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Efficiency Model of Philippine Social Protection Insurers

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Abstract: The Philippines is one of the members of ASEAN Economic Community (AEC) having a long history and more developed social protection. In the Philippines, the Philippine Health Insurance Corporation (PhilHealth) serves as health insurance, the Government Service Insurance System (GSIS) for pensions and benefits for government offices, the Social Security System (SSS) for the pensions and benefits of private companies and the Home Development Mutual Fund (HDMF) or the PAGIBIG for the savings and housing loans. A large number of the population of ASEAN community who are currently employed informally and enrolled in social insurance schemes have limited access to the social services. The aim of the present study is to gauge the relative efficiency of social protection insurers by using Data Envelopment Analysis for the year 2010 until 2014, consists of SSS, PAGIBIG, Philhealth, and GSIS by using software STATA the relative efficiency. The findings indicate that in the social protection insurers, the smaller the size of the operations, the higher the probability for the operations to be more efficient in utilizing their inputs to generate more outputs. The present study will be beneficial for researchers and practitioners to better understand the mechanism of Philippine social protection insurers.

Key Words: Efficiency; data envelopment analysis; social protection insurers

1. INTRODUCTION

The Philippines is concurrently governed by the Philippine constitution of 1987. It encompasses various areas of the sectors of economy. Section 9 of article 2 provides provision to foster social security to guarantee the prosperity and independence of the nation and alleviate poverty by providing policies concerning sufficient social services, promote full employment, raise standard of living and improve quality of life for all. Also, section 15 of article 2

supplies the right of the nation to have a sound health status. The section 11 of article 13 adopts an integrated and comprehensive program to make essential goods, health and other social services available to the citizens at a reasonable cost. The regulators must address one of the most pressing concerns of society which is medical care.

The Philippines is one of the members of ASEAN Economic Community (AEC) having a long history and more developed social protection. In the Philippines, the Philippine Health Insurance



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Corporation (PhilHealth) serves as health insurance, the Government Service Insurance System (GSIS) for pensions and benefits for government offices, the Social Security System (SSS) for the pensions and benefits of private companies and the Home Development Mutual Fund (HDMF) or the PAGIBIG for the savings and housing loans.

Given the fact that the Philippines' established social protection program, it is difficult to argue to have a sufficient policies. Enhanced coverage remains still a challenge for many years. Social protection for the poor and informal sector contributes to the issues. The state formulates several strategies to overcome the situations such as Health Sector Reform Agenda (HSRA, 1999 to 2004), FOURmula One (F1, 2005 to 2010) and the Aquino Health Agenda (from 2010 to present). Every one of the formulations has still universal spread of security for the poor and the informal sector.

1.1 Philippine social protection insurers

The social protection insurers in the Philippines exhibit high administrative costs which impedes the ability to redistribute the funds to the pensioners. For instance, administrative inefficiency interferes with the collection of contributions from and payment of benefits to hard-to-reach groups such as rural and informal sector workers. Also, compliance costs adversely affect the social protection. This refers to the cost to the employers and the employees of complying with the provisions of pension systems. For example, employers have to collect contributions from employees and remit them to relevant authorities, in addition to contributing their share. This is higher when the pensioner does not get benefits on time, and has to make several trips to ensure that benefits are paid. Furthermore, the government has only limited capacity to enforce compliance; employers may evade rather than contribute.

High transaction costs and weak governance hinder the development of the pension system. Also, it is failing because the design might not be responsive – adequate, affordable, robust, sustainable and equitable. Given the fact that the Philippine population is ballooning, the regulators failed to capture larger groups. Our social protection's inclination is still toward urban areas and formal sectors. We also provide higher concentration on the government sectors. This

illustrates that rural and informal sectors will garner higher administrative costs.

Main coverage of SSS and GSIS are retirement pensions and income security. SSS and GSIS seek to protect the private and public sectors respectively. They offer the same package such as retirement pensions, survivorship pensions, disability benefits and sickness benefits. Unfortunately, income security has been identified to be insufficient for the informal sectors. SSS can accommodate the informal sector members for voluntary contributory subscription, however still finds it unaffordable for them. Meanwhile, the PAG-IBIG grants a savings fund and a loan system that caters low-income earners, thence functioning as a social protection for the informal sectors to a certain extent.

PhilHealth takes charge of the health insurance protection. Before the establishment of the PhilHealth, there is an institution taking effect, the SSS and GSIS. SSS and GSIS basically provide the same except that SSS is for private while GSIS is for public sectors. However, these organizations work hand in hand with the PhilHealth.

There is considerable way of achieving optimal efficiency of the pension system is to re-engineer to satisfy adequacy and sustainability. Since inability to enhance performance and pension system design block the way of effectiveness, it is essential to address in pension reform. One widespread room for improvement is to reinforce the institutional and administrative capacity. Second, needs improvement on governance and regulation. Third, enhancing the coverage since the labor market is ever-increasing. Fifth, financial sustainability could respond to the increasing needs of the market especially the parameters –retirement age, contribution rate and benefits. Sixth, liberalize the fund management to improve the returns. Lastly, establish a pension system accounting for smaller amount so as the entire population even the poor can participate.

The current study will measure how a certain level of input affects the cost efficiency of the Philippine social protection insurers. This will try to provide comprehensive framework to achieve specified goals. Thus, this research paper will be dealing with the following questions: 1) which social protection insurers is the most efficient; 2) the practices in enhancing the efficiency of the Philippine social protection insurers. The objective of the study is to provide efficiency framework that administrator



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would use to improve understanding and strategies and to reveal the effect of insurers activity on their performance.

1.2 Efficiency measures

Measuring cost efficiency is essential in revealing the firm performance to adapt the best practices of the most efficient firm. Given the fact that financial ratio analysis is the frequently used way to benchmark industry practices, modern frontier efficiency methods are considerably superior on the other because of its statistical modification comparing companies based on multidimensional framework. On the said superior method, production frontier is gauged by optimizing output on a certain level of input. For instance, if the production frontier can be construed to measure a firm's optimum utilization of technology, the company might want to upgrade its technology in a state of the art (Farrell, 1957).

There are three approaches for choice of input and output variables, intermediation approach, user cost approach, and value added approach. The value added approach is most frequently used due to its modification of considering all the categories of financial publications of firms to have some output instead of differentiating inputs and outputs (Berger and Humprey, 1997; Cummins and Weiss, 2010; Afza and Asghar, 2010; Janjua and Akmal, 2014).

1.2.1 Selection of input

The predictive power of labor, business services, and capital in defining cost efficiency is widely used in vast number of literatures. For instance, Boonyasai (2002) found significant impact on the efficiency of country-specifics of life insurers such as Korea and Philippines due to regulation change. Also, Carr, et al. (1999) revealed that direct life insurers are more efficient than the exclusively dealing life insurers and direct writers should focus due to distribution systems. Choi and Weiss (2004) asserted cost efficient Property-Liability insurers can dictate price but still earning higher profits due to market structure. Meanwhile, Weiss and Choi (2009) added that competitive and deregulated states can enjoy market power by charging higher unit prices but still earn a reasonable profit margin; and lower prices in deregulated states would mean lower prices. It was also established that small and medium-sized

Property-Liability insurers in the United States maximize economies of scale as compare to larger insurer (Cummins and Xie, 2009). Additionally, financial and risk management and capital utilization of Property-liability insurers can be improved by reducing labor by 62%, materials by 46%, and least use of capital (Cummins and Nini, 2002). Afar from others dealing with market structure, change in regulation, intercompany comparison, organizational form, country-specific comparison, and distribution systems, Cummins, et. al. (2010) argued that non-acquiring firms are less likely to be inefficient over acquiring firms and target firms exhibiting growth over non-targets.

The main reasons behind is summarized as follows. First, insurers provide many services for the interests of stakeholders like loss to property, life or business. Second, higher returns on the stakeholders certainly possess higher risk. Third, regardless of size of company, it is required to make optimum allocation of inputs and make them more cost effective.

1.2.2 Selection of output

There has been a debate as to the appropriate proxy for the choice of output for insurers (Luhnen, 2009). The value added approach assumes three services provided by the insurers as follows. First, risk pooling and risk bearing wherein insurers create value added by operating a risk pool, collecting premiums from policyholders, and redistributing most of them to customers who have incurred losses proxied by premiums and incurred benefits. Holding a reserve is one way of reducing customers' risk should the unexpected loss arise. Second, "real" financial services relating to insured losses, means that insurers create value added for their policyholders by providing real services such as financial planning (life) or the design of coverage programs (property-liability) is correlated with claims incurred and reserves. Lastly, service is intermediation proxied by reserves or invested assets, where insurers create value added by acting as financial intermediaries that invest assets, which policyholders provide by way of their premiums (Cummins and Nini, 2002; Cummins and Weiss, 2000; Cummins et al., 2004). However, this study focuses only on the first service which is the risk pooling and risk bearing.



1.2.3 Methodology in determining efficiency

Several studies have been conducted using frontier efficiency measurement on banking and insurance industry (Berger and Humprey, 1997; Cummins and Weiss). Given that cost efficiency study can have variety of applications depending on the purpose such as regulation change (Mahlberg and Url, 2003), general level of efficiency and evolution over time (Barros and Obijiaku, 2007), scale and scope economies (Hwang and Gao, 2005), distribution systems Trigo (Gamarra and Growitsch, 2008), financial and risk management and capital utilization (Cummins and Nini, 2002), methodology issues comparing different techniques or assumptions (Leverty and Grace, 2008), organizational form and corporate governance issues (Erhemjamts and Leverty, 2007), market structure (Choi and Weiss, 2008), mergers (Davutyan and Klumpes, 2008), and intercountry comparisons (Zanghieri, 2008), the focus of this literature review is similar to distribution systems, financial and risk management and capital utilization, and market structure.

2. METHODOLOGY

This study will gauge the efficiency among the social protection insurers. There are four (4) social protection insurers in the Philippines. The data were obtained from 2010 to 2014 annual reports. Two input and two outputs were considered in this study. The inputs are expenses and benefits incurred and equity and output was premium and investment income.

To measure the contributions of technical and efficiency change to growth of productivity of all the social protection insurers, Malquist index is adopted in this study. The Malquist indexes were derived using the Data Envelopment Analysis (DEA). The DEA does not require input and output prices in the analysis, which suits the current study given the fact that prices are hard to estimate.

The positive change in the efficiency component yielded index values greater than one and is considered to be evidence of catching up (to the frontier). Values of the technical change component greater than one are considered to be evidence of technological progress. Following Fare et al. (1994), this study uses an enhanced decomposition of the Malmquist index by decomposing the efficiency change component calculated relative to the constant

returns to scale technology into a pure efficiency component (calculated relative to the VRS technology) and a scale efficiency change component which captures changes in the deviation between the VRS and CRS technology. The subset of pure efficiency change measures the relative ability of operators to convert inputs into outputs while scale efficiency measures to what extent the operators can take advantage of returns to scale by altering its size toward optimal scale.

3. RESULTS AND DISCUSSION

3.1.1 Descriptive statistics

Table 1. Descriptive statistics

Statistics	Inputs		Output	
	Expenses	Benefits Incurred	Investment income	Premium
Mean	15.03	49.91	39.75	61.12
Median	13.93	47.42	27.34	60.93
SD	6.1	32.46	38.77	30.49
Min	7.62	0.002	0.78	19.79
Max	28.13	102.6	106.32	120.65

***in billion pesos

Table 1 illustrates the mean, median, mode, and minimum and maximum values for the input and output variables for the data set used in the analysis. The descriptive statistics were computed from the panel data sample of 20 firm-year observations. The results show that the annual premium of the total sample of social protection insurers over the period (2010-2014) on average premium is Ps.61.12B. The maximum premium was reported at Ps.120.65B, while the minimum premium generated was at Ps.19.79B. All the standard deviations are lower than the means meaning no presence of outliers on the data set.

3.1.2 Production frontier and efficiency

This section outline a number of commonly used efficiency measures and discuss how they calculated relative to an efficient technology, which is



generally represented by some form of frontier function. Tables 2 and 3, reports efficiency change for the social protection insurers from 2010-2014 under constant returns to scale (CRS) and variable returns to scale (VRS) respectively, since the basic component of the Malmquist productivity index is related to measures of efficiency. For the values of unity, the firm is implied to be on the industry frontier in the related year, while the values that are less than unity imply that the firm is below the frontier or technically inefficient. Thus, the lower the values from unity, the firm is said to be more inefficient compared to the values closer to one.

Tables 2 and 3, all the social protection insurers were consistently efficient during the study periods 2010 to 2014, under constant returns to scale (CRS) except SSS and GSIS. Meanwhile, the efficiency (CRS) of SSS increased within the study periods but the efficiency (CRS) position is going to worsen in terms of GSIS. In contrary, all the social protection insurers were consistently efficient under VRS except GSIS in 2014.

Table 2. Efficiency scores (Constant Return to Scale) for the year 2010-2014

	2010	2011	2012	2013	2014
SSS	0.783	1	1	1	1
GSIS	1	1	1	1	0.969
PAGIBIG	1	1	1	1	1
PhilHealth	1	1	1	1	1
Mean	0.9456	1	1	1	0.9923

Tables 2 and 3 exhibited the percentage of the realized output level compared to the maximum potential output level at the given input mix. For instance, in 2010, SSS produced 78.3% of its output level and GSIS produced 96.9% in 2014 of its potential under CRS. On the other hand, under VRS in the 2014, the GSIS produced the potential output 98%.

Table 3. Efficiency scores (Variable Return to Scale) for the year 2010-2014

	2010	2011	2012	2013	2014
SSS	1	1	1	1	1
GSIS	1	1	1	1	0.98
PAGIBIG	1	1	1	1	1
PhilHealth	1	1	1	1	1
Mean	1	1	1	1	0.995

3.2 Productivity performance of the individual social protection insurers

Tables 4 and 5 reported the performance of the firms from 2010 to 2014 in terms of TFP change and its two subcomponents which were technical change and efficiency change respectively. Note that a value of the Malmquist TFP productivity index and its components of greater than one imply improvements of productivity in the relevant aspects, while values less than one indicate a decrease or deterioration in productivity. Subtracting 1 from the number reported in the table gives an average increase or decrease per annum for the relevant time period and relevant performance measure. These measures also capture the performance relative to the best practice in the relevant performance or relative to the best practice in the sample.

Table 4. Social protection insurers relative Malmquist TFP change for the year 2010-2014

	2010-2011	2011-2012	2012-2013	2013-2014	Mean
SSS	0.9769	0.9362	0.9435	0.95	0.9517
GSIS	1.2195	1.0511	0.7603	1.2409	1.0679
PAGIBIG	0.9895	0.9684	1.6252	0.7246	1.0769
PhilHealth	0.8694	1.1026	1.085	1.0854	1.0356
Mean	1.0138	1.0146	1.1035	1.0002	1.033

Table 4 exhibited calculated changes in the Malmquist-based Total Factor Productivity index. As



shown in the results, all had deterioration for the period of 2010-2011 to 2012-2013 except for PhilHealth and all have increasing trends from 2012-2013 to 2013-2014 except for PAGIBIG. In addition, PAGIBIG had occupied the first rank with 7.69% average TFP annual growth rate, followed by GSIS and PhilHealth with an annual rate of 6.79% and 3.56% respectively, and SSS with -4.83% deterioration.

The Malmquist index was further decomposed into its two components, technical change and efficiency change. The results of technical change and efficiency change are displayed in Tables 5 and 6. Table 5 portrays the index values of technical progress or retreat as measured by average shifts in the best-practice frontier from period t to $t+1$. Based on the results, social protection insurers experienced technical progress and retreat. However, GSIS and PhilHealth had experienced technical progress for the periods of 2010 to 2014. In contrast, SSS and PAGIBIG were the firms that have experienced technical retreat for the periods of 2010 to 2014. During the study period GSIS and PhilHealth had positive productivity changes for the years of 2010-2010, but they faced a notable reduction in productivity in 2010-2011. On the other hand, PAGIBIG had achieved the maximum change in technical progress (62.52%) in the period 2012-2013 and maximum retreat in 2013-2014.

Table 5. Social protection insurers relative technical change for the year 2010-2014

	2010-2011	2011-2012	2012-2013	2013-2014	Mean
SSS	1.2474	0.9362	0.9435	0.95	1.0193
GSIS	1.2195	1.0511	0.7603	1.203	1.0584
PAGIBIG	0.9895	0.9684	1.6252	0.7246	1.0769
PhilHealth	0.8694	1.1026	1.085	1.0854	1.0356
Mean	1.0815	1.0146	1.1035	0.9908	1.0476

Table 6 reveals the changes in relative efficiency for each individual social protection insurers. The results indicate considerable variation

across insurers and time. It is very good to see that all the social protection insurers have been found to be consistently efficient, except SSS through the year 2010 to 2011. During the entire period of study, the results indicate that, on average, the only GSIS experienced the highest efficiency change with 3.15%, while only SSS that experienced efficiency decline by 21.68%.

Table 6. Social protection insurers relative efficiency change for the year 2010-2014

	2010-2011	2011-2012	2012-2013	2013-2014	Mean
SSS	0.7832	1	1	1	0.9458
GSIS	1	1	1	1.0315	1.0079
PAGIBIG	1	1	1	1	1
PhilHealth	1	1	1	1	1
Mean	0.9458	1	1	1.0079	0.9884

In order to examine a change in scale efficiency, the efficiency change is further decomposed into two subcomponents, namely pure efficiency change and scale efficiency change in which the results are reported in Table 7. The results indicate that the pure efficiency and scale efficiency appear to be an equally important source of growth to efficiency change. All the social protection insurers recorded no changes in annual growth for both the scale and pure efficiencies, except SSS during the period 2010-2011 and GSIS during the period 2013-2014. Relative to other insurers, SSS had attained the highest deterioration of scale efficiency at -21.68% and GSIS had opined the highest growth of scale efficiency at 1.04% during the study period through 2013-2014.

Table 7. Social protection insurers relative technical change for the year 2010-2014

	2010-2011		2011-2012		2012-2013		2013-2014	
	PEC	SEC	PEC	SEC	PEC	SEC	PEC	SEC
SSS	1	0.7832	1	1	1	1	1	1
GSIS	1	1	1	1	1	1	1.0209	1.01039



PAGIBIG	1	1	1	1	1	1	1	1
PhilHealth	1	1	1	1	1	1	1	1
Mean	1.0815	1.0146	1.1035	0.9908				1.0476

3.3 Productivity performance of social protection insurers

The Malquist index and constant return to scale was calculated for all the social protection insurers. Table 8 shows results of four efficiency measures namely efficiency change, pure efficiency change, scale efficiency change, technological efficiency change; calculated using Malquist index. The year-wise changes in productivity calculated for the five year period from 2010 to 2014 had been calculated and presented below.

Table 8. Summary of Malquist productivity index for the year 2010-2014

	EC	PEC	SEC	TC	TFPC
SSS	0.9458	1	0.9458	1.0193	0.9517
GSIS	1.0079	1.0052	1.0026	1.0584	1.0679
PAGIBIG	1	1	1	1.0769	1.0769
PhilHealth	1	1	1	1.0356	1.0356
Mean	0.9884	1.0013	0.9871	1.0476	1.033

***Note: EC = efficiency change; PEC = pure efficiency change; SEC = scale efficiency change; TC = technical change; TFPC = total productivity change

Table 8 summarizes the performance of the Malquist productivity index of the Philippine social protection insurers during the year 2010 to 2014. On average, PAGIBIG recorded the highest growth in TFP with 7.69% and no change in efficiency change and technical change. In contrast, SSS had shown the lowest and negative growth in TFP (-4.83%) and efficiency change (-5.42%) and interesting to see that there is an increase of 19.3% in technical change. In addition, GSIS and PhilHealth had experienced growth in TFP because of growth in technical change.

On average, the TFP is above the pure efficient level, mainly due to both efficiency and technical changes with -1.16% and 4.76% respectively. In addition, the efficiency change was largely by scale efficiency rather than pure efficiency. This indicates that the size of the insurer was a factor affecting efficiency changes. This study revealed that there were very few substantial growths in technical components and efficiency change suggesting that TFP in the Philippine social protection insurers was due to the innovation in technical components coupled with considerable improvement in the efficiency aspect. The Philippine social protection insurers faced more positive impact of technical changes than a negative efficiency change, the overall TFP for these insurers within the period of study was maintained at a value slightly higher than 1 (1.033 mean of TFP change).

4. CONCLUSIONS

The researcher utilized DEA to explore the contributions of technical and efficiency change to the growth of productivity in the social protection insurers in the Philippines by applying Malquist index for the years 2010-2014. The efficiency measures of social protection insurers are comparatively gauged where it was found on the point on efficiency, the TFP of the social insurers in the Philippines was near about efficient due to improvement in technical changes rather than the deterioration in efficiency change with 4.76% and -1.12% respectively.

Furthermore, the efficiency change was contributed by the scale efficiency rather than pure efficiency. This indicates that the size of the social insurers had an influence in affecting the efficiency changes. However, this study found that there were diminutive significant growths in technical components and no improvement in efficiency change suggesting that TFP in Philippine social protection insurers was due to the less innovation in technical components coupled with an insignificant improvement on the aspect of efficiency.

On average, social insurers experienced a technical progress. In contrast, there was a slight decline in efficiency change, the subcomponent of this efficiency change, namely pure efficiency, did show a slight improvement (0.0013 percent).



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However, deterioration in the scale efficiency (-1.21 percent) can't offset the scale efficiency deterioration effect thus giving a small decrease efficiency change. Hence, this finding indicates that the smaller the size of the operation, the higher the probability for the companies to be more efficient in utilizing their inputs to generate more outputs. Overall, PAGIBIG had recorded the highest growth in TFP with 19.4 percent and efficiency change (just 1) and technical changes with 7.69%. SSS, on the other hand, recorded the lowest growth in TFP with (-4.83%), which is mainly due to technical regress (1.93%). The findings of this study give significant benefits to the social protection insurers' regulators in assisting them to take strategies in terms of the operations and management in order to improve the efficiency of both industries in utilizing their inputs to generate more outputs, thus, improving their services further. This result indicates that Philippine social protection insurers have a great potential to further increase their TFP through improvements in both efficiency and technical component such as enhancing the use of information and communication technology in order to provide good services to the subscribers. This paper will provide footprints on the regulators and to the ASEAN Economic community to reach out the untapped communities by educating and communicating to people the benefits of availing the services.

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