1. Introduction

1.1 RESEARCH QUESTIONS

The rapid growth of the Chinese insurance industry has attracted serious attention from academic researchers, policymakers and investors. Its total premium income rose from RMB 1.6 billion in 1980 to RMB 978.4 billion ($143.88 billion) in 2008, or increased by 39 per cent from 2007, the highest annual growth since 2002. Total assets of the industry reached RMB 3.34 trillion in December 2008, an increase of more than eight times, from RMB 317.41 billion in 2000. Despite its fast growth, the insurance industry is still underdeveloped compared to other sectors of the economy. The latest statistics show that China accounted for less than 2.3 per cent of the world’s total insurance premiums in 2007 although it has 22 per cent of the world’s population. The insurance depth was 2.85 per cent and insurance density was RMB 533, again far below the international average (CIRC, 2008).¹

China’s accession to the WTO has profound implications for the country’s insurance market. By the end of 2006, all the restrictions imposed on foreign insurers had been removed. Further deregulation has also been implemented. However, the domestic insurance market is still overwhelmingly dominated by a few large state-owned or state-controlled firms in terms of premium income. As the demand for insurance is rising exponentially, there exist huge potential opportunities as well as challenges for non-state, foreign and joint venture insurance companies.

Efficiency is the key concern of the management of insurance companies in making the company competitive in the market. Measuring performance and efficiency can bring about a behavioural response in the organisation and this in turn can lead to a change in performance (Thanassoulis, 2001). Thus, the efficiency study is critical and practical to management. Benchmarking is used in the financial industry because service standards are more difficult to measure than manufacturing outputs (Zhu, 2003). Emulating the best practice in the industry, insurance firms can be better prepared to face the change in the environment. Examination and exploration of efficiency issues also help policymakers regulate the insurance market more effectively. The insurance markets require the efficient allocation of resources, which drives mergers and acquisitions among insurance companies.
companies. The efficiency study is essential for identifying inefficiencies, finding possible solutions and maintaining the long-run survival ability of insurers.

This is the first study in the English literature to address the efficiency issues of the Chinese insurance industry. We try to identify which insurance companies are the benchmarks in the Chinese insurance industry as measured by technical efficiency, where the efficiency gaps come from, what factors are influencing the technical efficiency of insurers, and what strategies and policies can be applied to improve efficiency. The benchmarks identified in this study can be different from those obtained with other ranking techniques. The results will clearly indicate the areas in which an inefficient insurer can emulate a benchmark in order to improve its technical efficiency.

In the literature, efficiency refers to a firm’s ability to maximise output (such as premiums and investment income) for a given set of inputs (such as labour and capital), or to minimise the use of inputs given a set of outputs. A firm is technically efficient if it cannot increase its output without a corresponding augmentation of inputs under the current state of production technology. When considering the prices of inputs and outputs, we can derive the concepts of cost efficiency and revenue efficiency from the technical efficiency definition. This study will focus on technical efficiency because profitability is not a good measure to reflect the real performance of insurers in China. Their profit can be affected by the accounting policy the company adopted in calculating and recording additions to reserves. For example, the ratio of additions to reserves to the total premium of the People’s Insurance Company of China (PICC) in 2007 was 83.9 per cent, compared to 282.6 per cent of China Pacific and 377.4 per cent of Ping An insurance company (CIRC, 2008). In addition, it is impossible to separate the quantity and price information from the sales of insurance products and services, though in the technical efficiency analysis we have to use values to approximate quantities. More importantly, unlike prices, the variables used in the technical efficiency analysis are usually under the control of the management. The analytical results can provide meaningful and feasible recommendations for the management to achieve better performance.

1.2 RESEARCH METHODS

Research has been done in various countries to measure the efficiency of insurance companies, but few studies have focused on China. Although some qualitative studies of the Chinese insurance industry can be found
in Chinese-language journals, few studies have used quantitative methods such as DEA (data envelopment analysis) or SFA (stochastic frontier analysis) to address the issue.

DEA was first developed by Charnes, Cooper and Rhodes (1978). It evaluates the efficiency scores of organisations by linear programming. It has two generic models. The multiplier model calculates efficiency scores by constructing virtual input and output weight, while the envelopment model uses the possible production sets to form a virtual decision making unit on the efficiency frontier and estimates the distance between the real unit and the virtual unit. To specify a DEA model, few assumptions are needed, such as the nature of returns to scale and input or output orientation. This study focuses on interpreting the results obtained from the input-oriented CRS (constant returns to scale) envelopment model for two reasons. Firstly, the CRS model can identify more inefficient insurers than the VRS (variable returns to scale) model and hence has more discrimination power. Secondly, for most Chinese insurance companies, it is much easier to reduce the input level while maintaining the output level than to increase the output level while keeping the input level constant.

As a non-parametric method, DEA overcomes the specification problems and is more commonly useful in generating managerial implications when compared to a parametric method, such as SFA. However, it cannot statistically identify the relationships between input and output variables and other factors that may affect an insurer’s efficiency. Therefore, a correlation analysis between DEA and SFA results will be carried out to check the robustness of the DEA results. In the SFA model, the impact of size and employees’ education background on the insurer’s technical efficiency is also tested.

This study adopts a unique approach to define DEA outputs and corresponding models. The choice of input and output variables is always a controversial issue. Usually, capital, labour and operating expenses are regarded as the major inputs in insurance production (Yuengert, 1993). For outputs, studies from the late 1990s have preferred to use the sum of claim payments, additions to reserves and incurred benefits instead of total income as the output variable (Cummins and Weiss, 1998; Ryan and Schellhorn, 2000; Worthington and Hurley, 2002). They think the former reflects insurance companies’ performance in providing risk pooling and risk sharing services and products. However, insurers’ ability to generate income should not be ignored in the efficiency analysis. Above all, the ultimate goal of an insurance company is to generate profit, which is closely linked to income. Furthermore, the income of an insurance company reflects its amount and the quality of insurance products and services provided to consumers (Ward, 2002). Hwang and Gao (2005)
specify two outputs, insurance benefits and investable funds, in examining cost efficiency in the Irish life insurance industry. This study attempts two DEA approaches. In the income approach, total income is the sole output variable, while in the RSRB approach the output variable, is defined as the sum of claim payments, additions to reserves and incurred benefits. Later the income variable will be further decomposed to identify the comparative advantages of insurers in generating premium income and investment income.

The DEA method produces efficiency scores for each insurer over six years. Firms that maintain full efficiency and appear in the reference sets the most are regarded as benchmarks in the insurance industry. DEA results classify the radial contractions and cut-down of input slacks that inefficient insurers can make in order to improve technical efficiency. The model could also point out targets for inefficient insurers in changing their input mix and level to achieve full efficiency.

When scale economy is considered, insurance companies can change the scale to achieve constant returns to scale, which is equivalent to technical efficiency. Merger may change the efficiency of participating insurers but the result may not be favourable to all of them. Insurers need to avoid simply aggregating the inputs and outputs in the merger process.

The Malmquist Index developed in this study is the first attempt to measure the productivity growth of the Chinese insurance industry in the literature. Through the Malmquist Index, we will be able to examine the productivity growth of insurers over time. The productivity growth is then decomposed into frontier shift, scale change and pure technical efficiency improvement. The results enable insurers to find some alternative strategies, through technological progress, or change in size, or improvement in pure technical efficiency. Policymakers could have a clearer understanding of competition and set up regulations accordingly.

1.3 RESEARCH STRUCTURE

This book has nine chapters including the introduction and conclusion. Chapter 1 defines research questions and research design. Chapter 2 looks at the development of the Chinese insurance industry and discusses various competition issues that concern domestic and foreign insurers. Chapter 3 critically reviews the existing literature of efficiency studies on insurance industries. It covers eight topics including the types of efficient frontiers, output and input definitions, scale and scope efficiency, average efficiency scores and rankings in previous studies, effect of merger, impact of organisational form and distribution strategies on efficiency, relationships
between efficiency and human resource practice and IT management and the changes of productivity. Chapter 4 discusses theories associated with efficiency concepts and the DEA model.

Empirical analysis is the subject of Chapters 5, 6, 7 and 8. Chapter 5 defines the approaches, models, inputs and outputs in the DEA context. It evaluates insurance companies based on efficiency scores, slacks and targets and frequencies of appearing in the reference sets. Chapter 6 addresses the managerial concerns, such as scale efficiency, merger impact and super-efficiency. The stability of the DEA results is tested with window analysis. Chapter 7 estimates the efficiency of insurers in China by SFA and tries to identify the influential factors. The robustness of the DEA results is tested by comparing the DEA results and the SFA results. In Chapter 8, a Malmquist Index is constructed to decompose the productivity growth of insurers into technological progress, scale change and pure technical efficiency improvement. A number of competition strategies are proposed. Chapter 9 concludes the whole book, clarifying the contributions to the literature, offering policy recommendations and pointing out the limitations of our study and the direction of future research.

NOTE

1. The ratio of total insurance premiums to GDP is called insurance depth. The per capita spending on insurance is called insurance density.