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Ownership Structure, Efficiency, and Long-Term Performance: Life Insurer Demutualizations in U.S.

ABSTRACT

Th is paper examines the efficiency changes of U.S. life insurers. The purpose of this paper is to investigate why life insurers changed ownership structure from mutual form to stock form. Our study extends previous literature by providing different perspectives to life insurers that changed ownership structure. Our paper improves previous method by using the frontier approaches to measure the efficiency changes. We use the data envelopment analysis (DEA) and measure the cost efficiency of the firms and its two components.

Recent literature (e.g. Mayers and Smith, 1986) suggests two competing hypotheses to explain why mutual insurers convert: the efficiency hypothesis and the expropriation hypothesis. By adopting both the value-added and the financial intermediary approach, we find that firms demutualize in order to improve their efficiency through access to the financial markets. Our results thus are consistent with the efficiency hypothesis. We conclude that both approaches in the input/output analysis provide important insights on the efficiency issue.

Keyword: Efficiency, Ownership Structure, Demutualization, Life Insurance

本研究旨在探討美國壽險公司的效率改變, 特別是壽險公司為何由相互公司形態轉變為股票公司形態。 本研究延伸過去的文獻, 對壽險公司轉變股權形態提供不同的觀點。本研究利用兩種效率前緣的方法來衡量效率的變化: 一為資料包絡法（DEA）來衡量公司的成本效率及組成成本效率的兩項因子, 另一為 Malmquist 指數分析法, 以估計轉型保險公司效率及生產力的變化。

最近的文獻（e.g. Mayers and Smith,1986）以效率假說及侵占假說來解釋相互保險公司轉型的原因, 其中效率假說說明相互壽險公司之所以轉型, 是因其意圖改善公司之營運狀況。 利用兩種投入／產出的衡量方法——附加價值法及金融仲介法, 我們發現相互保險公司轉型的原因, 是在於利用資本市場的管道來改善公司的效率。 因此, 本研究結果與效率假說一致。 此外, 本研究結果也表示此兩種投入／產出的衡量方法在效率分析的研究上都佔有重要的地位。

關鍵詞: 效率, 股權結構, 相互公司轉型, 壽險

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I. Introduction and Literature Review

The existence of alternative ownership structures in the insurance industry naturally focuses attention on the implications of these differences. Several earlier have examined the performance of competing insurance ownership structures using cross-sectional analysis (e.g. Spiller 1972 and Frech 1980). Recent studies have compared the performance of the same companies before and after conversion to another ownership structure (Mayers and Smith 1986, McNamara and Rhee 1992, and Cole, McNamara, and Wells 1995).

Another interesting research vein has focused on the efficiency of U.S. life insurers. Traditional research of efficiency in the financial services industry such as banking starts to use frontier approach and becomes popular since late 1980s. Sherman and Gold (1985), Rangan et al (1988), Aly et al (1990) and Ferrier and Lovell (1990) are among some of the studies that have used a frontier approach to measure the input/output efficiency of banks. Similar research in insurance industry units, however, starts only after Cummins and Weiss (1993), Yuengert (1993), and Gardner and Grace (1993) investigate the X-efficiency of insurers either in life or in property-casualty industry in U.S. Recently, Cummins, Weiss and Zi (1999) use frontier analysis (DEA) to examine the input/output efficiency difference between different organizational forms in U.S. property-casualty insurance industry. Cummins, Tennyson and Weiss (1999) also use DEA method to examine the efficiency performances of target insurers before the mergers and acquisitions.

At least two approaches have been used in the insurance literature to measure the outputs and inputs used in the efficiency studies: the value-added approach and the financial intermediary approach. The value-added approach states that all the financial variables with substantial value added are employed as the important outputs (see Berger & Humphrey, 1992). On the other hand, the second approach views an insurance company as a financial intermediary. We use value-added approach to examine the efficiency of our sample firms, and we then use financial intermediary approach to compare the efficiency difference of two methods brought by the capital concern. We intend to see whether the conversion of firms fulfills the capital requirement of mutual insurers.

Finally, we examine the long-term stock return of the demutualization firms. The objective of a financial manager should be shareholder wealth maximization, which is consistent with stock price maximization. The long-term stock return of the demutualization firm relative to the control firm will provide additional insight on the

motivation behind the demutualization.

II. Purpose

Recent literature (e.g. Mayers and Smith 1986) suggests two competing hypotheses to explain why mutual insurers convert: the efficiency hypothesis and the expropriation hypothesis. The efficiency hypothesis states that insurers demutualize in an effort to improve efficiency. On the other hand, the expropriation hypothesis implies that the ownership structure change is motivated by wealth transfer opportunities. This hypothesis implies a non-positive impact on the value of the firm. Our paper investigates the pre-versus post-demutualization efficiency of life insurers. The efficiency hypothesis predicts that firms that shift from mutual form to stock form could be motivated by opportunities to improve operating performance. If this hypothesis is true, we should see that stock firms that converted from the mutual form of organization exhibit higher efficiency after their demutualizations. However, if we do not find significant evidence of improved efficiency, we may conclude that demutualizations are more possibly expropriation-based.

III. Methodology

Our paper extends the prior literature by providing different perspectives to life insurers that changed ownership structure. Earlier studies of life insurers that converted to another ownership structure did not focus on input/output efficiency. Instead, these studies focused on a limited number of variables as proxies for "performance." The purpose of our paper is to examine whether U.S. life insurers improved their efficiency after they converted from mutual form to stock form. We use two frontier approaches to measure the efficiency changes. First, we use data envelopment analysis (DEA) to measure the cost efficiency of the firms. We also consider the two components of cost efficiency: technical efficiency, which measures the ability of a firm to obtain maximal output from a given set of inputs, and allocative efficiency, which reflect the ability of firms' managers to allocate the resources based on input prices. In addition, we use Malmquist indices to investigate the efficiency and productivity change of converted insurers over time. We believe Malmquist analysis helps our analysis in that it can further separate the productivity change into two components: technology change and technical efficiency change. It allows us to investigate whether a firm's productivity improvement is due to its adoption of new technology or due to its favorable efficiency improvement.

IV. Results and Conclusion

We examine the DEA efficiency performance of the demutualized firms first by

adopting the value-added approach. The results are reported in two panels of Table 1. Each panel refers to the efficiency results of the demutualized firms relative to the non-demutualized firms. Our results in Panel A of Table 1 show that prior to the demutualization, the efficiencies of the demutualized firms increase gradually relative to the non-demutualized mutual firms. In other words, the mutual firms who convert are those firms who are the most efficient. However, our results in Panel B of Table 1 show that five years after the conversion, the efficiency performance of the demutualized firms do not improve throughout the years. Relative to other non-demutualized stock firms, both the cost and technical efficiency of the demutualized firms drop throughout time.

[Table 1 about here]

Table 2 shows the DEA efficiency performance by adopting the financial intermediary approach, and the results are summarized in two panels of Table 2. Our results show that prior to the demutualization, the efficiency of the demutualized firms decreases gradually relative to the non-demutualized mutual firms. This result is strikingly different from what we found in Panel A of Table 1, which states that those who are most efficient among the mutual firms convert later. We explain the differences as following. Note that it is generally more difficult for mutual firms to acquire capital from the stock market, and firms may use demutualization as a way to fulfill their capital needs. Also note that in the financial intermediary approach, the financial condition of a firm is considered as one of the firm's output. Without considering the financial condition of a firm in the value-added approach, we find that mutual firms who convert later are firms who are the most efficient among firms with similar size. However, by considering the financial condition of a firm in the financial intermediary approach, the efficiency of the demutualized firms decreases gradually relative to the non-demutualized mutual firms. One possibility to explain this is that firms which convert later are in an effort to improve efficiency, but they are unable to reach their objective considering their weak financial condition and their capital shortage. Therefore, they demutualize in order to improve their efficiency through the access to the financial markets. Our results thus are consistent with the efficiency hypothesis.

[Table 2 about here]

The results in Panel B of Table 2 also support our argument. By examining the results of Panel B of Table 1, we found that the efficiency performance of the demutualized firms do not improve five years after the conversion. However, the results in Panel B of Table 2 show that after we consider firm's paying ability and capital utilization, the relative performance of the demutualized firms increases throughout the years. In other words, it shows that the demutualized firms improve their efficiency through demutualization and their capital needs are fulfilled. Our results thus are consistent with the efficiency hypothesis and shed light on the motivation of recent

demutualizations.

V. 計畫成果自評部分

本研究除了就原計畫所述內容加以討論外, 另外並對相互保險公司轉型之後長期的表現加以評估, 希望以此類公司長期的表現來佐證其當初轉型的原因。研究結果與原計畫所預期之情況多為一致。 此研究結果應可對相互保險公司為何轉型做進一步了解。 此外, 對於學術界長久以來在保險業效率分析中對投入／產出的衡量方法的爭論, 本研究可提出不同的見解。本研究已於 2003 年 1 月發表於 Western Risk Management and Insurance Annual Conference (Hawaii, USA) 及於 2003 年 8 月 發表於全美風險管理與保險年會(ARIA Annual Conference, Denver, CO USA), 並即將於近期內投稿至適合的學術期刊發表, 相信未來發表的機會和價值極高。

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Table 1: The DEA Efficiency Score Results

Note: year zero refers to the year firms demutualized, while the years with minus sign in front refer to the pre-demutualized years, and the years with positive sign refer to the post-demutualized years. Panel A refers to the results of converting firms using ten mutual firms with similar size as control sample, and Panel B refers to the results of converting firms using ten stock firms with similar size as control sample.

Panel A: converting firms vs. mutual firms

	Cost Efficiency			Technical Efficiency		
YEAR						
	D firm	non-D firm	Relative Performance	D firm	non-D firm	Relative Performance
-5	**0.751**	**0.713**	**1.053**	**0.940**	**0.901**	**1.043**
-4	0.834	0.684	1.219	0.979	0.874	1.120
-3	0.813	0.710	1.145	0.949	0.890	1.066
-2	0.818	0.699	1.170	0.996	0.879	1.132
-1	0.800	0.725	1.103	0.982	0.893	1.099
0	**0.827**	**0.711**	**1.163**	**0.983**	**0.885**	**1.110**
+1	0.778	0.716	1.086	0.852	0.884	0.964

+2	0.821	0.739	1.111	0.939	0.910	1.032
+3	0.841	0.742	1.134	0.965	0.904	1.067
+4	0.676	0.746	0.906	0.920	0.873	1.054
+5	**0.637**	**0.741**	**0.860**	**0.873**	**0.882**	**0.990**

Panel B: converting firms vs. stock firms

	Cost Efficiency			Technical Efficiency		
YEAR						
	D firm	non-D firm	Relative Performance	D firm	non-D firm	Relative Performance
-5	**0.834**	**0.709**	**1.176**	**0.917**	**0.883**	**1.039**
-4	0.855	0.711	1.202	0.959	0.864	1.110
-3	0.862	0.715	1.205	0.998	0.853	1.170
-2	0.911	0.747	1.219	1.000	0.894	1.118
-1	0.868	0.709	1.225	1.000	0.860	1.163
0	**0.825**	**0.751**	**1.099**	**0.994**	**0.893**	**1.113**
+1	0.711	0.744	0.956	0.919	0.866	1.060
+2	0.776	0.746	1.040	0.984	0.887	1.109
+3	0.840	0.736	1.142	0.970	0.870	1.115
+4	0.824	0.730	1.128	0.953	0.875	1.089
+5	**0.765**	**0.744**	**1.027**	**0.895**	**0.910**	**0.983**

Table 2: The DEA Efficiency Score Results

Note: year zero refers to the year firms demutualized, while the years with minus sign in front refer to the pre-demutualized years, and the years with positive sign

refer to the post-demutualized years. Panel A refers to the results of converting firms using ten mutual firms with similar size as control sample, and Panel B refers to the results of converting firms using ten stock firms with similar size as control sample.

Panel A: converting firms vs. mutual firms

	Cost Efficiency			Technical Efficiency		
YEAR						
	D firm	non-D firm	Relative Performance	D firm	non-D firm	Relative Performance
-5	0.921	0.845	1.089	0.998	0.997	1.001
-4	0.915	0.998	0.917	0.998	1.000	0.998
-3	0.917	0.874	1.049	0.998	0.999	0.998
-2	0.866	0.999	0.866	0.969	0.999	0.970
-1	0.843	0.894	0.943	1.000	0.996	1.004
0	0.871	0.894	0.974	0.965	0.999	0.966
+1	0.891	0.862	1.034	1.000	0.997	1.003
+2	0.850	0.863	0.984	0.969	0.997	0.972
+3	0.852	0.857	0.995	1.000	0.993	1.007
+4	0.869	0.866	1.003	0.977	0.998	0.979
+5	0.885	0.860	1.029	1.000	0.997	1.003

Panel B: converting firms vs. stock firms

	Cost Efficiency			Technical Efficiency		
YEAR						
	D firm	non-D firm	Relative Performance	D firm	non-D firm	Relative Performance
-5	0.676	0.751	0.900	1.000	0.999	1.001
-4	0.722	0.831	0.868	1.000	0.999	1.003
-3	0.815	0.846	0.962	1.000	1.000	1.000
-2	0.786	0.778	1.010	1.000	1.000	1.000
-1	0.708	0.859	0.823	1.000	1.000	1.000
0	**0.711**	**0.823**	**0.864**	**1.000**	**1.000**	**1.000**

+1	0.812	0.817	0.994	1.000	1.000	1.000
+2	0.719	0.836	0.860	1.000	1.000	1.000
+3	0.779	0.866	0.899	0.999	0.999	0.999
+4	0.830	1.000	0.830	1.000	1.000	1.000
+5	**0.874**	**0.879**	**0.994**	**1.000**	**0.999**	**1.001**