Cost Efficiency of Thrift Banks in the Philippines: A Data Envelopment Approach

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Abstract - *The aim of this study is to determine the cost efficiency of thrift banks in the Philippines. Data were taken from the financial statements of thrift banks in the Central Bank of the Philippines from 2013 to 2016. In deriving cost efficiency, the inputs used were total liability, net of real and other property acquired and net of bank premises, furniture and fixture, and equipment, while outputs were represented in terms of total loan portfolio (TLP) and other financial assets. With the input and output variables employed, evident in the outcomes of data envelopment analysis that variable return-to-scale (VRS) assumption resulted to greater number of cost efficient banks as compared under constant return-to-scale (CRS) assumption. Although findings had revealed that most thrift banks cost efficiency percentages lie below 50 percent, there were still identified thrift banks that has been cost efficient in terms of inputs and outputs used in the study. Hence, majority of the thrift banks in the Philippines were not cost-efficient with respect to the inputs and outputs. Additionally, the number of thrift banks found to be cost-efficient are significantly low in both CRS and VRS assumptions, although VRS reflected greater number than CRS assumption. Implications were discussed in this paper based on the findings gleaned from the econometric analysis.*

Keywords- *cost efficiency; thrift banks; data envelopment analysis; Philippines*

1. INTRODUCTION

Banks are significant role players in the economic development of nations due to its remarkable influence over the supply of money in circulation and stimulate economic progress as it facilitates the productive utilization of ideal funds and therefore supporting society in generating wealth (Rengasamy, 2012)[31]. Moreover, inevitable it is that banks continuously attract attention on supervising institutions, regulators, bank management bodies and customers. Additionally, investigation of the clients' behavior in terms of bank selection together with the motives behind will aid banks to understand clients better (Kontot, Hamali & Abdullah, 2016)[23], as banks are becoming gradually conscious about stability and sustainability.

Assessing banks' performance is purely vital. At present, banks face a very competitive market structure and yet remain to play a key role in the economic growth and advancement of a country given its prime purpose as financial intermediaries (Gordo, 2013)[20]. In recent years new technology has been innovated, such as electronic banking, that increased the efficiency of the U.S. banking system and not only the US but also other developing country (O'Connor, 2014)[29].

There are three major types of depository institutions enveloping the world of finance in the Philippines: commercial banks, thrift banks (which includes savings and loan associations and savings banks) and credit unions covering the world of economy (Peavler, 2016)[30]. Although the structure of sectors and the approaches of these banking institutions diverge from each other between countries and sectors, still the main aim is to improve the sector's cost efficiency, effectiveness and competitiveness as discuss by Peavler (2016)[30]. Thrifts are generally smaller, local institutions focusing more on consumers than businesses, not necessarily required to reach the resources such of a large national bank, and with a firsthand function of receiving customer deposits and make home mortgages (Peavler, 2016)[30]. Furthermore, thrift institutions have access to lower cost funding and often pay out more in dividends as compared to traditional ones and designated as more community- focused.

In the Philippines, the biggest variance between a thrift bank and a conventional bank is that thrifts are premeditated to serve consumers better than businesses (Bell, 2016)[7]. Also, Delavin (2015)[18] supported the idea emphasizing an advantage of thrift banks over major banks such as foreign participants and large residential banks alike, since thrift banks are smaller, they have the flexibility to accelerate the processes in allowing loans and accounts, as portion of its service assistance.

Furthermore, Amadeo (2017)[3] talks about the ability of the thrift banks to offer customers with a higher savings

account yields and since thrift banks have greater fluidity for building home mortgage loans. There is a large scale of numbers of thrift banks scattered all over the country ranging from small to huge corporations ready to offer services to their customers with the benefits in favor to them (Banko Sentral ng Pilipinas [BSP], 2016)[6].

The unified Chamber of Thrift Banks (2017) has demonstrated its efficacy as proficient association by the policies it has been able to translate into material achievement and programs it has succeeded to put in place in the past years. Through their struggle, alterations to the decrees overriding the thrift banks were decreed through the Thrift Banks Act of 1995 lengthening their supremacies and further cultivating their role in the armament of small scale deposits and extension of credit capitals to individuals and SMEs (predominantly in the country) and in the establishment of housing and consumer loans.

The study aims to look in a general view the contribution of some factors that determine cost efficiency of thrift banks whose objective as banking institutions is to offer savers with all the reasonable benefits a thrift bank can offer such as offering higher interest rates on savings deposits than most traditional banks, more flexible and because thrift bank savings and loans specialize in low-risk they are less likely than other financial institutions to sell real estate loans to investors (Rose, 2010)[33]. To date, few studies employed methods that can assess and estimate the cost efficiency and/or inefficiency of thrift banks in the Philippines. The essential role of this depository institution and its contribution to the economy and living, concisely put, is what makes this study worth researching.

2. METHODOLOGY

2.1 Research Design

An econometric approach called data envelopment analysis (DEA) was utilized in this study. DEA measures the relative efficiency in the presence of single input-output and multiple inputs and outputs factors of firms or decision-making units (DMUs). When the weights are restricted, efficiency of DMUs could be defined as the ratio of the weighted sum of outputs over the weighted sum of inputs, as cited by Talluri (2000), as:

$$\text{Efficiency} = \frac{\Delta y}{\Delta x}$$

There are two general approaches to measure efficiency - the econometric approach and the mathematical programming approach. The DEA which was used in this study belongs to the latter group of techniques and is the more popular approach. Furthermore, this approach is best suited for the intentions of the study, which involves determining which thrift bank in the Philippine are cost-efficient with respect to the input and output used in this study. Efficient firms are those that produce a certain amount of or more outputs while spending a given amount of inputs or use the same amount of or less inputs to

produce a given amount of outputs (Charnes, Cooper & Rhodes, 1978). Moreover, DEA attempts to compare the overall input and output of various units with each other and not to discover a function of production that can combine input with output. This was used in this study since it focuses in determining cost efficiency of thrift banks in the Philippines based on the given inputs and outputs.

2.2 Sources of Data

This study used secondary data that are publicly-downloadable from the official website of Bangko Sentral ng Pilipinas (BSP). The published reports of the statement of financial position of Thrift Banks in the Philippines was the source dated as of December 31, 2013 to December 31, 2016 as approved for release by the BSP. A four-year period was required for the purpose of comparison of cost efficiency scores and to look for changes in such scores to be compared and analyzed in determining cost efficiency of both inputs and outputs.

2.3 DEA Model Specification

The employment of data envelopment analysis (DEA) in determining the cost efficiency of thrift banks in the Philippines, is predominantly inspired by the work of Coelli (1996)[13] that provided an emphasis about Data Envelopment Analysis Program 2.1 (DEAP 2.1), a computer program employed to create DEA frontiers for the calculation of technical and cost efficiency scores that are input and output oriented under the CRS and VRS DEA models.

To measure the cost efficiency of thrift banks in the Philippines, the study considered three inputs, which are as follows: total liabilities, real and other property acquired-net and bank premises, furniture and fixtures, and equipment-net. The two output variables include the total loan portfolio and other financial assets. Total liabilities largely represent deposit liabilities (Yilmaz, 2013)[36], the thrifts main source of financial capital and also encompasses other costs of operations; the real and other property acquired, net and bank premises, furniture and fixtures and equipment, net which represents the company's fixed assets. Banks are viewed as financial intermediaries that collects funds (deposits) that are then converted into loans and other assets using company's premises and these are the inputs that individually generates cost reflected by the prices of each (Kočišová, 2014)[22]. Furthermore, Kočišová (2014)[22] also mentioned that outputs of thrift banks consist of its total loan portfolio and other earning assets and these outputs, as opposed to the inputs that generates cost, are income generating. In fact, Nitoi and Spulbar (2015)[28] selected inputs and outputs in view of banks as financial intermediaries that considers inputs to generate assets.

2.4 Data Analysis

Descriptive statistics was used in determining the profile of thrift banks in the Philippines based on given input and output variables. On the other hand, the input-oriented cost

data envelopment analysis (DEA) was used in analyzing the data and in measuring the efficiency of the DMUs based on the variables of the study. An input-oriented analysis is useful in the evaluation of inputs or inefficient unit to be made efficient by reducing the inputs without affecting the outputs. Furthermore, the Constant Return to Scale (CRS) and Variable Return to Scale (VRS) are the two scaled assumptions of DEA which were compared. The analysis was done through the use of Data Envelopment Analysis Program (DEAP) Version 2.1.

3. RESULTS

3.1 Descriptive Profile of Input and Output Factors of Thrift Banks in the Philippines

Descriptive analysis was used to determine the average value of the three inputs and two outputs, with information taken from the Bangko Sentral ng Pilipinas website covering years 2013 to 2016. Table 1 shows the summary of the average values for each year as well as for the entire period.

Table 1. Descriptive Statistics Results of Inputs and Outputs Used to Estimate Cost Efficiency of Thrift Banks from Years 2013 to 2016

Variables	Year	N	$\bar{x}$
y_1	2013	69	7,419,745,844.80
	2014	63	9,105,201,812.41
	2015	65	10,596,515,904.99
	2016	57	13,690,816,753.47
	Total	**254**	**10,058,032,544.27**
y_2	2013	69	119,058,826.60
	2014	63	126,644,060.20
	2015	65	137,328,403.87
	2016	57	163,068,382.19
	Total	**254**	**135,491,649.07**
x_1	2013	69	9,996,115,485.39
	2014	63	12,179,388,921.02
	2015	65	13,325,460,309.03
	2016	57	16,541,448,498.59
	Total	**254**	**12,858,468,326.86**
x_2	2013	69	208,317,913.60
	2014	63	222,290,567.99
	2015	65	238,321,475.94
	2016	57	275,275,687.04
	Total	**254**	**234,487,605.98**
x_3	2013	69	171,720,834.29
	2014	63	185,815,786.57
	2015	65	184,474,755.09
	2016	57	213,586,045.21
	Total	**254**	**187,875,573.93**

As to the inputs used, thrift banks of the Philippines were found to have Php 12,858,468,326.86 on the average for total liability in the past four years, exhibiting an increasing value as the year progresses. 2015 status with regards to bad loans, a data from the Bangko Sentral ng Pilipinas (BSP) showed a declining state enabling the thrift banks to sustain its performance and to maintaining the overall stability of the domestic financial system (Montecillo, 2015)[27]. There was even a pronouncement that Philippine Business Bank (PBB) would establish more branches around National Capital Region to serve clients and meet their need (Avante, 2013)[5]. In relation to this, it was observed that Philippine Business Bank (PBB) opened 21 more branches all over the country targeting areas and cities with strong small, medium enterprises (Songlingco, 2014)[34] resulting to increase total liabilities and bank premises, furniture and fixtures.

Similarly, on the same period covered, net real and other property acquired also displayed an increasing value with an average of Php 234,487,605.98. An ABS-CBN News

article (2014) disclosed that BDO Unibank completed its acquisition of 10 branches of Citibank Savings a thrift bank unit in the Philippines, these 10 banks will be named under BDO Savings Bank. BDO Unibank Incorporated, being one of the largest Philippine Bank in terms of assets, loans, deposits, capital and trust funds, is purchasing another thrift bank as part of its tactic to enlarge market reach and client coverage in the year 2014 causing an increase to net real and other property acquired (Rivera, 2014)[32].

Lastly, the thrift banks posted an average of Php 187,875,573.93 for bank premises, furniture and fixtures covering years 2013 to 2016. Cebu Daily News (2013) reported that it was expected that thrift banks will increase up to Php 3.19 billion of its bank shares to fund the bank's expansion program of the year. Also, Dumlao (2013) make known that the Philippine Stock Exchange (PSE) has permitted an initial public offering worth up to P4.25B by PBB as a debut for the year that resulted to an increase of the Bank Premises, Furniture and Fixtures

However, 2015 inputs (bank premises, furniture and fixtures) show a declining state because BDO Unibank Inc. has given up the thrift banking license held by a dormant subsidiary that became part of the group following the bank's acquisition of Citibank Savings Inc. and it was approved by the BSP for withdrawals to function the said subsidiary (Abadilla, 2016)[1]. Even with the BDO's revocation, the year 2016 shows an update that thrift banks have hardly transformed its lending standards for SMEs, based on a survey by the BSP that reported double digit growth for the year (Chipongian, 2016). Despite of the decrease, thrift banks are anticipated to continue growing their footmark in the country side, particularly in Visayas and Mindanao, as investors continue to drove to those areas amid develop sentiment on doing commercial in local areas following the triumph of President Duterte. Caraballo (2016)[9] also agrees with the idea that the expansion of microfinance sector continues to advance due to sustained harmonization and collaboration with industry players and stakeholders. Looking into the values, the three input factors of thrift banks increases values from 2013 and 2016, denoting that thrift banks perform better on recent years.

As to outputs, thrift banks posted an average value of Php 10,058,032,544.27 for total loan portfolio, also noting a rise of its value from year 2013 to year 2016 for the reason that year-on-year all bank types registered positive growth, with the thrift banks being on the 2nd place that displays a growth of 11 percent shows a vital role of this increase (De Vera, 2017)[17].

Also, a reason for the increase is the declining status of bad loans with never ending efforts of these banks resulting to improve their books (Montecillo, 2015)[27]. Although year 2016 declared that bad loans increases up to 4.53 percent the Central Bank added that even though there is an increase on TLP the thrift banks continued to be manageable across economic divisions (Agcaoili, 2016)[2]. On the other hand, the banks' (Other Financial

Assets) also grew, with banks having an average of Php 135,491,649.07 for the same period. The growth in the number of banking institutions supported the rise in the total resources of the banking system increasing the loans, securities and other shares and Other Financial Assets of Thrift Banks (Martin, 2014)[26]. In addition, microfinance in the country continuous to operate and expand the Philippine economy by supporting the need for specialized monetary services to lower-income individuals and advertising one of their objective relating to industry advancement (Cuaresma, 2015)[15]. Another reason is the well-planned strategy of thrift banks that aimed on expanding customer base system by providing clients the best customer experienced at every encounter, at every channel of every bank (Abadilla, 2016)[1].

3.2 Cost Efficiency Analysis of Thrift Banks in the Philippines

Table 2 will cover the cost efficiency DEA results under CRS and VRS assumption with regards to the input and output used in the study, while table 3 presents the distribution of the number of thrift banks based on certain cost efficiency score thresholds.

Under the CRS assumption, year 2013 displays a result of 50 out of 69 thrift banks that scored less than 25% and are considered inefficient. As the supervisory body of the state's lending system, the BSP ordered the closure of some banks particularly those banks unqualified of sustaining its operations' which resulted the declining numbers of thrift banks in the Philippines (Lopez, 2016). However, three thrift banks attained 100% efficiency score: Mbank Philippines Inc., Optimum Development Bank Inc., and United Overseas Bank Philippines.

Under the VRS assumption on the same year, 46 out of 69 thrift banks scored less than 25%. Nine banks scored 100% cost efficiency score: Business and Consumers Bank, Card Sme Bank Inc.: A Thrift Bank, Citibank Savings Inc., Inter-Asia Development Bank, Mbank Philippines Inc., Optimum Development Bank Inc., Pampanga Development Bank, Queen City Development Bank Inc Or Queenbank, and ND United Overseas Bank Philippines that are considered to be Cost Efficient. Year 2013, Mbank Phil. Inc. did not sustain its cost efficiency score after voluntarily surrendering its banking license due to capital insufficiency (Grimes, 2017).

Similarly, year 2014 shows 54 out of 63 thrift banks scored less than 25% cost efficiency score. Nevertheless, two out of the 63 Thrift Banks scored 100% that were identified to be Cordillera Savings Bank Inc., and Village Bank Inc. under the CRS assumption. On the other hand, VRS assumption displays 44 out of the 63 thrift banks that scored less than 25%. Six out of 63 thrift banks were identified to be cost efficient scoring 100 percent of the scale these banks are Bataan Savings And Loan Bank, Century Savings Bank Corporation, Cordillera Savings Bank Inc., Maritime Savings Bank Corporation, Optimum Development Bank Inc., and Village Bank Inc. As a candidate of being cost efficient thrift bank, BSP approved

Optimum Development Bank Inc. with its eight extension offices across the Philippines (De Vera, 2015)[16].

Also, in year 2015, under the CRS assumption, 53 out of 65 thrift banks scored less than 25% and are considered inefficient. Conversely, two out of 65 thrift banks landed a perfect score of 100% to be cost-efficient: Bank One Savings and Trust Corp. and University Savings Bank Incorporated. Though, 2015 proved to be one of the challenging year for the banks, the banks sustained to gain drive in their core businesses resulting consumer loans established growth (Abadilla, 2016)[1]. In the perspective of VRS assumption, 42 out of 65 thrift banks were marked to be inefficient since they scored less than 25%. Nonetheless, seven out of 65 thrift banks scored a 100% and are highly cost-efficient. These banks are Bank One Savings and Trust Corp., Bataan Development Bank, Century Savings Bank Corporation, Dungganon Bank Inc., Optimum Development Bank Inc., United Overseas Bank Philippines, and University Savings Bank Incorporated. The macroeconomy of the Philippines has had 64 consecutive quarters of expansion which has been achieved while keeping prices stable that driven its growth throughout the years (Business Mirror, 2015)

Lastly, in year 2016, under the CRS assumption, 46 out of 57 thrift banks scored less than 25% and understood to be inefficient. However, only two out of 57 thrift banks landed on the score of 100% dominating other banks on the efficiency score and was identified to be Phil Star Development Bank Inc. and University Savings Bank Incorporated. Moreover, under the VRS assumption, 39 out of 57 thrift banks concluded to be inefficient for the reason of scoring less than 25% cost efficiency score. Thrift banks regularly accommodate the retail consumers as segment believed to be riskier compared to commercial clients still thrift banks functions well due to flexible terms even with this limitation (Lopez, 2017)[25]. Nonetheless, five out of 57 thrift banks scored 100% surpassing other banks and considered to be cost-efficient. The five banks who scored 100 percent are identified to be First Consolidated Bank Inc, Phil Star Development Bank Inc., Sun Savings Bank Inc., University Savings Bank Inc., Yuanta Savings Bank Philippines Incorporated with regards to the inputs and outputs used in this study. Based on facts from the Bangko Sentral ng Pilipinas (BSP), thrift banks in 2015 devoted 12.53% of their loan portfolio and some of thrift bank opted to convert into rural banks and explain the reduction of thrift bank population (Cu, 2016)

Table 2. Cost Efficiency of Thrift Banks from Years 2013 to 2016 in CRS and VRS Assumptions

Thrift Bank	2013		2014		2015		2016		Average	
	CRS	VRS	CRS	VRS	CRS	VRS	CRS	VRS	CRS	VRS
1st Valley Bank Inc	0.013	0.071	0.031	0.163	0.008	0.075	0.009	0.057	0.015	0.092
Bank of Makati Inc	-	-	-	-	0.082	0.201	0.004	0.004	0.043	0.103
Allied Savings Bank	0.013	0.023	0.047	0.216	-	-	-	-	0.030	0.120
Bangko Kabayan inc.	-	-	-	-	-	-	0.020	0.073	0.020	0.073
Bank One Savings and Trust Corp.	0.632	0.636	0.135	0.148	**1.000**	**1.000**	0.000	0.003	0.442	0.447
Bataan Development Bank	0.389	0.391	0.317	0.332	0.871	**1.000**	0.074	0.095	0.413	0.455
Bataan Savings and Loan Bank	0.035	0.093	0.587	**1.000**	0.046	0.083	0.000	0.001	0.167	0.294
BDO Elite Savings Bank Inc	0.001	0.088	0.000	0.013	-	-	-	-	0.001	0.051
BPI Direct Savings Bank Inc	0.006	0.012	0.019	0.045	0.018	0.075	0.024	0.104	0.017	0.059
BPI Family Savings Bank Inc	0.094	0.095	0.023	0.047	0.382	0.391	0.059	0.065	0.140	0.150
BPI Globe Banko Inc	0.002	0.021	-	-	-	-	-	-	0.002	0.021
Business and Consumers Bank	0.772	**1.000**	0.122	0.314	0.187	0.193	0.289	0.398	0.343	0.476
Card SME bank Inc	0.654	**1.000**	0.132	0.324	0.412	0.417	0.049	0.061	0.312	0.451
Century Savings Bank Corporation	0.624	0.625	0.369	**1.000**	0.323	**1.000**	0.340	0.410	0.414	0.759
China Bank Savings Inc	0.014	0.075	0.012	0.029	0.028	0.033	0.122	0.353	0.044	0.123
Citibank Savings Inc	0.797	**1.000**	-	-	-	-	-	-	0.797	1.000
City Savings Bank Inc	0.058	0.113	0.040	0.082	0.030	0.176	0.090	0.120	0.055	0.123
Citystate Savings Bank Inc	0.024	0.025	-	-	0.115	0.272	0.005	0.006	0.048	0.101
Comsavings Bank	0.203	0.208	0.320	0.441	0.228	0.279	-	-	0.250	0.309
Cordillera Savings Bank Inc	0.132	0.162	**1.000**	**1.000**	0.129	0.177	0.220	0.396	0.370	0.434
Dumaguete City Dev Bank Inc	0.239	0.335	0.156	0.199	0.378	0.382	0.333	0.465	0.277	0.345
Dungganon Bank	0.118	0.159	0.109	0.192	0.335	**1.000**	0.139	0.200	0.175	0.388

Enterprise Bank Inc	0.015	0.027	0.016	0.022	0.053	0.088	0.002	0.009	0.022	0.037
Equicom Savings Bank Inc	0.051	0.083	0.025	0.033	0.056	0.135	0.007	0.010	0.035	0.065
Farmers Savings & Loan Bank Inc	0.252	0.268	0.045	0.072	0.116	0.278	0.031	0.071	0.111	0.172
First Consolidated Bank Inc	0.180	0.207	0.065	0.091	0.003	0.045	0.200	**1.000**	0.112	0.336
Hiyas Banking Corporation	0.401	0.427	0.126	0.144	0.200	0.338	0.108	0.173	0.209	0.271
HSBC Savings Bank(Phils) Inc	0.017	0.059	0.017	0.019	0.079	0.111	0.003	0.007	0.029	0.049
Inter-Asia Development Bank	0.068	**1.000**	0.012	0.022	0.247	0.364	0.305	0.400	0.158	0.447
Isla Bank (A Thrift Bank) Inc	0.880	0.918	0.223	0.237	0.021	0.160	0.062	0.228	0.297	0.386
Legazpi Savings Bank Inc	-	-	0.036	0.242	0.021	0.101	0.014	0.052	0.024	0.132
Lemery Savings & Loan Bank, Inc.	0.118	0.126	0.096	0.139	0.062	0.433	0.163	0.180	0.110	0.220
Life Savings Bank Inc	0.219	0.351	0.079	0.092	0.018	0.123	0.082	0.321	0.100	0.222
Luzon Development Bank	0.020	0.083	0.004	0.024	0.002	0.061	0.001	0.003	0.007	0.043
Malasiqui Progressive SLB, Inc	0.069	0.082	0.030	0.038	0.092	0.130	0.004	0.004	0.049	0.064
Malayan Bank Savings and Mort Bank Inc	0.026	0.065	0.009	0.130	0.149	0.170	0.001	0.003	0.046	0.092
Maritime Savings Bank Corporation	0.153	0.173	0.337	**1.000**	0.156	0.263	0.003	0.003	0.162	0.360
MBANK Philippines (A Thrift Bank) Inc	**1.000**	**1.000**	-	-	0.050	0.100	-	-	0.525	0.550
Merchants Savings & Loan Assn Inc	0.370	0.456	0.190	0.357	0.248	0.364	0.270	0.323	0.270	0.375
Metro Cebu Public Savings Bank	0.080	0.128	0.144	0.169	0.131	0.131	0.111	0.140	0.117	0.142
Microfinance Maximum SB Inc	0.022	0.024	-	-	-	-	-	-	0.022	0.024
Northpoint Dev't Bank Inc	0.132	0.139	0.045	0.047	0.398	0.400	0.533	0.865	0.277	0.363
Opportunity Kauswagan Bank Inc	0.463	0.524	0.199	0.262	0.207	0.301	-	-	0.290	0.362
Optimum Development Bank Inc	**1.000**	**1.000**	0.946	**1.000**	0.459	**1.000**	0.002	0.032	**0.602**	**0.758**
Pacific Ace Savings Bank Inc	0.042	0.061	-	-	0.102	0.135	-	-	0.072	0.098
Pampanga Development Bank	0.986	**1.000**	0.404	0.434	0.159	0.199	0.334	0.465	0.471	0.525
Penbank Inc	0.027	0.070	0.045	0.049	0.063	0.065	0.005	0.101	0.035	0.071
Phil Postal Savings Bank Inc	0.007	0.015	0.027	0.036	0.049	0.114	0.015	0.047	0.025	0.053
Phil Savings Bank	0.008	0.012	0.047	0.064	0.404	0.471	0.174	0.258	0.158	0.201
Phil Star Development Bank Inc	-	-	-	-	-	-	**1.000**	**1.000**	1.000	1.000
Philippine Business Bank Inc	0.097	0.097	0.022	0.043	0.026	0.090	0.212	0.415	0.089	0.161
Philippine Resources Savings Banking	0.015	0.072	0.022	0.034	0.007	0.102	0.000	0.011	0.011	0.055
Planters Development Bank	0.096	0.150	0.192	0.404	0.051	0.088	-	-	0.113	0.214
PNB Savings Bank	-	-	-	-	0.008	0.068	0.010	0.014	0.009	0.041
Pride Star Development Bank Inc	0.043	0.068	-	-	-	-	-	-	0.043	0.068
Phil Star Development Bank Inc	-	-	0.014	0.015	0.104	0.216	-	-	0.059	0.116
Producers Savings Bank Corporation	0.116	0.126	0.027	0.351	0.017	0.076	0.024	0.032	0.046	0.146
Progress Savings and Loan Bank Inc	0.004	0.051	0.088	0.120	0.008	0.071	-	-	0.033	0.081
Queen City Development Bank Inc or Queenbank	0.764	**1.000**	0.005	0.033	0.008	0.027	0.004	0.068	0.195	0.282
Quezon Coconut Bank Inc	0.047	0.114	0.072	0.164	0.215	0.221	0.144	0.248	0.120	0.187
RCBC Savings Bank Inc	0.045	0.089	0.238	0.298	0.018	0.098	0.061	0.076	0.091	0.140
Sampaguita Savings Bank Inc	0.073	0.073	0.135	0.158	0.155	0.522	-	-	0.121	0.251
Security Bank Savings Corporation	0.012	0.038	0.006	0.028	-	-	-	-	0.009	0.033
Sterling Bank of Asia Inc	0.010	0.019	0.058	0.093	0.017	0.044	0.065	0.171	0.038	0.082
Sun Savings Bank Inc	0.097	0.097	0.232	0.281	0.181	0.251	0.759	**1.000**	0.317	0.407

The Palawan Bank (Palawan DB) Inc	0.321	0.361	0.112	0.165	0.166	0.230	0.227	0.231	0.207	0.247
The Real Bank Inc	0.014	0.025	-	-	-	-	-	-	0.014	0.025
Tongyang Savings Bank Inc	0.356	0.428	0.189	0.217	0.102	0.116	-	-	0.216	0.254
Tower Development Bank	0.141	0.167	0.179	0.202	0.148	0.184	-	-	0.156	0.184
UCPB Savings Bank	0.020	0.034	0.041	0.137	0.054	0.069	0.002	0.004	0.029	0.061
United Overseas Bank Philippines	**1.000**	**1.000**	0.010	0.024	0.656	**1.000**	-	-	0.555	0.675
University Savings Bank Inc	0.317	0.322	0.154	0.472	**1.000**	**1.000**	**1.000**	**1.000**	0.618	0.699
Village Bank Inc	0.130	0.135	**1.000**	**1.000**	0.196	0.215	0.170	0.211	0.374	0.390
Wealth Development Bank	0.077	0.102	0.008	0.030	0.008	0.036	0.004	0.005	0.024	0.043
World Partners Bank	0.302	0.307	0.159	0.277	0.176	0.296	0.264	0.271	0.225	0.288
Yuanta Savings Bank Philippines Inc	-	-	-	-	-	-	0.171	**1.000**	0.171	1.000
AVERAGE	**0.225**	**0.280**	**0.152**	**0.235**	**0.176**	**0.275**	**0.146**	**0.233**	**0.179**	**0.262**

Table 3. Distribution of Thrift Banks According to Cost Efficiency Scores from Years 2013 to 2016

Cost Efficiency Score	2013				2014				2015				2016				Average			
	CRS	%	VRS	%	CRS	%	VRS	%	CRS	%	VRS	%	CRS	%	VRS	%	CRS	%	VRS	%
less than 25%	50	72.5	46	66.7	54	85.7	44	69.8	53	81.5	42	64.6	46	80.7	39	68.4	56	73.7	46	60.5
26% to 50%	8	11.6	10	14.5	5	7.9	13	20.6	8	12.3	15	23.1	7	12.3	12	21.1	14	18.4	21	27.6
51% to 75%	3	4.3	3	4.3	1	1.6	0	0.0	1	1.5	1	1.5	1	1.8	0	0.0	4	5.3	4	5.3
76% to 99%	5	7.2	1	1.4	1	1.6	0	0.0	1	1.5	0	0.0	1	1.8	1	1.8	1	1.3	2	2.6
100%	3	4.3	9	13.0	2	3.2	6	9.5	2	3.1	7	10.8	2	3.5	5	8.8	1	1.3	3	3.9
Total	69	100	69	100	63	100	63	100	65	100	65	100	57	100	57	100	76	100	76	100

3.3 The Philippine Thrift Bank that Lie in the Cost Efficiency Frontier

Of all the thrift banks, this study revealed that on the aspect of cost efficiency, Optimum Development Bank Incorporated was identified as the bank that lies in the efficiency frontier based on the result of summary peer and peer count.

Among the thrift banks, Optimum Development Bank is the most cost-efficient and lies in the efficiency frontier. During the year 2013 to year 2014, Optimum Bank maintained its position as being cost efficient both in variable return to scale (VRS) and constant return to scale (CRS) assumption while in 2015, its efficiency score drops to 50% under CRS yet still preserved its full cost efficiency status under VRS assumption. However, cost efficiency scores under CRS and VRS assumptions dropped in year 2016.

Still, Optimum Development Bank has one of the highest cost efficiency average of 60.2% under CRS assumption and 75.8% under VRS assumption for four years as seen in Table 2. This implies that Optimum Development Bank Incorporated may be viewed as the most cost-efficient thrift banks in terms of operating its inputs, namely total liabilities, net real and other property acquired, and net bank premises, furniture, and its outputs, namely fixtures total loan portfolio (TLP) and other financial assets at its maximum level. It was found out that the former Senator and Vista Land and Lifescapes Inc. Chairman Manuel Villar invested billion to at least 20 branches of thrift bank units of Optimum Development Bank (ODB) to be used for industrial estate development. This investment could be the main factor that resulted to higher TLP and other inputs and outputs of ODB (Austria, 2017)[4]. Also, Legaspi (2016) added that billions of cash was also used by ODB on mortgage, which is seen as a reason for its sound financing.

4. IMPLICATIONS

The population of thrift banks in the Philippines from the year 2013 to year 2016 demonstrated a declining figure starting from 69 thrift banks on the year 2013 and ending in 57 thrift banks during the year 2016. All input variables displayed an increasing amount of average during the four-year period covered except a very minimal decrease of almost 1% in bank premises, net furniture and fixtures and equipment in the year 2015 but revealed an increase of almost 16% in the subsequent year. Also, all output variables increasing digits of average was observed throughout the period with the other financial assets increasing figures at an increasing rate.

With the input and output variables employed, it was evident in the outcomes of data envelopment analysis that variable return to scale (VRS) assumption resulted to greater number of cost efficient banks as compared under constant return to scale (CRS) assumption. Although findings had revealed that most thrift banks cost

efficiency percentages lie below 50%, there were still identified thrift banks that has been cost efficient in terms of inputs and outputs used in the study. The most cost-efficient thrift bank during the four-year period covered in the study is the Optimum Development Bank while Phil Star Development Bank Inc. attained on the average a perfect efficiency score but was not considered since it has just started in 2016 reflecting only a year of operations.

More so, the outcome of this study indicated that majority of the thrift banks in the Philippines were not cost efficient in terms of the inputs and outputs selected. The studies main support showed that cost efficiency scores of thrift banks from year 2013 to year 2016 lies below 25% which is a manifestation of poor performance. The population of thrift banks that are founded to be cost efficient are significantly low in both CRS and VRS assumptions although VRS reflected greater number than CRS assumption.

5. LIMITATIONS

The presented findings of the study cannot be considered conclusive due to some inherent limitations along the process. A primary limitation that could significantly put an effect in relation to the efficiency score results is the selection of the input and output variables which is actually left in the users' judgment and it has been emphasized that cost efficiency scores rely solely in the inputs and outputs provided. Another restraint that may affect the study is the fact that the variables identified, both the input and output may not be complete and exact as there may be other variables that could influence the thrift banks performance in terms of being cost efficient.

As the limitations suggests, a future coherent direction is to come up with a study regarding applicable standard methods of ascertaining the input variables and the output variables as well. Likely, other input and output variables might be considered for future investigation in order to come up with different cost efficiency results.

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