of private savings, the takeover wave of the 1980s, deregulation and the integration of capital markets, the 1998 East Asia crisis, which has put the spotlight on corporate governance in emerging markets, a series of recent USA scandals and corporate failures of the late 1990s (Becht, Bolton and Roell, 2002).

The corporate collapses of the late 1990s highlighted the need for good corporate governance and financial reporting quality. There exist various studies explore corporate governance aspects in relation to corporate performance in various countries. For example, Balatbat, Taylor and Walter (2004) found that board composition measured by outsider ownership is not related with Australian IPOs operating performance while independent board leadership structure is associated with better company's performance. The consistent finding about the influence of CEO duality on corporate performance also is found in Bai *et al*. (2004) and Li and Naughton (2007) which focus the studies in Chinese context.

In Chinese companies context, Hovey, Li and Naughton (2003) confirmed that ownership concentration has little explanatory power but ownership structure has significant relationship with firm performance. However, Xu and Wang (1999) argued that the mix and concentration of stock ownership significantly affect a company's performance. Lehmann and Weigand (2000) also found that ownership concentration negatively affect the corporate profitability in German corporations. Furthermore, investigating ownership structure and corporate performance in the Czech Republic,

Claessens and Djankov (1999) also found that the more concentrated the ownership, the higher the firm profitability and labor productivity.

In Thai context, there exist a numbers of studies examine the influence of corporate governance variables on corporate performance, for example, Alba, Claessens and Djankov (1998) investigated the relationships between ownership concentration, leverage and corporate performance of non-financial firms listed on SET. The empirical findings highlight the weaknesses in corporate governance and the risky corporate financing structures. Consistently, Dhnadirek and Tang (2003) investigated the status of Thai corporate governance system prior to the 1997 financial crisis focus on firms in the finance industry and suggested solving ownership concentration problems should be the first priority in strengthen Thai corporate governance systems.

In contrast, Suehiro (2001) explored the relationship between ownership patterns, corporate structure and economic performance in listed Thai companies between 1996 and 2000. The major finding is that family businesses were not a major cause of the financial distress. The similar results also found in Wiwattanakantang (2001) which investigated the effects of controlling shareholders on corporate performance and suggested that family-controlled firms display significantly higher performance. Furthermore, Yammeesri, Lodh and Herath (2006) examined the effect of ownership structure on corporate performance of Thai non-financial firms between 1993 and 1996 and reported the positive association between concentrated ownership and firm performance. The results show that different types of concentrated ownership have positive relationships to performance measures.

Sukcharoensin (2003) provided three assays of corporate governance and corporate performance in Thailand. First, the effect of the board independence on firm performance in contingent on the ownership structure of the firm was investigated. Secondly, the relationship between audit committee independence and firm performance was examined. Finally, the effect of the announcement of corporate director changes on the company's stock price is explored. Overall results suggest that an independent board member of Thai listed firms is important factor in explaining corporate performance.

Limpaphayom and Connelly (2004) reviewed corporate governance issue in Thailand and analyzed the relationship between corporate governance practices and firm performance. The results found a positive relationship between corporate governance rating and firm value measured by Tobin's Q ratio. The study confirmed that corporate governance practices can lead to high firm value.

Rather than focus on established companies in Thailand, Kim, Kitsabunnarat and Nofsinger (2004) examined corporate operating performance by focusing on the IPOs company. The study explored the association of managerial ownership and the post-IPO change in performance. The results found a curvilinear relationship between managerial ownership and corporate performance after going public.

By focusing the study on specific sector, Limpaphayom and Connelly (2004) examined the relationship between board characteristics and firm performance in life insurance companies in Thailand. The empirical evidences suggest that board composition is positively related to profitability and negatively related to the risk-taking behavior of life insurance firms. However, board size is not significantly associated with firm performance.

It can be seen that various studies found the evidences support the importance of corporate governance in relation to corporate performance. In contrast, Weir and Laing (2001) investigated the relationship of corporate governance structure with corporate performance in the UK and suggested that there is no clear relationship between corporate governance and corporate performance.

If corporate governance factors influence the performance of the company, then the governance attributes are expected to impact on the likelihood of company survival Goktan, Kieschnick and Moussawi (2006).

Prior literature suggests that many corporate governance structures are associated with financial distress or the likelihood of firm survival. For example, Lee, Yeh and Liu (2003) employed accounting, corporate governance and macroeconomic variables to construct a binary logistic regression model for the prediction of financially distressed firms. The percentage of directors controlled by the largest shareholder, management participation, and the percentage of shares pledged for loans by large shareholders are found to have positive relationship with the probability of financial distress.

Lee and Yeh (2004) utilized three corporate governance variables namely, the percentage of directors occupied by the controlling shareholder, the percentage the controlling shareholders shareholding pledged for bank loans and the deviation in control away from the cash flow rights to fit the dichotomous prediction models. The results suggested that three variables mentioned above are positively related to the risk of financial distress of Taiwan companies.

Goktan, Kieschnick and Moussawi (2006) examined the relation between corporate governance structures and the likelihood of a company going private, being

acquired or going bankrupt. They found the evidence that corporate governance primarily influences whether a corporation is acquired or goes private but not whether it goes bankrupt. In order to reduce the agency cost, Yang and Sheu (2006) suggested that the equity stake owned by management, especially by top officers, of an IPO firm should be encouraged. Furthermore, they observed the U-shaped relationship between insider ownership and the survival time of Taiwan IPOs.

Rather than focusing on the established company survival, various studies have focused on IPOs company. IPOs refers to the first sale of stock by a private company to the public. The process of going from a private to a public company often begins when a young company needs additional capital to grow its business. In order to gain access to required capital, the firm will sometimes choose to sell an ownership stake or shares of stock to outside investors. This process results in several internal changes for IPOs company especially in ownership and governance structure and this is an opportunity of the firm to considering the optimal board structure that maximizing the market value of the company (Shekhar and Stapledon, 2007).

The survival of IPOs companies has been investigated by existing literature *e.g.* Cockburn and Wagner (2007) examined the effect of patenting on the survival of internet-related firms which going public during the dot-com boom after the late 1990s. The independent variables include industrial classification, financial data. firm's age, venture capital backed, firms' total assets, market environment and patent information. Using Cox's Proportional Hazard model, the results found that patenting is positively associated with survival controlling for age, venture-capital backing, financial characteristics, and stock market conditions.

Additionally, Kauffman and Wang (2007) investigated the drivers of internet firm survival and exit using Cox proportional hazards model and a semiparametric Bayesian survival analysis. The empirical results suggested that market, firm and e-commerce related variables can reduce an internet firm's likelihood of exit. Those variables include the entry of additional internet firms via IPOs, a smaller firm size, good IPO timing, being a late entrant and the selling of digital products or services. In addition, internet firms which operate in breakthrough markets are more likely to survive than those that operate in re-formed markets.

The recent literature on the survival of IPOs which focus on the impact of corporate governance *e.g.* Audretsch and Lehmann (2004) explored the relationship between ownership and induced incentives and the survival of young and high-tech firm survival listed on the *Neuer Markt* in Germany from 1997 to 2002. They found that CEOs ownership negatively related to company failure likelihood but it become insignificance when introducing measurements of human capital and intellectual rights. The results confirmed that the governance structure needed for firms in the new economy industries are different from traditional firms.

Van der Goot, Van Giersbergen and Botman (2008) analyse the determinants of survival of internet firms listed on the NASDAQ between 1996 and 2001. Their results show that surviving firms are associated with lower risk indications in the IPO prospectus, higher underwriter reputation, higher investor demand for the shares issued at the IPO, lower valuation un-certainty, higher insider ownership retention, a lower NASDAQ market level, and a higher operating cash flow to liabilities ratio compared to non-survivors.

In Thailand, to our best knowledge, there is no prior study has explored the survival of IPOs companies. Kim, Kitsabunnarat and Nofsinger (2004) is the first study examining IPOs companies in Thailand but the study main focus is on exploring managerial ownership on the post-IPO change in performance. Furthermore, there exist limited number of studies explored corporate governance variables and financial distress in Thai context. These studies include Mainkamnurd (1999) and Jaikengkit (2004).

Mainkamnurd (1999) focused on exploring managerial determinants in relation to firm's financial distress rather than focused mainly on corporate governance variables. Specifically, the study explored whether management is related to financial distress or not. However, it should be noted that some variables used in the study *e.g.* ownership structure, management turnover and quality and creditworthiness of financial information could be categorized as corporate governance variables. Furthermore, Jaikengkit (2004) examined the relationship between corporate governance variables and financial distress in Thai context. However, the sample incorporate in Jaikengkit (2004) consist of established companies rather than IPOs companies.

Using logistic model, Jaikengkit (2004) examined the impacts of concentrated ownership, board of director characteristics and managerial ownership on the probability of financial distress. The findings indicated that corporate governance and corporate failure are associated and confirmed that an early warning system in financial distress prediction can not be complete without incorporating the corporate governance characteristics.

To our best knowledge, this is the first study which investigates the survival of Thai IPOs based on corporate governance attributes. By examining extensive corporate governance attributes as the predictor of IPOs company survival in Thailand, this study will make the contribution regarding corporate governance and IPOs company survival literature in Thai context.

Table 2: Summary of selected empirical studies on corporate governance and firm survival

No	Studies	Data			Methodology	Results
		Countries	Period	Independent Variables		
1.	Alba, Claessens and Djankov (1998)	Thailand	1992 - 1996	Ownership concentration, leverage, corporate financing patterns, Sector Dummy and Size Dummy	Correlation analysis	- Firms with concentrated ownership show a deteriorating performance relative to firms with less concentrated ownership. - Firms with relatively worse performance got a disproportionately large share of financing in the period immediately preceding the crisis.
2.	Claessens and Djankov (1999)	Czech Republic	1992 - 1997	Accounting data and the share of equity held by the top five investors	Regression analysis	- The study found the positive nonmonotonic relation between ownership concentration and both profitability and labor productivity.
3.	Xu and Wang (1999)	China	1993 - 1995	Ownership mix and concentration, legal person shareholders and the inefficiency of state ownership	Regression analysis	- The results suggest the importance of large institutional shareholders in corporate governance, the inefficiency of state ownership and potential problems in an overly dispersed ownership structure.
4.	Lehmann and Weigand (2000)	Germany	1991 - 1996	Ownership concentration, the managed vs. the governed firm, corporations traded on the stock exchange and	Regression analysis	- Ownership concentration to affect profitability significantly negatively. However, this effect

No	Studies	Data			Methodology	Results
		Countries	Period	Independent Variables		
				non-stock corporations		depends intricately on stock market exposure, the location of control rights, and the time horizon (short-run vs. long-run).
5.	Suehiro (2001)	Thailand	1996 - 2000	Types of business, ownership patterns, management structures, profiles of board of directors, and executive committee and audit committee members	Descriptive statistics	- Family-type business do not always demonstrate poor performance in comparison with other types of ultimate owners. - Firms with foreign shareholdings of 30-49% put in the best performance, followed by firms with foreign shareholdings of 50% and above. In contrast to these two groups, firms with foreign shareholdings of 0-9% performed worst in every financial indicator. - The group of corporations with no ultimate owners has always shown the worst business record.
6.	Wiwattanakantang (2001)	Thailand	1996	The presence of controlling shareholders, types of controlling	Regression analysis	- The presence of controlling shareholders is associated with higher performance.

No	Studies	Data			Methodology	Results
		Countries	Period	Independent Variables		
				shareholders, the involvement in management by controlling shareholders, firm characteristics and industry effects		- Family-controlled firms display significantly higher performance. Foreign controlled firms as well as firms with more than one controlling shareholder also have higher ROA, relative to firms with no controlling shareholder.
7.	Dhnadirek and Tang (2003)	Thailand	1994 - 1996	Managerial ownership, debt pressure, bank ownership, year dummy variables and firm size	Ordinary-least-squares regression and hierarchical regression	- Managerial ownership beyond 25 per cent and 30 per cent levels, respectively, have a negative association with firm performance - The results found significant negative relationship between debt pressure and performance measures implying that debt is not a monitoring mechanism - Bank ownership shows no significant relationship with firm performance regardless of cut-off points.
8.	Hovey, Li and Naughton (2003)	China	1997 - 1999	Ownership of large shareholders, the top five shareholders, and the state and legal persons, relative	Regression analysis	- Ownership concentration has little explanatory power on firm performance but ownership structure does matter.

No	Studies	Data			Methodology	Results
		Countries	Period	Independent Variables		
				to the proportion of tradable A-shares		- Legal person's shareholdings are positively related to firm valuation.
9.	Bai *et al*. (2004)	China	1999 - 2001	Ownership variables, board of directors, executive compensation, the percentage of shares held by these top executives, financial transparency, government controlling , size, leverage ratio, the capital-sales ratio, the operation income-sales ratio and industry sector	The fixed effects models and the random effects models	- Both high concentration of non-controlling shareholding and issuing shares to foreign investors have positive effects on market valuation - A large holding by the largest shareholder, the CEO being the chairman or vice chairman of the board of directors, and the largest shareholder being the government have negative effects.
10.	Balatbat, Taylor and Walter (2004)	Australia	1976 – 1993	Ownership and corporate governance attributes	Ordinary-least-squares regression	- Any evidence of a positive association between insider ownership and firm performance is confined to the fourth and fifth years after the IPO. - Evidence of a positive relation between institutional ownership and performance is restricted to the latter part of our 5-year post-listing window. - Board composition is not

No	Studies	Data			Methodology	Results
		Countries	Period	Independent Variables		
						associated with operating performance.
11.	Limpaphayom and Connelly (2004)	Thailand	1997-2002	Sales, single domestic owner dummy variables, non-family group dummy variables, new firms dummy and industry dummy variables.	Regression analysis	- The results found a positive relationship between corporate governance rating and firm value.
12.	Li and Naughton (2007)	China	1999 - 2001	Board independency, leadership structure, board size, year of issuance, IPO offer size, lottery rate ratio, industry dummy, legal person ownership, tradable A-shares ownership and earnings per share	Ordinary-least-squares regression	- Board size is positively related to short-term returns, while in the long-term, a positive relationship exists between performance and the voluntary post-listing separation of the roles of CEO and Chair of the Board.
13.	Mainkamnurd (1999)	Thailand	1996 - 1998	Ownership structure, managerial turnover, management's aggression in terms of investing and financing styles, skills and perspectives of managing under floating exchange rate regime, quality of conducting financial information and industry condition	Logistic regression analysis	- Management competency coupled with the factor outside managerial control is responsible for corporate financial distress. The capability of capital management appears to be the most crucial determinant.

No	Studies	Data			Methodology	Results
		Countries	Period	Independent Variables		
14.	Lee, Yeh and Liu (2003)	Taiwan	1998 - 2001	Accounting, corporate governance and macroeconomic variables	Logistic regression analysis	- The percentage of directors controlled by the largest shareholder, management participation, and the percentage of shares pledged for loans by large shareholders are positive related with the probability of financial distress. - Firms with higher sensitivities to the annualized growth rates of manufacturing production index and money supply (M2) are more vulnerable to financial distress.
15.	Audretsch and Lehmann (2004)	Germany	1997 - 2002	Firm age, firm size, firm growth, ownership academic title executives and board and firm patents	Proportional hazard duration model	- The incentive structure dictates that a predominant ownership share by executives will result in a superior firm performance. - CEOs ownership negatively related to company failure likelihood but it become insignificance when introducing measurements of human capital and intellectual rights.
16.	Jaikengkit (2004)	Thailand		Concentrated ownership, board of director characteristics and	Logistic regression analysis	- Corporate governance and corporate failure are associated

No	Studies	Data			Methodology	Results
		Countries	Period	Independent Variables		
				managerial ownership		
17.	Kim, Kitsabunnarat and Nofsinger (2004)	Thailand	1987 - 1993,	Managerial ownership	Ordinary-least-squares regression	- A curvilinear relationship between managerial ownership and the post-IPO change in performance is found. - Firms with 'low' and 'high' levels of managerial ownership experience positive relationships between managerial ownership and the change in performance, while firms with 'intermediate' levels of managerial ownership exhibit a negative relationship between managerial ownership and the change in performance.
18.	Lee and Yeh (2004)	Taiwan	1996 - 1999	The percentage of directors occupied by the controlling shareholder, the percentage the controlling shareholders shareholding pledged for bank loans and the deviation in control away from the cash flow rights	Logistic regression analysis	- The purposed corporate governance variables positively related to the risk of financial distress
19.	Goktan, Kieschnick and	U.S.A.	1997 - 2004	A firm's financial features, board size, board	A discrete time hazard model with competing	- Corporate governance primarily influences whether a

No	Studies	Data			Methodology	Results
		Countries	Period	Independent Variables		
	Moussawi (2006)			composition, management's equity stake, corporate charter/bylaws, and the state laws	risks.	corporation is acquired or goes private, but not whether it goes bankrupt.
20.	Yang and Sheu (2006)	Taiwan	1992-2000	Managerial ownership retention, managerial ownership structure, the square of managerial ownership, age, size, IPO activity, market level, and industry effect	Survival analysis	- The survival time of IPOs first decreases and then increases with the percentage of total insider ownership at the time of offering, forming a U-shaped relationship. - The survival time is positively affected by the officer-to-insider holding ratio.
21.	Lamberto and Rath (2008)	Australia	1995 - 2004	Age at offering, offer price, size of the offering, ownership retained, attachment of options to the offer, underwriter backing, issue costs as a percentage of the offer proceeds, auditor in the big 5, earnings to price ratio, forecast dividend yield, number of risk factors in the prospectus, non-executive chairman,	Cox proportional hazard model	- The number of risk factors listed in the prospectus and the size of the firm are both found to be negatively related to survival. - The size of the offering and the forecast dividend yield are positively related to survival. - The likelihood of survival is also found to vary with industry and firms in the finance and natural resource industries are more likely to survive than

No	Studies	Data			Methodology	Results
		Countries	Period	Independent Variables		
				number of directors, percentage of independent directors, industry, leverage, profitability, size of the firm, tangibility of assets, total asset turnover		firms in other industries.
22.	Van der Goot, Van Giersbergen and Botman (2008)	U.S.A.	1996 - 2001	Number of risk factors, a reputation of the lead manager, firm size, investor demand, valuation uncertainty, percentage of insider ownership retention duration of internet activities, market level at the time of offering, offer-to-book ratio, net sales over assets, operating cash flow over liabilities and receivables over total assets.	Cox proportional hazard model	- Surviving firms are associated with lower risk indications in the IPO prospectus, higher underwriter reputation, higher investor demand for the shares issued at the IPO, lower valuation un-certainty, higher insider ownership retention, a lower NASDAQ market level, and a higher operating cash flow to liabilities ratio compared to non-survivors.

2.5 THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

The development of agency theory suggests that there is the link between corporate governance and firm performance (Audretsch and Lehmann, 2004). If corporate governance influences corporate performance, then it should have some effect on corporate survival (Goktan, Kieschnick and Moussawi, 2006). There exist the literature explore the relationship between corporate governance structure and corporate survival. For example, Lee and Yeh (2004) presented the connection between corporate governance and financial distress and emphasised that firms with weak corporate governance are vulnerable to economic downturns and the probability of falling into financial distress increases. This finding is consistent with Johnson *et al*. (2000).

In this study, we explore three areas of corporate governance include the board size, board independence and ownership concentration. Company-specific variables *e.g.* company age and company size are additionally included in the model as the control variables.

2.5.1 Corporate governance attributes

2.5.1.1 Board size

There exist mixed results relating the effect of board size on firm survival. Lamberto and Rath (2008) claimed that guidelines of good governance endorse larger board sizes based on the notion that greater accountability will result. In addition, Pfeffer and Salancik (1978) argued that firms with large boards will bring a wider range of views and external connections, will exploit more opportunities and strengthen the power of the board relative to the CEO. Furthermore, Li and Naughton (2007) found

that the board size of Chinese IPOs has a significant positive relationship to initial returns, suggesting that board size is an important issue for IPO investors in China. This is consistent with the findings of (Adams and Mehran, 2003).

However, board size is found to have inverse relationship with firm value (Yermack, 1996). The author also pointed out that companies with small boards exhibit more favorable values for financial ratios and provide stronger CEO performance incentives form compensation and the threat of dismissal. Furthermore, Elsayed (2007) found board size is never significant impact on corporate performance. This finding is consistent with Parker, Peters and Turetsky (2002b) and Lamberto and Rath (2008) which also found that board size has insignificant effect on survival. By investigating life insurance company in Thailand, Connelly and Limpaphayom (2004) also confirmed that board size is not significantly related to firm performance.

In this study, the total number of director on the board is used to measure board size to test the effect of board size on IPOs survival.

2.5.1.2 Board independence

While the importance of board independence has been generally acknowledged, there is no common consensus relating the definition of ‘independence’ (Brennan and McDermott, 2004; Kang, Cheng and Gray, 2007). Previous studies have using the word ‘outside directors’ instead of ‘independence’ to describe directors who are presumed to be independent from management (Ajinkya, Bhojraj and Sengupta, 2005). Some existing studies simply consider the differences between ‘executive’ and ‘non-executive’ directors (Kang, Cheng and Gray, 2007; Lamberto and Rath, 2008).

1) Percentage of Independent Directors

Based on agency perspective, Fama and Jensen (1983) argued that if the majority of the directors on the board are independent director, then the less likely the CEO and inside directors will exercise behaviors that are self-serving on the costs of shareholders.

Consistently, Pass (2004) pointed that since non-executive directors can provide independent judgment, thus, the interests of shareholders will be protected by the presence of independent directors. Furthermore, the company could benefit from non-executive directors since they can contribute valuable external business expertise to the company, can often see risks and opportunities for the company which might have been overlooked by the company's executive directors who are typically immersed in the day-to-day running of the business.

The results from existing literature relating the effects of proportion of non-executive directors on corporate performance and survival are mixed. Some literature found evidence support expectation that higher proportion of non-executive directors in the board lead to better corporate performance and consequently, higher probability of corporate survival. *e.g.* Rosenstein and Wyatt (1990), Daily and Dalton (1994) and Beasley (1996). In contrast, Hermalin and Weisbach (1991), Yermack (1996) and Klein (1998) found a negative relationship between the proportion of outside directors and corporate performance. Furthermore, some literature found there is no relationship between the proportion of non-executive directors and corporate performance *e.g.* Vafeas and Theodorou (1998), Laing and Weir (1999), Bhagat and Black (2001) and Balatbat, Taylor and Walter (2004).

In Thai context, Sukcharoensin (2003) suggested that an independent board member of Thai listed firms is important factor in explaining corporate performance. In addition, Connelly and Limpaphayom (2004) also found the positive relationship between insurance firm performance and the board composition measured by the number of outside directors divided by the total number of board members. Based on Connelly and Limpaphayom (2004), this study also adopted the same measurement of independent directors for examining the effect of independent directors on IPOs survival.

2) Non-Executive Chairman

Chairman is responsible for leadership of the board, for the efficient organization and conduct of the board's function and for the briefing of all directors in relation to issues arising at board meetings (ASX, March 2003).

It is expected that a company with the presence of independent chairman is more likely to pursue the interests of the shareholders and effectively monitor the management (Weir and Laing, 2001). This implies that non-executive chairman enhance the corporate performance and survival likelihood.

In contrary, executive chairman is expected to have a greater knowledge of a firm and its industry and have greater commitment to the organization than an external or non-executive chairman (Boyd, 1995). Therefore, this argument expects the negative relationship between the presence of non-executive chairman and firm performance and survival.

It can be seen that there are conflicting argument about the effect of non-executive chairman on corporate performance and survival. Therefore, it remains

open question whether IPOs company with the presence of non-executive chairman is more likely to survive.

The third measure of board independence is the usage of independent leadership structure. The details are described as follows.

3) Dual Leadership Structure

CEO duality leadership structure exists when the same person serves as a firm's CEO and the chairman of the board of directors while independent leadership structure could be described as the case which different individuals serve in these positions is referred.

There exist conflicting opinions about the benefits and costs of using these leadership structures. Proponents of the independent structure argue that CEO duality structure may constitute a clear conflict of interest and systematically reduces the board's ability to fulfill its governance function (Rechner and Dalton, 1991; Brickley, Coles and Jarrell, 1997).

Given that one of the board's central functions is to monitor the performance of top management, allowing the CEO serve both roles may lead to compromise in the desired system of check and balance (Levy, 1981; Dayton, 1984; Rechner and Dalton, 1991). The inappropriate governance structures may contribute to firm crisis and eventual bankrupt (Daily and Dalton, 1994).

Advocates of the CEO duality structure argue that CEO duality structure provides a single focal point for company leadership and provides clear focus for objectives and operations (Rechner and Dalton, 1991). Additionally, the independent leadership structure may lead to a potential for rivalry between the CEO and the

chairperson and making it difficult to pinpoint blame for poor performance (Brickley, Coles and Jarrell, 1997).

The empirical results regarding the association between CEO duality structure and corporate performance survival are mixed. For example, Fama and Jensen (1983), Rechner and Dalton (1991), Jensen (1993) and Daily and Dalton (1994) suggested that CEO duality leadership is ineffective. However, some studies found CEO duality has no impact on corporate failure (Chaganti, Mahajan and Sharma, 1985) and corporate performance (Elsayed, 2007).

A dummy variable is used for measure of independent leadership structure. Specifically, if the chairman and CEO are different people then a value of 1 is recorded, 0 otherwise. The third area of corporate governance mechanisms examined in this study is the ownership concentration. Particular attention on the corporate governance literature has been put on ownership concentration as a key to more effective corporate governance and shareholders value maximization.

The theoretical and empirical studies relating ownership concentration and IPOs company survival is discussed as follows.

2.5.1.3 Ownership concentration

Agency theory concerns what set of governance rules will enhance efficiency and thus maximize wealth (Arthur *et al*., 1993). The main concern is whether managers pursue their own interests rather than maximize shareholder's values.

Based on the monitoring and convergence of interested hypothesis of agency theory, when shareholders are too diffuse to monitor managers, corporate assets can be used for the benefit of managers rather than for maximizing shareholder wealth

(Himmelberg, Hubbard and Palia, 1999). In addition, it is argued that firm is more likely to survive if ownership concentration is high. This is because shareholders are more likely to have an influence on management's decisions and shareholders will want to expend monitoring costs as their stake in the firm is relatively high (Jensen and Meckling, 1976).

Based on information asymmetry theory, when stockholdings are concentrated, information asymmetries are low, the ability of stockholders to remove a management team is high and managers are more likely to pursue strategies that are in stockholder's interests. In contrast, when stockholding are diffused, the significant information asymmetries are likely to exist and management is then more likely to pursue strategies inconsistent with stockholders interested (Hill and Snell, 1989).

The effect of ownership concentration on corporate performance has been the subject of many theoretical and empirical researches. However, the empirical results about effects of ownership concentration on firm performance are mixed. For example, Claessens and Djankov (1999) suggested that the more concentrated the ownership, the higher profitability and labor productivity. Consistently, Bai *et al*. (2004) confirmed the positive relationship between ownership concentration and corporate values.

In contrast, some studies suggested that ownership concentration negatively related to corporate survival *e.g.* Woo, Jeffrey and Lange (1995) and Kang, Cheng and Gray (2007). Furthermore, Demsetz and Lehn (1985) found that corporate ownership concentration is not related to accounting profit rates of a company. Consistent with Demsetz and Lehn (1985), Hovey, Li and Naughton (2003) also indicated that ownership concentration does not explain firm performance.

In Thai context, Alba, Claessens and Djankov (1998) discussed that concentration of ownership is common in developing countries and there are both pros and cons to such concentration. However, high concentrated ownership in Thailand may lead to following disadvantages. First, ownership concentration may impede the development of professional managers that are required as economies and firms mature and become more complex. Second, it may have led to increased risk taking behavior by firms given the inter-relationships between financial institutions and banks. The empirical results found that firms with concentrated ownership show a deteriorating performance relative to firms with less concentrated ownership.

Consistently, focusing the analysis on firms in finance industry, Dhnadirek and Tang (2003) also reported that Thai system lacks diversity in governance mechanisms while ownership concentration is ineffective.

However, Suehiro (2001) found that ownership via family affiliated firms is positively related to corporate performance measured by ROA and ROE. Additionally, Wiwattanakantang (2001) also confirmed the consistent results that family-controlled firms are associated with higher performance. The consistent evidence also found in Yammeesri, Lodh and Herath (2006) which reported the positive association between concentrated ownership and Thai non-financial firms performance.

This study examines the relation of ownership concentration and IPOs survival, this study hypothesizes that ownership concentration attribute is significantly related IPOs companies survival.

Furthermore, this study additionally explores the relationship between control variables and the likelihood of survival of IPOs companies in addition to corporate governance as the core variables in the analysis. The details are specified as follows.

2.5.2 Company-specific variables

Two variables measuring company-specific characteristics are employed in the analysis as following details.

2.5.2.1 Company size

Prior literature presented that firm survival are negatively correlated with its size. The rational for this relationship is the larger firms have more ability to avoid financial distress by using public equity markets (Goktan, Kieschnick and Moussawi, 2006). Schultz (1993) found the inverse relationship between the probability of delisting and firm size. Smaller firms have a higher probability of delisting and larger firms have a higher probability of survival. Therefore, it is expected that larger IPOs firms will survive longer than smaller ones.

2.5.2.2 Company age

Previous studies, for example, Jovanovic (1982), Chen and Lee (1993), Lensberg, Eilifsen and McKee (2004), Rommer (2004), Li, Zhang and Zhou (2005), Rommer (2005), Hensher, Jones and Greene (2007) suggest the importance of company age in explaining financial failure. Jovanovic (1982) developed a learning model where age captures the experience of firm and thus is the major determinant of firm survival. Younger firm may have less experience, incomplete knowledge of the business,

limited managerial quality (Jovanovic, 1982; Hopenhayn, 1992). Therefore, younger companies are associated with higher risks of failure.

Accordingly, this study expects that company age is negatively related to the likelihood of corporate failure.

2.6 CONCLUSIONS

This chapter has described the situation of IPOs in Thailand and its role on the nation economy. It can be seen that IPOs were important part in overall economy in terms of growth distribution in the country. It is widely believed that a vibrant market for IPOs is an asset of the economy. Black and Gilson (1998) and many others argue that the existence of such a market plays a critical role in facilitating entrepreneurship and venture capital in the economy.

This chapter also presented some issues relating the failure rate from previous literature. Furthermore, the chapter also has reviewed and briefly discussed previous literature examining IPOs survival or failure in various countries *e.g.* Australia, China, Germany, Taiwan, U.S.A. and Thailand using various research methodologies such as logistic regression, multivariate discriminant analysis, neural network, survival analysis and *etc*. These studies have been conducted both within the qualitative and quantitative framework.

It can be seen that previous studies have been using various empirical methodologies in exploring the issue regarding IPOs survival or failure. The next chapter will discuss the methodologies adopt in previous studies and also describe in full detail of the research methodology used in this study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter aims to explain and classify the models employed in failure or financial distress prediction studies. The next section will discuss the classification of statistical methodologies employed by previous literature. This section elaborates on the different classical statistical models by explaining the features of each method, the previous studies that applied the models, and the advantages and drawbacks of the method. Section 3.3 demonstrates the background and details of logistic regression followed by the application of logistic regression in previous studies relating failure prediction model. Then data and sample used in the analysis will be described in Section 3.4. Finally, Section 3.5 presents the conclusions drawn from this chapter.

3.2 EMPIRICAL METHODOLOGIES EMPLOYED IN FAILURE PREDICTION LITERATURE

According to Balcaen and Ooghe (2004b), the evolution of financial distress prediction models starts from the classical statistical methods and goes on to the application of several alternative methods. The classical statistical methods have been widely used for the development of corporate failure prediction models. These models are called ‘single period’ classification models or ‘static’ models (Shumway, 2001). These techniques include univariate analysis, multivariate analysis and conditional probability models *e.g.* probit and logit model.

3.2.1 Univariate analysis

Univariate analysis is the statistical technique that involves an individual financial ratio as the single predictor of corporate failure. A classification procedure is organized separately for each ratio in the model. In the process of classifying a firm, the optimal cut off point of the measure is developed on the basis of minimizing the percentage of misclassifications. If the firm's ratio value is below the cut off point, then it is classified as a failed firm; otherwise, it is classified as a non-failed firm. The classification accuracy can be measured by the total misclassification rate and the percentage of type I and type II errors.

Beaver (1966) pioneered the development of a corporate failure prediction model with financial ratios using a univariate analysis model. The sample of the study consisted of 79 failed firms during 1954 to 1964 and a paired sample of non-failed firms matched by industry and asset sizes. Univariate analysis was applied to investigate the predictive ability of six financial ratios selected from the original thirty different financial ratios on the basis of the lowest percentage of error. The six ratios as the predictors of financial failure were cash flow to total debt, net income to total assets, total debt to total assets, working capital to total assets, current ratios and the no-credit interval. Beaver concluded that ratio analysis can be useful in the prediction of failure for at least five years before failure and cash flow to total debt is suggested as the best overall predictor.

Beaver (1968) extended his 1966 study by using the same data to illustrate a method for evaluating alternative accounting measures as the predictors of failure. The groups of non-liquid asset ratios and liquid asset ratios were used in solvency determination and analysed at three levels including 1) the dichotomous classification

test, 2) the comparison of mean values of ratio components and 3) the likelihood ratio analysis. The results indicated that the non-liquid asset measures predict failure better than do the liquid asset measures.

Focusing the failure study on SMEs context, Laitinen (1992) used univariate analysis exploring newly founded SMEs failure in Finland. The study is based on a supposition that failure process in a newly founded firm is characterized by a too high initial indebtedness and by too low revenue financing as compared with the budget. The empirical results reported that the best univariate predictors proved to be stockholders capital to total capital ratio (indebtedness), cash flow to net sales ratio (revenue financing), and cash flow to total debt ratio (sufficiency of revenue financing to pay financial obligations).

Although the simplicity of the univariate model is appealing, this model shows some important disadvantages. As univariate analysis involves an individual financial ratio as a single predictor of failure, an inconsistency problem can occur. The model may give inconsistent and confused classifications results for different ratios for the same firm (Altman, 1968). Furthermore, the univariate model differs from reality in that the financial status of a company is a complex issue that cannot be analysed by one single ratio. There are various factors that can describe the financial status of the firm; hence, a single financial ratio cannot include all the information (Edmister, 1972).

3.2.2 Multivariate Discriminant Analysis

To overcome the problems resulting from the univariate analysis method, in 1968, Altman introduced the statistical multivariate analysis technique into the problem of

company failure prediction and estimated a model called the ‘Z-score model’. Since then, this study has dominated the literature relating to financial failure or bankruptcy prediction models. There have been many studies based on Altman’s Z-score model, such as Joy and Tollefson (1975), Libby (1975), Altman, Haldeman and Narayanan (1977), Dambolena and Khoury (1980), Taffler (1982), Appetiti (1984), Frydman, Altman and Kao (1985) and Laitinen (1992).

Multivariate Discriminant Analysis (MDA) is used to classify an observation into one of several a priori groups depending on the observation’s individual characteristics. The MDA model consists of a linear combination of variables where the objective is to obtain the linear combination of the independent variables that maximizes the variance between the populations relative to within-group variance. The main idea of multivariate analysis is to combine the information of several financial ratios into a single weighted index, unlike the univariate analysis, which analysed the predictive ability of a single ratio (Laitinen, 1993).

In Altman’s study (1968), the sample comprised 66 manufacturing corporations with 33 failed firms in the period 1946 to 1965 and 33 non-failed firms pair matched on the basis of year, industry and asset size. Altman’s Z-score model utilized five financial ratios from twenty-two variables as the best predictors of financial failure. The discriminant model that performed the best overall job of predicting bankruptcy consist of five financial ratios include working capital/total assets, retained earnings/total assets, earnings before interest and taxes/total assets, market value equity/par value of debt and sales/total assets

Based on Altman’s (1968) model, Joy and Tollefson (1975) criticized the predictive ability, the relative discriminatory power of variables and the classification

efficiency of MDA. Joy and Tollefson pointed out that those studies with the application of discriminant analysis to dichotomous classification problems have paid relatively little attention to the design and interpretation difficulties associated with discriminant analysis; consequently, the conclusions and generalizations that can be drawn from such studies are frequently tenuous and questionable.

The ZETA model developed by Altman, Haldeman and Narayanan (1977) was further improved due to the dramatic change in size, financial profile, financial and accounting standards and the retail business's expansion. By using a quadratic discriminant analysis to overcome the assumption of equal dispersion matrices required by linear discriminant analysis, the ZETA model improved the original Z-score model in terms of a higher accuracy rate for one to five years prior to failure.

Other studies employed MDA in the corporate failure prediction model for example Dambolena and Khoury (1980), Taffler (1982), Appetiti (1984), Laitinen (1992).

The literature discussed earlier are all focus on large corporation context, Laitinen (1992) and Bilderbeek and Pompe (2005) are the example of studies that focus on failure prediction issue in SMEs context rather than the large listed corporation. Particularly, Laitinen (1992) applied MDA and univariate analysis in exploring SMEs failure in Finland to develop a failure prediction model based on financial statement data from newly founded firms. The study period was 1980-1985 with various independent variables include size, static solidity, velocity capital, profitability, growth, dynamic liquidity, static liquidity and dynamic solidity. The results showed that the model can predict the failure of a newly founded firm in the

first year after foundation. Furthermore, the prediction accuracy will increase when the date of failure is approached.

Although MDA is the most frequently used modelling technique in failure prediction, it has some serious disadvantages. MDA requires three restrictive assumptions. Firstly, the independent variables included in the model are multivariate normally distributed. Secondly, the group dispersion matrices or 'variance-covariance matrices' are equal across the failing and the non-failing group. Finally, the prior probability of failure and the misclassification costs are specified. In practice, it seems that the first assumption of multivariate normality is often violated (Deakin, 1976), which might result in a significant bias (Eisenbeis, 1977; Mcleay and Omar, 2000). Furthermore, most corporate failure studies did not attempt to analyse whether the data satisfy this assumption, as in practice, the data rarely satisfy the three statistical assumptions. These situations result in questions being raised relating to the conclusions and generalizations with respect to the MDA technique, which is often applied in an inappropriate way (Joy and Tollefson, 1975; Eisenbeis, 1977).

3.2.3 Probit model

MDA is commented on as a violation of the assumption of the multivariate normal distribution of independent variables and as such is unsuitable for the interpretation of independent variables (Eisenbeis, 1977). The main criticism of MDA resulted in the introduction of conditional probability models in which no assumptions are made regarding the distribution of the independent variables (Ohlson, 1980). These models included logit analysis and probit analysis. Ohlson (1980) pioneered using logit

analysis with financial ratios in order to predict company failure while Zmijewski (1984) was the pioneer in applying probit analysis.

Probit techniques are parametric techniques based on a cumulative probability function. The techniques produce the results in the forms of probability of a firm being classified as belonging to an *a priori* group according to the financial characteristics of the firm. The probit techniques are nonlinear probability models in which a dependent variable is not continuous, but performs a discrete characteristic, such as distressed or non-distressed firms. The coefficients of the model are obtained by maximizing the log-likelihood function.

This study will use logistic regression model because the logistic regression model seems to be a much more popular model compared with the probit model because probit techniques require more computations (Dimitras, Zanakis and Zopounidis, 1996). We will discuss the background and details of the model in the Section 3.3.

3.2.4 Artificial Neural Networks

Artificial Neural Networks (ANN) is becoming a very popular research subject with applications in many areas such as medicine, business, politics and technology (Charalambous, Charitou and Kaourou, 2000).

In 1990, the ANN technique was been applied in the field of business failure prediction and it became a very popular technique that dominated the literature on business failure in the second half of the 1990s. In 1990, Odam and Sharda were the first researchers to apply ANN to the prediction of company failure (Balcaen and Ooghe, 2004b). The networks consist of a number of highly interconnected

processing elements, called ‘neurons’. In ANN, the independent variables offered to the network are called ‘inputs’, the dependent variables are known as ‘training values’ and the estimated values are called ‘output values’ (Shachmurove, 2002).

Several studies reported the superiority of the neural networks to other methods in predicting financial distress or bankruptcy areas. For example, Salchenberger, Cinar and Lash (1992) compared the predictive performance between a neural network and a logit model in discriminating failed and surviving saving and loan associations (S&Ls). The financial data on 3,479 S&Ls for the period January 1986 to December 1987 were incorporated in the models. The study concluded that the neural network performed as well or better than did the logit model in classifying thrift institutions as failed or non failed, achieved a higher degree of prediction accuracy, and was more robust.

Using a data sample comprising Texas banks that failed in the period 1985 to 1987, Tam and Kiang (1992) also reported that ANN had a better predictive accuracy than did discriminant analysis, logit, k Nearest Neighbor (kNN) and decision tree analysis. The empirical results showed that the neural network is a promising method of evaluating bank conditions in terms of predictive accuracy, adaptability and robustness. In addition, comparing a neural network with MDA in predicting financial distress using data covering the period 1970 to 1989, Coats and Fant (1993) found that MDA produced excellent results for the year of the going-concern opinion; however, the Cascade Correlation (Cascor) neural network did better by comparison in the earlier years’ classification.

Using the data, specifically 65 bankrupt firms and 64 non bankrupt firms matched on industry and year and covering the period 1975 to 1982, Wilson and

Sharda (1994) compared the predictive capabilities for firm bankruptcy of neural networks and classical MDA. Their results also indicated that neural networks performed significantly better than did MDA at predicting firm bankruptcies. However, using data from the U.S. oil and gas industry, Yang, Platt and Platt (1999) indicated that whereas probabilistic neural networks without pattern normalization and Fisher discriminant analysis achieve the best overall estimation results, discriminant analysis produces superior results for bankrupt companies.

Balcaen and Ooghe (2004b) also concluded that although a sophisticated method such as a neural network is a more complex computation than are classical statistical methods, which offer univariate analysis, MDA, and probit and logit analysis, it is not clear that neural networks performed better than did those classical methods.

Among the studies mentioned above that focus on listed companies failure, Bilderbeek and Pompe (2005) utilized neural network with the seventy-three financial ratios in exploring SMEs failure. More specifically, four categories of financial ratios include profitability, activity, liquidity and solvency are included in the analysis within the study period between 1986 and 1994. The study results indicated that virtually every ratio has some predictive power. Therefore, an approaching bankruptcy is visible in almost every dimension of a firm's financial position.

Compared to other models, ANN has several advantages in the application of predicting financial distress or bankruptcy. ANN has the ability to analyse complex patterns quickly and to represent better the nonlinear discriminant function with a high accuracy level (Tam and Kiang, 1992). Unlike linear discriminant analysis, ANN

does not require restrictive assumptions about the probability distribution of the data, which results in an unbiased analysis.

In addition, an ANN is able to deal with missing or incomplete data (Shachmurove, 2002; Hawley, Johnson and Raina, 1990). Furthermore, Tam and Kiang (1992) reported that ANN has the ability to adopt to the changing environment by adjusting the model.

However, ANN also shows some limitations. The most important problem related to the use of neural networks is the 'black box' problem. A neural network does not reveal the significance of each of the variables in the final classification and the derived weights cannot be interpreted. Additionally, the technique does not reveal the knowledge concerning how and why the network classifies companies into the failing and non-failing groups, which might restrict the use of this modelling technique (Balcaen and Ooghe, 2004a; Hawley, Johnson and Raina, 1990; Salchenberger, Cinar and Lash, 1992).

Furthermore, there is no formal theory for determining optimal network topology; the development and interpretation of neural network models requires more expertise from the user than do traditional statistical models (Salchenberger, Cinar and Lash, 1992). The neural network produced the best results when used in conjunction with an expert since there is no structured methodology available for choosing, developing, training and verifying neural networks (Shachmurove, 2002).

3.2.5 Survival analysis

Survival analysis is a class of statistical methods for studying the occurrence and timing of events (Allison, 1995). The hazard function is an important function in

survival analysis, because it models the hazard rate, which is the basic concept of survival analysis. The hazard function models the probability of failure in the next period given that the firm was active at time *t*. Given that *T* is a random variable that defines the event time for some particular observation

The main application of survival analysis in accounting research has been in the area of financial distress. Studies in financial distress prediction models that applied a Cox proportional hazards model include Luoma and Laitinen (1991), Chen and Lee (1993), Wheelock and Wilson (1995), Henebry (1996), Turetsky and McEwen (2001) and LeClere (2002).

Luoma and Laitinen (1991) applied a Cox proportional hazards model to point out the advantages and shortcomings of survival analysis in company failure prediction and found that the best Cox proportional hazards model was composed of six financial variables and an interaction term.

In order to examine financial distress in the oil and gas industry, Chen and Lee (1993) employed a Cox proportional hazards model to determine the length of time between the onset of economic adversity and the onset of financial distress. The result indicated that the liquidity ratio, leverage ratio, operating cash flows, success in exploration, age and size are significant factors affecting corporate endurance. Additionally, the study compared survival analysis with the traditional logit model and found that these two models result in largely the same significant variables but the survival analysis provided an additional feature of prediction, that is, the capability to show the probability that a firm could endure until each given time interval.

Wheelock and Wilson (1995) also applied a Cox proportional hazards model to estimate the time to failure of banks in Kansas during the years 1910 through to

1928. Three specifications of the proportional hazards model were estimated. The results showed that undercapitalization, membership in the deposit insurance system and inefficiency increased the hazard rate.

Henebry (1996) also examined the bank failure issue focusing on whether the addition of the cash flow variable improves the performance of the Cox proportional hazards model. The improvement was identified through the comparison of R values, type I and II errors and rank order correlations. The result indicated the cash flow information improves predictive accuracy only in longer horizon models.

Turetsky and McEwen (2001) investigated the influence of certain risk dimensions and firm-specific attributes on the survival of distressed firms using a Cox proportional hazards model. The results showed that the significant accounting covariates tend to change, conditional on a firm having progressed through the diverse stages of distress, and indicated the heterogeneous nature of financial distress and potential business failure. Furthermore, LeClere (2002) examined the sensitivity of a Cox proportional hazards model to the choice of covariate time dependence within a financial distress context. The study found that the Cox proportional hazards models with time-dependent covariates outperformed the models with time-invariant covariates.

Researchers suggest that survival analysis techniques are particularly appropriate for examining corporate endurance (Flagg, Giroux and Wiggins, 1991; Chen and Lee, 1993; Audretsch and Mahmood, 1995; Turetsky and McEwen, 2001).

The previous studies mention earlier all focus on exploring listed companies, Wagner (1994) is the example of previous literature that focusing the study on SMEs context using survival analysis. According to Wagner (1994), the start-up size

industry variables include concentration, capital intensity, R&D intensity and growth are included in survival analysis in order to explore the risk of failure of small firms in German manufacturing industries between 1979 and 1982. The results found that the entrants face a high risk of failure, hazard rates tend to increase during the first years and to decrease afterwards. In addition, the results confirmed that there exist no clear-cut nexus between start-up size and probability of survival.

Survival analysis can handle two common features of data, namely, censoring and time-dependent covariates, which are difficult to handle with conventional statistical methods (Allison, 1995). Generally, censored observations arise when the duration of the study is limited. There are firms in the sample that never experience some or all of the potential distress stages. The survival analysis techniques that consider censored observations are able to avoid sampling bias (Turetsky and McEwen, 2001).

Additionally, according to Shumway (2001), survival analysis hazard models resolve the problems of static models by explicitly accounting for time. The dependent variable in hazard models is the survival time. Since the bankruptcy probability that a static model assigns to a firm does not vary with time, survival analysis techniques are preferable to static models both theoretically and empirically. By comparing the forecasting ability of survival analysis to Altman (1968) and Zmijewski (1984), Shumway reveals that about half of the financial ratios that have been used in previous study models are not statistically related to bankruptcy probability.

3.3 LOGISTIC REGRESSION MODEL

To achieve the research objective, logistic regression model or otherwise known as logit model will be employed in this study to obtain the probability of delisted IPOs based on corporate governance variables.

Logistic regression analysis emphasizes the probability of a particular outcome for each case. Compare to MDA introduced by Altman (1968) in predicting corporate bankruptcy, logistic model is more flexible than MDA because the model has no assumptions about the distributions of explanatory variables. In particular, in logistic model, the explanatory variables do not have to be normally distributed, linearly related or equal variance within each group (Tabachnick and Fidell, 2001).

When one or more of the explanatory variables in a model are dichotomous in nature, the use of MDA is ill-advised as the assumption of multivariate normality is violated. If the dependent variable is continuous the analysis can proceed via the usual regression route. However, when the dependent variable is dichotomous (0,1) a linear-regression model has the undesirable property of heteroscedasticity (Keasey and Watson, 1987). Violation of the homoscedasticity assumption has two undesirable consequences. First, the coefficient estimates are no longer efficient which means there are alternative methods of estimation with smaller standard errors. Second, and more serious, the standard error estimates are no longer consistent estimates of the true standard errors. That means the estimated standard errors could be biased to unknown degree. Accordingly, the test statistics could also be biased (Allison, 1999).

An obvious means of correcting for heteroscedasticity is to apply weighted least-squares estimation. The difficulty with weighted least squares is that there is no guarantee that the predicted value of the dependent variable will lie in the (0,1)

interval. In terms of failure prediction, this amounts to the possibility of a company having a negative probability of failure. The above difficulties with linear regression suggest the solution of transforming the original model in such a way that for all independent variables, predictions will lie in the (0,1) interval. Since the main concern in failure prediction is to achieve a predicted probability of failure, given a set of attributes, it makes good sense to use some notion of probability, as the basis of transformation. This requirement and that of monotonicity suggest that a cumulative probability function will provide a suitable transformation. The resulting probability distribution might be as follows (Keasey and Watson, 1987):

$$P_i = F(\alpha + \beta X_i) = F(Z_i)$$

where F = a cumulative probability function.

If cumulative logistic probability function is used: In logistic regression analysis, a non-linear maximum likelihood estimation procedure is used to obtain the estimates of the parameters of the following logit model (Gujarati, 2003).

$$P_i = F(Z_i)$$

$$P_i = \frac{1}{1+e^{-(\alpha+\beta_1 x_{i1}+\beta_2 x_{i2}+\ldots+\beta_k x_{ik})}}$$

where P_i = Probability of failure given the vector of attributes X_i

e = the exponential constant, approximately equal to 2.71828.

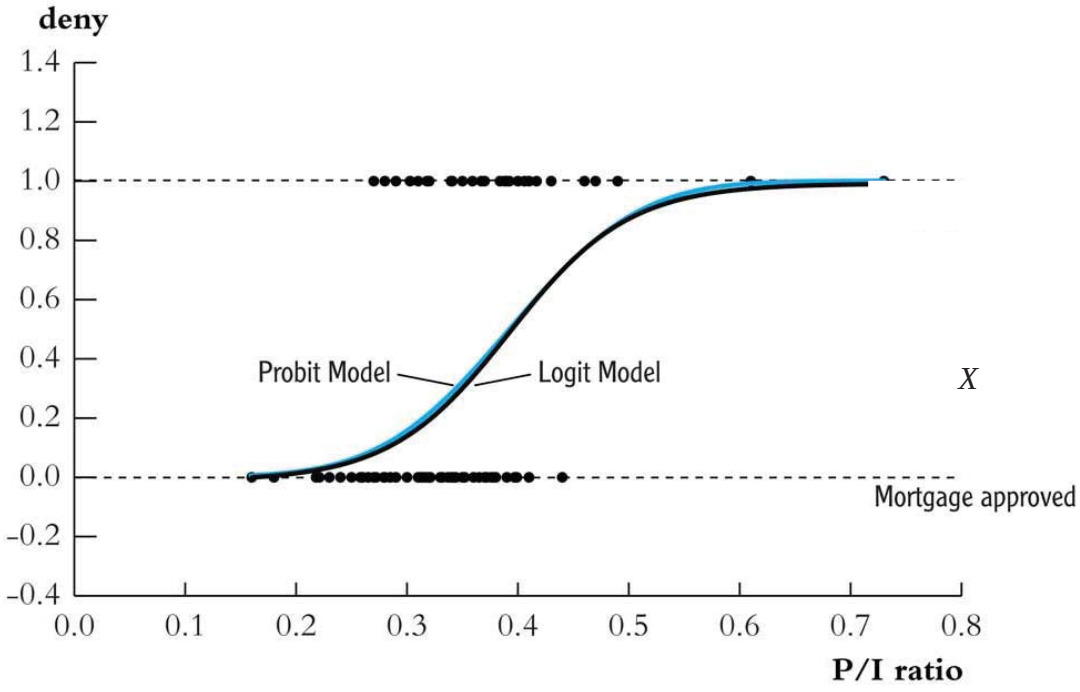
β_j = Coefficient of attribute j with $j = 1, \ldots, k$

α = Intercept

X_{ij} = Value of the attribute j (with $j = 1, \ldots, k$) for IPOi

The logit analysis model combines several characteristics or 'attributes' to give a multivariate probability score for each IPO, which indicates the 'failure probability' or the 'vulnerability to failure'. In logit analysis, failure probability P_1 follows the logistic distribution (Laitinen and Kankaanpaa, 1999).

This equation has the desired property that no matter what values we substitute for the β' P_i he x's, P_i will always be a number between 0 and 1. If we have a single x variable with α=0 and β=1, the equation can be graphed to produce the S-shaped curve in Figure 1. As x gets large or small, P_i gets close to 1 or 0 but is never equal to these limits.



Source: Stock and Watson (2007)

Figure 1: Graph of logistic regression model for a single explanatory variable

According to the graph, it can be seen that the effect of a unit change in x depends on where you start. When P is near 0.50, the effect is large but when P is near 0 or 1, the effect is small (Allison, 1999).

According to Allison (1999), there are alternative models that have similar S-shaped curves *e.g.* the probit and complementary log-log models. The logistic regression model is more popular because of the coefficients have simple interpretation in terms of odds ratios, the model is ultimately related to the loglinear model, it has desirable sampling properties and the model can be easily generalized to allow for multiple, unordered categories for the dependent variable.

Many studies have utilized logistic regression analysis in financial failure or bankruptcy prediction analysis. As mention earlier, most of these studies focus on listed company context. For example, Ohlson (1980) pioneered in using logit analysis to compute the probability of failure of 105 failed firms and 2,058 non-failed firms during the period 1970 to 1976. By constructing nine variables in firm failure prediction model, the predictability of the model was high at 96 percent for a one year prior to the event.

Another study that has extended logit analysis to classify and predict financial distress was Lau (1982). According to Lau, thirteen financial ratios were used to construct a multi-logit model, which was used to predict financial distress. As a result of developing a process of financial distress that divides the stage of financial distress into five states, Lau argued that the consideration of these various states of financial distress leads to a more realistic financial model.

In addition, Flagg, Giroux and Wiggins (1991) developed a failure prediction model to determine whether bankrupt and non-bankrupt firms could be correctly

classified when the sample consisted only of failed firms. The logistic regression model reached 94 percent for overall accuracy prediction. The authors suggested that the probabilities of moving one failure event to another can be analysed in greater detail by using new methods such as Markov processes or survival analysis.

Furthermore, Johnson and Melicher (1994) examined the added value of two types of information provided by multinomial logit models to explain and predict corporate bankruptcy. The two types of information include 1) the information obtained by expanding the outcome by including a third state of financial distress and 2) secondary classification information. The significant reductions in misclassification error rates for the multinomial model were found and the results also suggested that secondary classification information can be used to improve the ability to predict bankrupt firms correctly as well as predicting financially weak firms that will suffer impending financial distress.

Other studies employed logit analysis *e.g.* Zmijewski (1984), Johnson and Melicher (1994), Platt, Platt and Pedersen (1994), Ward and Foster (1997), Mainkamnurd (1999), Tirapat and Nittayagasetwat (1999) and Nikitin (2003).

3.4 DATA AND SAMPLE

During the period from 1992 and 2007, about 333 firms went public in the Stock Exchange of Thailand. After excluding banks, finance companies and missing data, the final sample consists of 166 IPOs (Securities and Exchange Commission, 2007; Stock Exchange of Thailand, 2011). For each IPO firm, the study collected individual data from IPO prospectuses, along with publicly available information from on-line

data sources including the Capital Market Information Center, the Securities and Exchange Commission (SEC). Since the start of the SEC, 20 firms have been delisted.

Analysis undertaken in this study comprises both outcome model estimation and prediction tasks. To enhance the robustness of the testing procedures and to ensure non-spurious interpretations of results, this final sample of 166 firms is divided into separate estimation and prediction (hold-out) samples. The random estimation sample was formed from the random number of 111 listed observations from the 166 total observations, with the unselected observations forming the hold-out sample used for testing the predictive accuracy of the model. The study records the board size, percent of independent directors, non-executive chairman, dual leadership and ownership concentration, as well as firm characteristics such as age and total asset.

Firm characteristics at the time of IPO are examined in Table 3 and allow a comparison of firms being delisted and those listed. Column 3 in Table 3 predicts the results from a two-tailed test of mean comparisons. First, the results find that the average number of committees as a measure for board size is about 11.071 for the delisted firms and 10.155 for the surviving firms. Although there is a difference of about 20 percent, this difference is not statistically significant on the 10 percent level.

Table 3: Characteristics of firms issuing IPOs during the period 1992 to 2007

Variable	Delisting		Surviving		Mean diff
	Mean	S.D.	Mean	S.D.	*t*-statistics
Broad size	11.071	2.336	10.155	2.563	1.264
Independent directors (%)	18.526	11.325	17.721	15.685	0.185
Non-executive chairman	0.071	0.267	0.144	0.353	-0.741
Dual leadership	0.357	0.497	0.763	0.642	-2.266**
Ownership concentration (%)	93.765	10.281	93.267	18.969	0.096
Size (total asset)	45.506	68.064	9203.67	89761	-0.380
Company age	11.571	8.364	11.907	8.653	-0.136

Note: ** Indicates statistical significance at the 5 percent level.

The percentage of independent directors is the percentage of the number of the independent directors and the number of all directors at the first day of IPO. On average, firms that were delisted show a higher percentage of independent directors with 18.526 percent compared to 17.721 percent for surviving firms. The median over all firms is about 22 percent. As before, although large, this difference is not statistically significant.

The independent chairman or non-executive chairman is a binary variable. The mean at the first day of IPO is 0.071 for delisting firms and about 0.144 for surviving firms. Although the difference is about 0.073, there are no statistically significant differences between both groups of firms. However, compared to another binary variable, ownership concentration, the mean at the first day of 0.357 for delisting firms and about 0.763 for surviving firms, statistical significance at the 5 percent level.

The total asset as a measure for firm size is about 45.506 million baht for the delisting firms and 9603.67 million baht for the surviving firms. Although there is a difference of about 20%, this difference is not statistically significant on the 10% level. Finally, firms being delisted are not significantly older than those not being

listed. The average age of the firms delisted is about 11.571 years, while the average age of the firm that is surviving is about 11.907 years.

3.5 CONCLUSIONS

This chapter explained and classified the models employed in financial distress prediction studies. The classification of the models generally progressed from classical statistical financial distress prediction models to alternative statistical models.

Classical statistical financial distress prediction models include univariate analysis, MDA, probit and logit analysis. Beaver is the pioneer in using univariate analysis in failure prediction. This analysis involves the use of a single financial ratio in a failure prediction model. Altman performed a multivariate analysis of failure by means of MDA. The main idea of that analysis is to combine the information of several financial ratios to form a single weighted index. Many other studies have followed this multivariate methodology: however, the method is statistically valid only if the variables are multivariate normal distribution which is often violated. This shortcoming has led to the use of logit and probit analysis, which do not assume the multi-normality of the variables.

Alternative statistical financial distress prediction models include ANN and survival analysis. In 1990, ANN was applied in the corporate failure prediction field and became a very popular technique. The technique dominated the literature on business failure in the second half of the 1990s; however, since there is no formal theory for determining optimal network topology, the development of neural network models requires more expertise from the user than do classical statistical models.

This chapter also has presented the background and details of logistic regression model and reviewed the existing studies using logistic regression model to predict business failure. In addition, the details of data, variables and empirical methodology used in this research are provided. The final sample consist of 166 IPOs include 20 delisted and 146 surviving firms which then are divided into training sample and hold-out sample for building the model and evaluating the predicting accuracy of the estimated model.

The variables adopt in the model include the board size, percent of independent directors, non-executive chairman, dual leadership and ownership concentration, as well as firm characteristics such as age and total assets. Data employed in the study are all obtained from on-line data sources including the Capital Market Information Center, the Securities and Exchange Commission.

The next chapter will reports and discusses the empirical results obtained from the analysis.

CHAPTER 4

EMPIRICAL RESULTS

4.1 INTRODUCTION

To examine the relationship between corporate governance attributes and the survival probability of IPOs in Thailand, the logistic regression model is estimated. This chapter provides the empirical results obtained from univariate model and multivariate model. To give the overall picture about the characteristics of the data employed in the model, next section will describe empirical results regarding descriptive statistics and correlation coefficient. Then, the results of the logistic regression analysis will be discussed in Section 4.3. Section 4.4 demonstrates predictive accuracy. Finally, Section 4.5 provides the conclusions.

4.2 THE UNIVARIATE TESTS

This study employs five corporate governance variables from three categories and two company specific variables in examining the determinants of IPOs survival or failure. Table 4 reports the correlation coefficients results to investigate the relationships between the variables used in the study. Correlation and dependence are any of a broad class of statistical relationships between two or more random variables or observed data values. The coefficient of correlation indicates an association between two variables. The value of correlation coefficient is always between -1 and 1. The value -1 represents a perfect negative correlation (when one increases, the other decreases in exactly the same proportion. The value +1 represents a perfect

correlation (when one increases, the other increases in exactly the same proportion. The value 0 represents a lack of correlation.

The knowledge of the correlations is useful for the model development because high correlation between two important variables could be the reason why only one of the variables should enter the model (Persons, 1999). In addition, Theodossiou *et al*. (1996) and Persons (1999) discussed that considering the correlations of explanatory variables is importance because the inclusion of highly correlated variables in a model could result in biased significant levels of parameters and frequently produce statistical artifacts. Furthermore, the inclusion of highly correlated variables does not much enhance the model's explanatory power. According to Table 4, the results indicate weak relationships across all of the variables. In conclusion, these results suggest that most of the employed variables in the study are providing unique information for the model.

Table 4: **Correlation coefficients of the data employed**

Variable	STATUS	BSIZE	BIND	NONEX	DUALL	OWNCON	TA	AGE
STATUS	1.0000	0.1202	0.0177	-0.0708	-0.1189	0.0092	-0.0364	-0.0130
BSIZE		1.0000	-0.2397	0.0723	-0.2449	-0.2921	-0.0842	0.2049
BIND			1.0000	0.1082	0.0884	0.0742	-0.1126	-0.0286
NONEX				1.0000	-0.0898	0.1355	-0.0363	0.0710
DUALL					1.0000	0.1143	0.0934	0.1323
OWNCON						1.0000	0.0304	0.0004
TA							1.0000	-0.0658
AGE								1.0000

4.3 LOGISTIC REGRESSION MODEL ESTIMATION

Since logit model assumes a nonlinear relationship between the probability and the explanatory variables. The change in the probability for a 1-unit increase in an independent variable varies according to where you start (Brigham and Ehrhardt, 2005). This issue becomes much simpler if we think in terms of odds rather than probabilities. The odds of an event is the ratio of the expected number of times that an event will occur to the expected number of times it will not occur. According to Allison (2000), These ratios are shown in the last column of Table 5. Odds ratio are obtained from the parameter estimates by computing e^{β} where β is the estimated parameter or coefficient displayed in the second column of the table. When we interpret the coefficient, the number of 'odds ratio' will be used instead of estimated coefficient. More specifically, for dummy variable, the odds ratio reply that how many times of the odds that the event occur if the dummy variable equal to 1 to that odds if the dummy variable equal to 1. For quantitative variables, ones should subtract 1 from odds ratio and multiply by 100 or equivalently compute $100(e^{\beta}-1)$. This figure reports the information that the percent change in the odds for each 1-unit increase in the independent variable.

Table 5 provides the empirical results of the logistic regression model estimation. The estimated coefficient, standard error, the z-statistics and the odds ratio for each significant independent variable are reported. The logistic model provides none significant variables in predicting IPOs survival in Thailand. The table also reports the number of observation which is 111 IPOs and the AIC statistics which is

relatively small. The relatively small AIC statistics indicate a good model fit. The finding and the interpretation for each variable are below.

Table 5: Logistic regression model estimation

Variable	Coefficient	Standard. Error	z-Statistic	Odds Ratio
C	-4.6768	2.5569	-1.8291	-
BSIZE	0.1718	0.1320	1.3014	1.1874
BIND	1.3283	2.1279	0.6243	3.7746
NONEX	-0.8589	1.1386	-0.7544	0.4236
DUALL	-0.5596	0.6664	-0.8397	0.5714
OWNCON	0.0129	0.0179	0.7198	1.0130
TA	-0.0006	0.0017	-0.3792	0.9994
AGE	-0.0116	0.0381	-0.3035	0.9885

Notes: Number of observations = 111 with 97 non-failed IPOs and 14 failed IPOs. Akaike Info Criterion (AIC) = 0.8604

According to odds ratio, we found that a 1-unit increase in BSIZE is associated with an 18.74 percent increase in predicted odds of IPOs failure. We use BSIZE as a measurement of the number of committee of IPOs and found that the board size is not significantly related to IPOs survival. This result is consistent with Yermack (1996), Parker, Peters and Turetsky (2002b), Elsayed (2007) and Lamberto and Rath (2008) which also found that board size has insignificant effect on survival. By investigating life insurance company in Thailand, Connelly and Limpaphayom (2004) also confirmed that board size is not significantly related to firm performance.

For board independence, we found that BIND is positively related to the probability of IPOs failure. More specifically, a 1-unit increase in BIND is associated with a 277.46 percent increase in predicted odds of IPOs failure. This result is consistent with Hermalin and Weisbach (1991), Yermack (1996) and Klein (1998) found a negative relationship between the proportion of outside directors and corporate performance.

Non-executive chairman, the result shows that NONEX is negatively related to the probability of IPOs failure. The result shows that a 1-unit increase in NONEX is associated with a 57.64 percent decrease in predicted odds of IPOs failure. This result is consistent with Weir and Laing (2001). It is expected that a company with the presence of independent chairman is more likely to pursue the interests of the shareholders and effectively monitor the management (Weir and Laing, 2001). This result implies that non-executive chairman enhance the corporate performance and survival likelihood.

CEO duality leadership structure, the result shows that DUALL is negatively related to the probability of IPOs failure. The result shows that a 1-unit increase in DUALL is associated with a 42.86 percent decrease in predicted odds of IPOs failure. This result is consistent with the finding in Chaganti, Mahajan and Sharma (1985) and Elsayed (2007) which also found that CEO duality has no impact on corporate governance.

Agency theory concerns, the result shows that OWNCON is positively related to the probability of IPOs failure. The result shows that a 1-unit increase in OWNCON is associated with a 1.30 percent increase in predicted odds of IPOs failure. This result is inconsistent with some studies which suggested that more concentrated the ownership, the higher profitability and labor productivity *e.g.* Claessens and Djankov (1999) and Bai *et al*. (2004). The insignificant result of ownership concentration variable is consistent with Demsetz and Lehn (1985) who found that corporate ownership concentration is not related to accounting profit rates of a company. Moreover, Demsetz and Lehn (1985), Hovey, Li and Naughton (2003) also indicated that ownership concentration does not explain firm performance.

Furthermore, the result shows that a 1-unit increase in TA is associated with a 0.06 percent decrease in predicted odds of IPOs failure. This result is consistent to the expectation and the finding in Goktan, Kieschnick and Moussawi (2006).

Finally, the results found AGE is negatively associated with the probability of IPOs failure. More specifically, we found a 1-unit increase in SIZE is associated with a 1.15 percent decrease in predicted odds of IPOs failure. This result is consistent to the finding in Jovanovic (1982), Chen and Lee (1993), Lensberg, Eilifsen and McKee (2004), Rommer (2004), Li, Zhang and Zhou (2005), Rommer (2005), Hensher, Jones and Greene (2007) suggest the importance of company age in explaining financial failure.

Therefore, the estimated logistic model in this study is as follow:

$$P_i = \frac{1}{1 + e^{-(-4.678 + 0.1718\text{BSIZE} + 1.3283\text{BIND} - 0.8589\text{NONEX} - 0.5596\text{DUALL} + 0.0129\text{OWNCON} - 0.0006\text{TA} - 0.0116\text{AGE})}}$$

Where P_i is the probability of IPOs entering failure, e is the exponential constant, approximately equal to 2.71828. BSIZE is the number of committees, BIND is the percentage of the number of the independent directors, NONEX is the independent chairman or non-executive chairman (binary variable), DUALL is dual leadership (binary variable), OWNCON is the percentage of ownership concentration, TA is total asset and AGE is the company age.

4.4 PREDICTIVE ACCURACY

In the previous section, the estimated logistic regression model is presented and discussed. The model is estimated by computing the maximum likelihood estimated

of the coefficients. The logistic procedure assumes the applicability of a logistic curve. Logistic regression enables user to classify IPOs as failed or non-failed according to their probability estimates. Particularly, IPOs with a probability estimate above a selected cutoff point would be classified as failed otherwise the IPOs would be classified as non-filed. The cutoff point is selected to minimize the misclassification rates. In this study, we select the cutoff point as 0.5. Pasiouras and Tanna (2010) discussed that varying the cutoff point changes the classification accuracies of the model because of the trade-off between type I and type II errors. Therefore, unless there are good prior reasons for selecting an appropriate cutoff point, different classification rules will lead to arbitrary differences in the performance ranking of the models. The issue about how to select the optimal cutoff point is discussed in details in Pasiouras and Tanna (2010).

Table 6: Classification accuracy of logistic regression model

Training Sample			
Actual	**Predicted**		**Total**
	Failed	**Non-failed**	
Failed	0	14	14
Non-failed	0	97	97
Total	0	111	111
Holdout Sample			
Actual	**Predicted**		**Total**
	Failed	**Non-failed**	
Failed	0	6	6
Non-failed	0	49	49
Total	0	55	55

According to estimated logistic regression model expressed the previous section, we summarize the classification accuracy of the model in Table 6. According to the table, it can be seen that the model correctly classified 97 IPOs out of the overall 111 IPOs or 87.39 percent of the sample. In addition, the type I and type II

error are 0 and 12.61 percent, respectively. In this study, a type I error occurs when a non-failed IPOs is classified as failed whereas type II error occur when a failed IPOs is classified as non-failed. Furthermore, to explore the predictive accuracy of the model, we further employ the estimated logistic regression model predicting the status of holdout sample and formulate the classification accuracy table as shown in Table 6.

Table 6 presents the classification results for the models based on a cutoff point set equal to 0.5. Based on the holdout sample consist of 6 failed IPOs and 49 non-failed IPOs, the model is correctly classify 49 IPOs out of the overall 55 IPOs 89.09 percent, type I and type II error are 0 and 10.91 percent, respectively. Therefore, we conclude that the estimated logistic model is quite high ability to classify failed and non-failed IPOs.

4.5 CONCLUSIONS

In order to achieve the study objective, the univariate and multivariate analysis are conducted. The univariate analysis include descriptive statistics and correlation coefficient estimation while logistic regression is employed as multivariate analysis to examine the probability of IPOs failure based on the purposed variables. This chapter reported and discussed the empirical results obtained from logistic regression model. The descriptive statistics of employed data are reported. In addition, according to correlation coefficients confirmed that most of variables used contain unique information. Based on logistic regression model, the results found none variables are significant variables in predicting the probability of IPOs failure.

Furthermore, to evaluate the predictive ability of the model we explore the classification accuracy of the estimated logistic regression model. Based on training

sample, the results found that the model is correctly classified at 87.39 percent with type I and type II error are 0 and 12.61 percent, respectively. When we further explore the predictive accuracy using holdout sample, the results reported that the model is correctly predicted at 89.09 percent with type I and type II error are 0 and 10.91 percent, respectively. These results confirm the predictive ability of the model.

CHAPTER 5

SUMMARY AND CONCLUSIONS

5.1 INTRODUCTION

This chapter presents the summary and conclusion of this research. The chapter begins with a summary of the study, which will provide the overall picture of this study, and a discussion of the empirical results and major findings will be given in the next section. The suggestions for future research will be presented in Section 5.3 and this chapter ends with the conclusion.

5.2 SUMMARY AND DISCUSSION

It is widely believed that a vibrant market for IPOs is an asset of the economy. Black and Gilson (1998) and many others argue that the existence of such a market plays a critical role in facilitating entrepreneurship and venture capital in the economy. This view permeates corporate finance textbooks. The law and finance literature shows that IPO activity depends on country-level laws and governance institutions. It also shows that IPO activity is higher in common law countries compared to countries with other legal origins. From this perspective, IPO activity has been vibrant in the economy because of better laws and better governance institutions.

Prior literature suggests that many corporate governance structures are associated with corporate survival. For example, Parker, Peters and Turetsky (2002a) reported that the auditor is less likely to issue a going concern modification to the company in the presence of employee audit committee members, greater insider ownership and blockholder ownership. By investigating 176 financially distressed

firms, Parker, Peters and Turetsky (2002b) suggested firms that replaced their CEO with an outsider were more than twice as likely to experience bankruptcy. Furthermore, the results suggested positive relationship between likelihood of firm survival and larger levels of blockholder and insider ownership.

In Thailand, there is no prior study has explored the survival of IPO companies in Thai context. Kim, Kitsabunnarat and Nofsinger (2004) is the first study examining IPO companies in Thailand but the study's main focus is on exploring managerial ownership on the IPO firms performance. In addition, Mainkamnurd (1999) and Jaikengkit (2004) is only two studies examined the relationship between corporate governance variables and financial distress in Thai context.

The aim of the study is to explore the relationship between corporate governance and IPOs survival in Thailand. Developing such methods would have practical value for practitioners and policy makers. To achieve this objective, the sample of IPOs companies which listed on the Stock Exchange of Thailand (SET) between 1992 and 2007 are tracked until 31 December 2009 to identify the companies status include trading and delisted. The logistic regression model is then employed to identify the probability of survival of a company after IPOs.

The list and the status of IPOs in Thailand were obtained from the Capital Market Information Center, the Securities and Exchange Commission. Accordingly, the IPOs will be classified as failed if they have been delisted otherwise that IPOs is classified as non-failed. Accordingly, dependent variable used in the analysis is dummy variable indicate IPOs status. Particularly, the variable is 0 if the IPO is non-failed otherwise the variable is set to be 1. Furthermore, the dependent variables include the board size, percent of independent directors, non-executive chairman, dual

leadership and ownership concentration, as well as firm characteristics such as age and total assets.

These variables are employed in logistic regression analysis framework. A prediction model based on these variables could, then, be a practical method for financial analysts and other interest groups in evaluating the failure probability of a IPO. This model does not require information about management, products, or markets because it rather deals with the symptoms of failure than the causes. The classification of the models used to examine the business failure generally progressed from classical statistical financial distress prediction models to alternative statistical models. Classical statistical financial distress prediction models include univariate analysis, MDA, probit and logit analysis while the alternative models include neural network and survival analysis. This study uses logistic regression because the model can provide the probability of IPOs failure which is the main objective of this study.

Consequently, the research questions are set as follows: a) What are the significant determinants of IPOs failure in Thailand? and b) Could logit model be used as the methodology in predicting IPOs failure in Thailand? According to the research questions, this study draws the relevant five research hypotheses relating three categories of corporate governance and two IPOs specific variables. To answer the above research questions, we utilize the logit model in order to obtain the probability of IPOs failure based on the selected independent variable. The sample consists of 166 IPOs include 20 failed and 146 non-failed IPOs which then are equally divided into training sample (111 IPOs) and hold-out sample (55 IPOs) for building the model and evaluating the predicting accuracy of the estimated model, respectively.

The empirical results found that IPOs failure or survival in Thailand is not significantly related to corporate governance attributes, including board size, board independent, dual leadership, ownership concentration and firm characteristics such as age and total asset. For board size variable, the result is consistent with Yermack (1996), Parker, Peters and Turetsky (2002b), Elsayed (2007) and Lamberto and Rath (2008) which also found that board size has insignificant effect on survival. For board independence, Hermalin and Weisbach (1991), Yermack (1996) and Klein (1998) also found a negative relationship between the proportion of outside directors and corporate performance.

Considering the result regarding non-executive chairman, the study found consistent result to Weir and Laing (2001) that a company with the presence of independent chairman is more likely to pursue the interests of the shareholders and effectively monitor the management. For CEO duality leadership structure, the result is consistent with the finding in Chaganti, Mahajan and Sharma (1985) and Elsayed (2007) which also found that CEO duality has no impact on corporate governance.

For ownership concentration, the result is inconsistent with some studies which suggested that more concentrated the ownership, the higher profitability and labor productivity *e.g.* Claessens and Djankov (1999) and Bai *et al*. (2004). For company size variable, the result is consistent to the expectation and the finding in Goktan, Kieschnick and Moussawi (2006). Finally, the results found company age is negatively associated with the probability of IPOs failure. The result is consistent to the finding in Jovanovic (1982), Chen and Lee (1993), Lensberg, Eilifsen and McKee (2004), Rommer (2004), Li, Zhang and Zhou (2005), Rommer (2005), Hensher, Jones

and Greene (2007) suggest the importance of company age in explaining financial failure.

To evaluate the predictive ability of the model we divided the sample into two subsets namely training sample and hold-out sample. The classification accuracy of the estimated logistic regression model is explored using hold-out sample. Based on training sample, the results found that the model is correctly classified at 87.39 percent with the type I and type II error are 0 and 12.61 percent, respectively while the predictive accuracy using holdout sample are that the model is correctly predicted at 89.09 percent with type I and type II error are 0 and 10.91 percent, respectively. These results confirm high predictive ability of the model.

5.3 SUGGESTIONS FOR FUTURE STUDIES

Future research could improve upon this current research in the following aspects.

5.3.1 Improvement on explanatory variables

Some doubts may cast on the appropriateness of model specification and the omission of important variables in previous studies. Thus, more future research incorporated other feasible variables is needed for model validation. The examples of those possible variables are the qualitative variables *e.g.* IPOs ownership structure data, specifically, the gender, education, the attitudes *etc*. (Yang and Sheu, 2006). Keasey and Watson (1987) discussed that marginally better predictions concerning small company failure may be obtained from non-financial data. Consistently, Laitinen and Kankaanpaa (1999) indicated that the efficiency of the prediction model in terms of its discriminatory power may be enhanced by non-financial characteristics and

pointed that agency theories suggest that managerial incentives are potentially influential factors.

5.3.2 Improvement on the sample

One possible limitation of financial failure or bankruptcy research is the limited sample size and data availability. This study also is not the exception. Particularly, many IPOs have to be cut from the analysis because of uncompleted data. Therefore, in future studies, research should put more effort into collecting larger data sets should be considered to avoid the limited reliability of the findings problem and support the empirical results found in this research.

5.3.3 Improvement on the adopted methodology

There have been various empirical methodologies employed to explore financial distress or bankruptcy areas. Researchers argue that these models have their own benefits and limitations. Laitinen and Kankaanpaa (1999) confirmed that no superior method among the six most popular failure prediction techniques *e.g.* MDA, logit analysis, recursive partitioning, survival analysis, neural networks and the human information processing approach. Accordingly, it can be stated that one of the latest applications, neural networks, is in its present form as effective as MDA which was as early as thirty years ago. Therefore, the future study that incorporates various methodologies *e.g.* MDA, survival analysis or neural network in predicting financial failure and compare the estimated model ability could contribute the empirical evidence to the relevant literature.

5.4 CONCLUSIONS

This research focuses on examining the probability of failure or survival of IPOs in Thailand using logistic regression model. Developing such models would have practical value for practitioners and policy makers. To achieve this objective, the sample of IPOs companies which listed on the Stock Exchange of Thailand between 1992 and 2007 are tracked until 31 December 2009 to identify the companies status include trading and delisted. All data were obtained from the Capital Market Information Center, the Securities and Exchange Commission. The logistic regression model is then employed to identify the probability of survival of a company after IPOs.

The empirical results found that IPOs failure or survival in Thailand is not affected by board size, board independent, dual leadership, ownership concentration and firm characteristics such as age and total asset. The classification accuracy of the estimated logistic regression model is explored using hold-out sample. Based on training sample, the results found that the model is correctly classified at 87.39 percent with the type I and type II error are 0 and 12.61 percent, respectively while the predictive accuracy using holdout sample are that the model is correctly predicted at 89.09 percent with type I and type II error are 0 and 10.91 percent, respectively.

Future research could further improve on the study in following directions: first, larger data-sets should be considered to confirm the evidence found in this study. Second, improvement could be made on adding potential explanatory variables especially the qualitative information and, finally, improvement on the methodology *e.g.* survival analysis or ANN.

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