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Financial reforms and efficiency in the insurance companies of Pakistan

Talat Afza¹ and Muhammad Jam-e-Kausar Ali Asghar^{1*}

¹COMSATS Institute of Information Technology, Lahore, Pakistan.

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This study examined the determinants of efficiency in the insurance companies of Pakistan over the period 2003 to 2007. Data envelopment analysis (DEA) was applied to estimate the efficiency scores of the insurance companies and then the study used regression analysis to analyze the relationship of line of business, size, profitability, investment, claim and financial reforms with the DEA efficiency scores. Moreover, for a more comprehensive analysis, the present study has also divided the sample into life and non-life insurers. In the non-life insurers, it was found out that investment, profitability and financial reforms are positively related whereas, claim was found negatively related with the efficiency scores. In contrast, investment, profitability and financial reforms were found negatively related whereas, claim was found positively related with the efficiency scores of the life insurers.

Key words: Pakistan, determinants, efficiency, life insurers, non-life insurers.

INTRODUCTION

The achievement of higher efficiency level for any insurers is one of their main business objectives, but in today's complex and interdependent economic world, it is now really challenging for the insurers to attain higher efficiency level. The insurers in developing countries like Pakistan are facing more economic challenges which restrict the insurers in achievement of higher efficiency level. These challenges include, funds inadequacy, lower growth rate, rising costs and aggressive financial reforms.

The primary objective of financial reforms is to enhance competition within industry by simplifying, reducing and making more cost effective regulations along with the improvement in financial soundness. Since the sole key to achieve higher efficiency level is to produce more outputs with the utilization of lower inputs; moreover, financial reforms also ensure a flexible financial system by adopting innovation in technologies and services to strengthen the performance of the insurers. Thus, we can

conclude that a well developed and financially strong insurance industry in a global business environment is essential for the economic development of any country, especially the emerging countries, since it provides a long-term support for physical and social infrastructure of the country.

Therefore, it is critical to investigate the relationship of financial reforms along with the various other financial factors, such as, size, profitability, investments, claims, etc., with the efficiency of insurers, since these factors exhibit variations in different countries, due to the dissimilarity in practices, operations and government control, especially, in case of developing economies like Pakistan. There are 5 life and 32 non life insurance companies operating in Pakistan. The insurance sector has faced many environmental barriers in Pakistan, like illiteracy, misconceptions about the insurance business, low per capita income, etc., which resulted in lower insurance density (\$6.5) and insurance penetration ratio (0.7%). To overcome these obstacles, the government of Pakistan has taken some positive steps, such as, insurance ordinance 2000, increase of minimum paid up capital requirement, regulatory control of insurance

*Corresponding author. E-mail: jamekausar@yahoo.com. Tel: +92-300-8822434.

industry to Security and Exchange Commission of Pakistan (SECP) and implementation of takaful, voluntary pension and valuation regulations, etc.

The objective of the present study is to analyze the relationship of different firm based and regulation based variables, including, size, leverage, profitability, investments, claims and financial reforms with the efficiency of insurers in Pakistan. The remaining paper is organized as follows; subsequently, studies related to determinants of efficiency are presented, after which the methodology used was discussed. This was followed by a discussion of the results before the concluding remarks were given.

LITERATURE REVIEW

The relationship of various characteristics of firm with the efficiency of the insurers has been examined by many researchers. For instance, some studies have examined the relationship between size and efficiency of the insurance firms, among them, Chaffai and Quertani (2002) applied both parametric Stochastic Frontier Approach (SFA) and non-parametric data envelopment analysis (DEA) to investigate the technical efficiency of 13 life and non-life insurance companies in Tunisia over the period 1990 to 2000. The results suggested that the small non-life insurers can improve their efficiency level if they follow the managerial strategy of larger insurers. In another study, Worthington and Hurley (2002) examined the technical, scale, allocative and cost efficiency of the 46 Australian non-life insurers using DEA. This study found out that cost efficiency scores were more closely related to assets size instead of listing and product diversification. Moreover, the large insurers appeared more efficient as compared to other insurers.

In the empirical literature, there are many studies which have investigated the relationship of different firm based and regulation based variables with the efficiency of the insurance companies. For instance, Hussels and Ward (2006) investigated the efficiency of 78 German and U.K. life insurers over the period 1991 to 2002. DEA and distribution free approach (DFA) were applied to compute the efficiency scores. It was discovered that the insurers of German market were more efficient as compared to U.K. insurers. Moreover, this study also analyzed the relationship of solvency, debt, claims, organization type, administration cost and size, etc., and found out that administrative expenses and the size of the insurer have a negative relationship with efficiency scores, whereas claims and younger life insurers have a positive association with efficiency scores. This study was not able to find any kind of relationship between the deregulation process and efficiency.

Some of the empirical studies have also analyzed the relationship between the financial reforms and efficiency of the insurance firms. For instance, Mahlberg and Url (2000) investigated the technical efficiency of the 533

life and non-life insurers of Germany using DEA over the period 1992 to 1996. This study examined the relationship of financial reforms, age, share of property and liability insurance business and organization form on the efficiency of insurers. It was found out that, the age, share of property and liability insurance have a negative relationship with efficiency. This study failed to determine the effect of financial reforms since it finds a decline in the efficiency scores over the study period, but in contrast to the efficiency scores, it finds an increase in the productivity of the insurers.

Ryan and Schellhorn (2000) examined the cost efficiency of 321 life insurers of United States of America over the period 1990 to 1995. This study applied DFA to compute the efficiency scores and further investigated the relationship of financial reforms, size, advertisement expenses, equity and market share with the efficiency. It was found out that the efficiency of insurance firms after the financial reforms was same. Moreover, it was also found out that mid-sized insurers were the least efficient. Advertisement cost and equity were found negatively related with the efficiency scores. In contrast, the market share was found positively related with the efficiency of the life insurers in USA.

There are studies that have also found positive effect of the financial reforms on the efficiency and productivity of the insurance companies. For instance, in another study by Badunenko et al. (2006) who examined the effect of financial reforms in 163 life and non-life insurance firms of Ukraine over the period 2003 to 2005. This study found out that the increase in the capital requirements positively contributed towards the improvement of both technical and scale efficiency of the insurers. In another study by Rees et al. (1999), they analyzed the technical efficiency in the life insurers of Germany and U.K. using DEA over the period of 1992 to 1994. It was found out that the relaxation of regulations and an increase in competition has positively affected the efficiency of insurance companies.

Boonyasai et al. (2002) applied DEA to compute the technical, pure technical and scale efficiency of 49 to 110 life insurers of Korea, Philippines, Taiwan and Thailand. The main focus of this study was to analyze the effect of regulation reforms in different countries. This study found out that the deregulation and liberalization have significantly enhanced the productivity in Korea and Philippines, but the increase in productivity in Taiwan and Thailand was less significant. Moreover, Eling and Luhn (2008) investigated the efficiency of 3,555 insurers over the period of 2002 to 2006 from 34 countries around the world. DEA and SFA were applied to compute the efficiency scores. This study found out that the highest average efficiency level in the insurance markets are Denmark and Japan, whereas the Philippines were found as the least efficient insurance markets. Moreover, the results also indicated that the capitalization and efficiency have a positive relationship

for life and negative relationship for non-life insurers. Furthermore, the results also suggested that the size of the firm has a positive relationship with non-life and negative relationship with life insurers.

There is no study in Pakistan to the best of our knowledge which have analyzed the determinants of efficiency in the insurance companies of Pakistan. However, Afza et al. (2010a) investigated the efficiency of non-life insurance companies in Pakistan and reported that the non-life insurers of Pakistan were 82.4% technical efficient, 91.4% pure technical efficient and 89.9% scale efficient. In addition, it was also found out that the large size insurers have higher efficiency level as compared to others.

In another earlier study, Afza et al. (2010b) applied DEA to compute the efficiency scores of insurance companies in Pakistan over the period 2003 to 2007 and it was found out that the insurance companies were on average of 92.7% technical efficient, 81.12% allocative efficient and 75.44% cost efficient. The focus of the present study is to investigate the factors which determine the efficiency of insurance companies in an emerging economy of Pakistan since it is in a regulatory transition process.

DATA AND METHODOLOGY

The present study used regression analysis to investigate the relationship of various firm based characteristics along with the financial reforms with the efficiency scores of insurance companies in Pakistan.

This study has used the efficiency scores of an earlier study by Afza et al. (2010b)¹. For a more comprehensive analysis, the present study has also divided its sample into life and non-life insurers to find out the real determinants of efficiency in each type of insurers along with a combine analysis. The model in Equation 1 is for the separate analysis, whereas the model in Equation 2 is for a combine sample of both types of insurers.

$$\theta_{i,t} = \beta_1 + \beta_2 \text{SIZE}_{i,t} + \beta_3 \text{INVSTMNT}_{i,t} + \beta_4 \text{PRFTBLTY}_{i,t} + \beta_5 \text{LVRG}_{i,t} + \beta_6 \text{CLMS}_{i,t} + \beta_7 \text{Dregulation}_{i,t} + \epsilon_{i,t} \tag{1}$$

$$\theta_{i,t} = \beta_1 + \beta_2 \text{Dtype}_{i,t} + \beta_3 \text{SIZE}_{i,t} + \beta_4 \text{INVSTMNT}_{i,t} + \beta_5 \text{PRFTBLTY}_{i,t} + \beta_6 \text{LVRG}_{i,t} + \beta_7 \text{CLMS}_{i,t} + \beta_8 \text{Dregulation}_{i,t} + \epsilon_{i,t} \tag{2}$$

where θ_{it} = A vector of efficiency (TE, AE and CE), TE = technical efficiency, AE = allocative efficiency, CE_t = cost efficiency, Dtype = 1 if non-life insurance company and 0 if life insurance company, SIZE = total gross premiums (Millions), INVSTMNT = investments/total assets (%), PRFTBLTY = earnings after tax (EAT)/gross premiums (%), LVRG = total debt capital/total assets, CLMS = net claims/net premiums and Dregulation = 1 if minimum paid up capital requirement increased by SECP (2003 and 2005) and 0 if otherwise.

According to empirical literature, insurance companies can be divided into life and non-life insurers based on their operations; we used a dummy variable which will be 1 for non-life insurers and 0 for life insurers. Barros et al. (2005) also used dummy variables to

investigate the effect of line of business. The aim of this dummy is to capture the role of life and non-life insurers in respect of their efficiency scores and also to determine the effect of regulatory and market constraints for the life and non-life insurers. To analyze the relationship between size and efficiency scores, the present study used the gross premiums as a measure of size, where gross premiums were defined as the sum of all premiums written by an insurance company. This study is expecting a positive relationship between size and efficiency score, because the large firms have higher market access as compared to their smaller counter parts.

It is obvious that every company want to enhance their profit, and higher profitability can be achieved with the optimum utilization of resources at a lower cost. Therefore, it is important to investigate the significance of the relationship between profitability and efficiency. This study has measured the profitability by dividing the earnings after tax with the gross premium. We are expecting a positive relationship between profitability and efficiency scores.

As the insurers receive premiums in advance and paid up claims in future, so it provides a space for insurers to invest their advance premiums into revenue generating investments. Investment assets mostly earn a significant amount of the revenues for the insurers. Therefore, it is important to examine the relationship between investments and efficiency scores. The present study measure the investment assets of each firm by dividing the total investments with the total assets, where total investments are defined as total invested assets provided in the balance sheet of each insurer (Cummins et al., 1996). This study is expecting a positive relationship between investments and efficiency scores, because higher invested assets leads to the higher investment revenues which result in higher efficiency of the insurers.

Leverage is an economical source of financing as compared to equity capital (trade off theory). Therefore, the overall cost will decrease, which result in higher efficiency level. Leverage consists of all borrowed funds in the current analysis, because it is an external source of financing for the insurers. This study is expecting a positive relationship between efficiency and the leverage due to its lower cost. Claims are another important part of insurance business and its successful payment to policyholders depends on the larger pool of insureds. This study used net claims paid to net premiums ratio as a measure of claims for both life and non-life insurance companies. Hussels and Ward (2006) also used the same measures for leverage and claims.

The current study is expecting a negative relationship between claims ratio and efficiency scores of non-life insurers and a positive relationship between claims ratio and efficiency scores of life insurers. The reason behind it is the nature of business as the higher claims increase loss for non-life insurers, whereas, in contrast, higher and timely payment of claims for life insurers increase its goodwill because higher number of payments to old policy holders result in higher number of new policy holders (e.g. Family and Friends).

A number of financial reforms have been made, recently, for the insurance industry of Pakistan. In the year 2003, the regulators have reduced the compulsory cession for the insurers. Moreover, the minimum paid-up capital requirement for non-life insurers was increased to Rs. 50 million and for life insurer to Rs. 100 million. In the year 2005, the minimum paid-up capital requirement for non-life insurer was further enhanced to Rs. 80 million and for life insurers to Rs. 150 million. Moreover, the valuation regulations for insurance companies were also implemented in the year 2005. Therefore, the present study has also incorporated the effect of those major financial reforms on the efficiency of the insurers to examine the impact of the financial reforms on the efficiency of the insurance industry.

This study incorporated a dummy variable “Dregulation” which would be 1 for the year 2003 or 2005 and 0 otherwise. The study is expecting a positive effect of financial reforms on the efficiency of insurance companies in Pakistan.

¹ For more information on the Data Envelopment Analysis and efficiency scores, see Afza, Talat & Jam-e-Kausar (2010b)

Data

Financial data was obtained from the financial reports of 33 insurers in Pakistan over the period 2003 to 2007 since the new accounting rules and regulations were implemented in the year 2002. The insurers in present study represent around 95% of all insurers in terms of their total assets in Pakistan. The descriptive statistic for the regression analysis is as shown in Table 1. The insurance companies are on average of 92.7% technical efficient, 81.12% allocative efficient and 75.44% cost efficient. The mean value of the size has been enhanced from 1049 million rupees in 2003 to 2028 million rupees in the year 2007. Investment assets have been increased from 34.82% in 2003 to 42.43% in 2007. The increase in size and investment assets suggests that insurance companies in Pakistan are growing rapidly.

The average profitability of the insurance market in Pakistan has been significantly increased as the profitability was just 17.59% in 2003, and which was enhanced around 12 times and it reached 213% in the year 2007. This might be the result of higher investment incomes. Leverage ratio has been decreased over the study period from 58.02% in 2003 to 50.17% in 2007. This might be due to the increase in the minimum paid up capital requirement.

EMPIRICAL RESULTS

The results regarding the relationships of firm characteristics with the different efficiencies were presented as shown in Table 2. These results reveal that dummy variable "Dtype" has positive relationship with all type of efficiencies of the insurer in Pakistan which indicates that the non-life insurers are more efficient as compared to life insurers.

These results are consistent with the results of Barros et al. (2005). Moreover, these results also suggest that there is a difference in the level of constraints in the Pakistani market for both types of insurers. The relationship of Dtype with TE and CE is not only significant, but also has higher coefficients as compared to AE which indicates that non-life insurers are more efficient in their operations and cost. SIZE is found positively related with all kind of DEA efficiencies in almost every model except one. These results indicate that the larger insurers in Pakistan are not only efficient in terms of their operations but also in terms of allocative and cost efficiency. Moreover, the positive coefficient also suggests that larger insurers are fully utilizing their competitive advantages, such as, higher access to market, lower per unit cost and well trained labor, etc. Barros et al. (2005) also reported a positive relationship between big size and efficiency scores. These results revealed that the managers of small insurers need to come up with new innovative insurance plans to attract large number of policy holders which should eventually improve the efficiency level is small insurers.

INVESTMNT variable in case of life insurers is found negatively related with all DEA efficiency scores which are contrary to our expectations. Life insurer's negative coefficient might be due to the life insurer's failure to utilize their investments in an optimum way. The managers need to improve the quality of their life

insurance products to remain in the competition as there are only five life insurers in Pakistan. Moreover, the largest sole state owned life insurer "State Life Insurance Corporation" has the largest market share. In contrast to life insurers, INVSTMNT variable is found positively related with the efficiency scores for non-life insurers. It indicates that the higher investments increase the cost and allocative efficiency of non-life insurer. Therefore, the managers need to improve their investments not only in quality but also in quantity to gain higher profits in future. Cummins et al. (1996) also found a positive relationship between the insurer's efficiency and investments.

PRFTBLTY is found positive related with the TE, AE and CE for non-life and also for combined sample, which indicates that the higher profitability leads to not only insurer's higher operating efficiency, but also enhance their ability to use their inputs with lower cost to attain higher allocative and cost efficiency. These results were as expected, because insurer's motive to earn higher profit makes the firm more productive and less costly. Earlier studies like Ismail et al. (2011) found positive relationship between efficiency and the profitability of the insurance companies. In terms of life insurers, the results suggest that PRFTBLTY is negatively and significantly related with TE and CE which is contrary to the expected results. It indicates that life insurer's efficiency does not enhance higher profitability, which might be due to the life insurer's failure to utilize their resources efficiently as it is a highly fragmented sector, since amongst the five life insurance companies, "State Life Insurance" have more than 60% of the market share as it is the oldest state owned corporation in Pakistan. Therefore, the managers of the life insurers need to take rationalization measures to make their life insurers productive to improve their efficiency.

This study has found a positive relationship of LVRG with TE, AE and CE. These results revealed that the insurers in Pakistan with higher debt financing are more efficient as compared to a firm which is highly financed by equity capital which may be the result of its lower cost. The interest rates remain very low over the period of 2003 to 2007. The positive coefficient of LVRG is also due to the fragmented insurance market of Pakistan where most of the insurers with larger size have more dependence on debt (up to 90% of total assets) instead of equity since large insurer were found more efficient than small and medium size of insurers in Pakistan by Afza and Jam-e-Kausar (2010a). Hussels and Ward (2006) also found positive relationship between leverage and efficiency scores for German insurance market.

This study found a positive relationship between CLMS and efficiency in case of life insurers. This might be because of the life insurer's better effectiveness in handling specific type of claims which lead to the enhancement of current level of business. Cummins et al. (1996) also found out that insurers with higher claims ratio were more efficient. In another study, Hussels and

Table 1. Descriptive Statistics (Regression Analysis) Insurance Sector of Pakistan from 2003 to 2007.

Variable	Statistics	2003	2004	2005	2006	2007	AVAREAGE
TE	Mean	0.9292	0.9336	0.9352	0.9007	0.9361	0.9268
	S.D.	0.1346	0.1144	0.1126	0.1648	0.1277	0.1312
AE	Mean	0.8342	0.8336	0.8619	0.7590	0.7671	0.8110
	S.D.	0.1518	0.1657	0.1534	0.2094	0.2090	0.1823
CE	Mean	0.7763	0.7842	0.8105	0.6811	0.7203	0.7542
	S.D.	0.1917	0.2010	0.1854	0.2265	0.2316	0.2109
Dtype	Mean	0.8333	0.8387	0.8750	0.8438	0.8387	0.8462
	S.D.	0.3790	0.3739	0.3360	0.3689	0.3739	0.3620
SIZE	Mean	1049	1148	1389	1687	2028	1464
	S.D.	2142	2316	2856	3357	3937	2985
INVSTMNT	Mean	34.8295	35.0085	34.4961	39.0112	42.4304	37.1646
	S.D.	25.0944	26.6329	25.2090	27.0349	29.2945	26.5365
PRFTBLTY	Mean	17.5947	15.1746	42.7760	74.3250	213.4539	75.9730
	S.D.	27.5990	24.1527	127.9623	187.8811	690.5388	334.0274
LVRG	Mean	0.5802	0.5689	0.5818	0.5238	0.5017	0.5511
	S.D.	0.2286	0.2394	0.2189	0.2475	0.2610	0.2386
CLMS	Mean	0.3999	0.4357	0.4333	0.4432	0.4971	0.4421
	S.D.	0.1964	0.2202	0.2045	0.1799	0.2121	0.2028
Dregulation	Mean	1.0000	0.0000	1.0000	0.0000	0.0000	0.3974
	S.D.	0.0000	0.0000	0.0000	0.0000	0.0000	0.4909
n		30	31	32	32	31	156

TE, technical efficiency; AE, allocative efficiency; CE, cost efficiency; Dtype, 1 if non-life insurance company and 0 if life insurance company; SIZE, total gross premiums (Millions); INVSTMNT, investments/total assets (%); PRFTBLTY, earnings after tax (EAT)/gross premiums (%); LVRG, total debt capital/total assets; CLMS, net claims/net premiums; Dregulation, 1 if minimum paid up capital requirement increased by SECP (2003 and 2005) and 0 if otherwise.

Ward (2006) found out that insurers with higher claims ratio were more technical, allocative and cost efficient in the UK life insurance market. In contrast to the life insurers, the non-life insurers are found negatively related with the efficiency of the firms since the higher claims ratio in non-life insurers increase the loss ratio for non-life insurers. Therefore, the higher claims ratio will increase the cost of doing business for non-life insurers. Thus, the manager of the non-life insurers need to reduce their claims ratio through enhancing more safety measures before insuring a thing as it will reduce the loss and eventually increase the efficiency of the non-life insurers. Finally, we investigated the effect of financial reforms on the efficiency level of insurers in Pakistan through a dummy variable "Dregulation" and found out that government policies have a positive relationship with all kind of efficiencies in Pakistan for non-life insurers.

Badunenko et al. (2006) and Rees et al. (1999) also found the positive impact of financial reforms on the efficiency of the insurers.

These results imply that the financial reforms are proven fruitful for non-life insurers in Pakistan. Therefore, the government of Pakistan needs to continue the process of financial reforms in the same direction to make the non-life insurance sector more efficient.

Contrary to our expectations, the coefficient of "Deregulation" is found negative for life insurance companies, although, this result is highly insignificant. On one side, the negative relationship indicates that the government fails to improve the efficiency of the life insurance companies in Pakistan through its financial reforms. This can be the result of the lower competitors as there are only five life insurers in Pakistan. On the other side, the management of the life insurers also needs to take positive steps to attract more policy holders in Pakistan as the people of Pakistan are not willing to get insured due to various reasons like, most Pakistanis think that the insurance premium payment is an extra burden on their pockets and some think it is against the teachings of Islam. Therefore, life insurers need to motivate the people of Pakistan through various means of communication, such as, electronic media, print media, etc., to increase the number of insured.

Conclusion

It is important to examine the factors which determine the efficiency of insurers, because every country has its own distinct environment due to change in control, and

Table 2. Determinants of Efficiency in the Insurance Industry of Pakistan.

Variable	TECHNICAL EFFICIENCY								
	LIFE			NON-LIFE			ALL		
	β	Sig	VIF	β	Sig	VIF	β	Sig	VIF
Dtype							0.234	0.048	2.211
SIZE	0.201	0.578	3.720	0.201	0.031	1.171	0.219	0.020	1.388
INVSTMNT	-0.291	0.302	2.220	0.075	0.462	1.431	0.004	0.969	1.943
PRFTBLTY	-0.589	0.015	1.397	0.133	0.188	1.395	0.114	0.222	1.387
LVRG	0.002	0.995	3.735	0.223	0.042	1.623	0.157	0.145	1.856
CLMS	0.035	0.916	3.152	-0.149	0.157	1.527	-0.052	0.568	1.333
Dregulation	-0.068	0.733	1.139	0.022	0.802	1.059	0.035	0.671	1.055
R Square		0.426			0.096			0.078	
n		24			132			156	
ALLOCATIVE EFFICIENCY									
Variable	LIFE			NON-LIFE			ALL		
	β	Sig	VIF	β	Sig	VIF	β	Sig	VIF
Dtype							0.083	0.434	2.211
SIZE	-0.010	0.976	3.720	0.064	0.460	1.171	0.083	0.324	1.388
INVSTMNT	-0.048	0.854	2.220	0.187	0.051	1.431	0.188	0.062	1.943
PRFTBLTY	0.047	0.820	1.397	0.192	0.042	1.395	0.181	0.033	1.387
LVRG	0.754	0.037	3.735	0.324	0.002	1.623	0.344	0.001	1.856
CLMS	0.369	0.245	3.152	-0.010	0.915	1.527	0.035	0.669	1.333
Dregulation	-0.103	0.584	1.139	0.207	0.012	1.059	0.173	0.020	1.055
R Square		0.493			0.213			0.241	
n		24			132			156	
COST EFFICIENCY									
Variable	LIFE			NON-LIFE			ALL		
	β	Sig	VIF	β	Sig	VIF	β	Sig	VIF
Dtype							0.179	0.096	2.211
SIZE	0.174	0.563	3.720	0.152	0.075	1.171	0.197	0.022	1.388
INVSTMNT	-0.273	0.247	2.220	0.180	0.057	1.431	0.146	0.148	1.943
PRFTBLTY	-0.507	0.012	1.397	0.219	0.020	1.395	0.204	0.017	1.387
LVRG	0.378	0.217	3.735	0.326	0.001	1.623	0.321	0.001	1.856
CLMS	0.216	0.437	3.152	-0.048	0.623	1.527	0.019	0.819	1.333
Dregulation	-0.112	0.503	1.139	0.190	0.020	1.059	0.164	0.028	1.055
R Square		0.603			0.234			0.234	
n		24			132			156	

Dtype, dummy for the line of business (1 if non-life insurance company and 0 if life insurance company); SIZE, total gross premiums (Millions); INVSTMNT, investments are computed through investments/total assets (%); PRFTBLTY, profitability is measured as earnings after tax (EAT)/gross premiums ratio (%); LVRG, leverage ratio is measured as total debt capital/total assets; CLMS, claims ratio is measured as net claims/net premiums; Dregulation, dummy to capture the regulation effect (1 if change in regulations (2003 and 2005) and 0 if otherwise).

regulations of the likes and dislikes of the people. Moreover, this study will also help the government and the management of the insurers to identify the factors which really determine the efficiency of insurers in Pakistan. A number of conclusions can be drawn from the present analysis. Firstly, size, profitability, investment and leverage are found as the main drivers of the efficiency. Although, the coefficient signs vary in life and non-life insurer's results, but still these have significant importance in determining the efficiency of the insurance

companies in Pakistan. Secondly, the results reveal that the non-life insurers are performing better than the life insurers. Therefore, the regulators have to implement more effective reforms specifically for life insurers to improve their efficiency level. Thirdly, although, the claims variable is not found significant in any of the model, but still, the separate results in life and non-life insurers are of significant importance as claims are found positively related with life and negatively related with non-life insurers. Finally, it was found out that in general,

financial reforms are found fruitful for the efficiency enhancement of the insurers, specifically, for the non-life insurers. Therefore, the government of Pakistan needs to continue the process of financial reforms in the same direction to make the non-life insurance sector more efficient. Moreover, for life insurers, both government and management need to motivate the people of Pakistan with various other means as the results are not satisfactory.

Future research may be taken to analyze the other important aspects of insurance industry. It is suggested that researchers can compare the parametric and non-parametric approaches to analyze the efficiency of insurers in Pakistan. Moreover, researchers can also consider the intermediation approach along with the value added approach at the same time to compare the efficiency scores. Furthermore, researchers can also compare the efficiency of insurers in Pakistan with the efficiency of insurers in other countries of the region, such as India, Sri Lanka, Bangladesh, China, etc. Finally, there is a need to further investigate the change in the productivity of insurers over time through DEA Malmquist total factor productivity index. Thus, these aspects should be considered to explore the insurance industry of Pakistan in future.

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