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Efficiency of Formal Microfinance in Indonesia: Using Data Envelopment Analysis Application

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Abstract

One of the key success factors of the financial institution sustainability is operational efficiencies. Using Data Envelopment Analysis (DEA), this paper measures the relative efficiency of the executing banking units of people business credit (*KUR*) program in Indonesia. Sample data of this study were obtained from all banking units from banks providing *KUR* located in the district of Pati, Central Java - district with the largest KUR receiver. This study consists of two stages of analyses: (1) it is found that 18 of the 35 banking units (51.43%) are in the scale efficiency, with units receiving 100% efficiency score being called efficient; (2) an output target is shown for the purpose of maximizing the output of the KUR disbursement without additional inputs.

Keywords: Bank, Microfinance, DEA, Efficiency, Sustainability.
JEL Classification: G21, C88, H21.

1. Introduction

Microfinancing is perceived as a less profitable business unit in the banking industry due to costs and obstacles associated with it (Demirgüç-Kunt and Klapper, 2012). Many studies reveal that micro-credits have many advantages for the society, however financial institutions cannot sustain this line of business. Low profit margins are not uncommon in practice due to its operational inefficiencies. As such, productivities and efficiencies in the banking industry are some

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key important indicators to analyze. According to (Parasuraman, 2010), banks should consistently improve its capacity to convert savings and term deposits into loans. Many instances are that micro credit can incur expenses higher than income it generates.

Micro credits are commonly targeted to low income household businesses and it is regarded as one of the programs to fight against poverty. Micro credits are usually in the form of informal lending provided by non-banking financial institutions. Since 2007 Indonesia has a micro-credit program called "*Kredit Usaha Rakyat* or KUR" targeted to un-bankable yet feasible micro-household businesses. With the innovation of easy requirements with no collaterals, KUR was able to reach low income household businesses which did not own bank accounts. Historically, KUR has relatively low figures of non-performing loan (Farida et al., 2015). The KUR has a credit limit of IDR 25 million with a tenor of 3 years for the working capital and 5 years for the start-up capital. KUR was distributed by a few numbers of banks appointed by the national government, however not all appointed banks had the capacity to serve micro household businesses. There were many banks serving only to large accounts, for the reason of efficiency or assumption that micro-household businesses have higher risks. Over 90% of KUR was distributed by a national-wide bank with the largest networks across Indonesia: Bank Rakyat Indonesia (BRI). The purpose of this study is to analyze the efficiency and productivity of BRI's KUR since the program should provide benefits for both supply and demand side. An efficient banking institution is an important factor to assure sustainability and create values for customers. From economic view, high productivity would have better sustainability in the competition, given that profit margin would shrink, thus inefficient financial institutions would be forced to leave the competition (Burger et al., 2008).

Some of executing banks designated for disbursing KUR are not able to reach micro enterprises because of a high cost. Meanwhile, they could not apply a high interest due to government has set a maximum interest for KUR. To sustain, banks have to operate efficiently. Based on the data, the average of credit for micro enterprises is Rp 8.3 million per establishment. Previously, loan schemes have been launched in Indonesia, however, they did not perform as expected, for instance the agricultural extensive loans and

the agricultural enterprises credit program. Their drawbacks such as complex procedure, high interest and collaterals, as well as high cost on late repayments, lead to the discontinuation of the programs (Farida et al., 2015).

Thus, this study aims to evaluate the efficiency of the executing banking units of KUR program, to find which banking units are becoming a role model for others, and to compare between their productivity and its output target. This study is using data envelopment analysis (DEA) application, a non-parametric approach. The research location is in the Pati District of Central Java Province as the largest KUR disbursement in Indonesia. Samples are taken from all of the 35 banking units, which spread from urban to rural.

2. Literature Review

Efficiency and effectiveness are interrelated concepts in the management theory. Effectiveness is concerned with maximizing outputs and efficiency is related with minimizing costs. Falkena et al., (2004) classified banking efficiencies into: allocative efficiencies and technical efficiency. Allocative efficiency is the extent to which available resources are utilized to produce maximum results. A company achieves technical efficiency if outputs can be produced with the least input possible.

Two methods are used to measure bank efficiencies: parametric and non-parametric. By parametric method, many studies apply stochastic frontier approach (SFA) such as (Baten and Kamil, 2010; Tahir and Haron, 2010). Meanwhile, efficiency measurement using Data Envelopment Analysis (DEA) has been widely used in banking (Tahir et al., 2009; Fethi and Pasiouras, 2010; Moradi-Motlagh et al., 2011; Suzuki and Sastrosuwito, 2011; Gordo, 2013). DEA is also used to measure efficiencies in many other areas such as rural economic development (Vennesland, 2005), poultry farm (Heidari et al., 2011), transportation (Bhagavath, 2006). Fethi and Pasiouras (2010) suggests that DEA is predominantly used in measuring bank performance.

The Advantage of DEA is the ease to collocate several inputs or outputs to calculate technic efficiency. However, DEA's shortcoming is that it only measures relative efficiency to the best sample outcome when interpreting more deterministic outcome. Consequently, the

output may not be as meaningful to compare scores between two independent studies (Bhagavath, 2006).

DEA approach does not have a formal consensus on the definition of the output-input variables used in the banking efficiency studies (Gordo, 2013). Madhanagopal and Chandrasekaran (2014) point out that DEA uses several inputs and outputs to analyze efficiencies, however, it does not offer any guides in choosing each variable, thus, input and output have to be chosen by the user. Nonetheless, the number of Decision Making Units or DMU is suggested to have minimum of 3 times of the sum of variables. In general, two approaches where used in DEA model: financial intermediaries and production approach. The first approach is the function of banks as intermediaries which collect funds from depositors and lend out to gain some margins. In this instance, the output is the loan, and the inputs are costs incurred such as: bank interest paid to depositors, employee salaries, and other operational costs. Efendic (2011) has studied to analyse efficiencies of conventional banks and islamic banks, the input variables are customer savings, fixed assets and employee costs, whilst output variables are net loan and other aset revenues. Input and output variables used by Efendic are similar to (Varias and Sofianopoulou, 2012)'s study in Greek banking system to evaluate the efficiencies of commercial banks. Tahir et al. (2009) evaluated efficiencies of domestic and foreign banks in Malaysia and found that domestic banks are more efficient. In (Tahir et al., 2009), the input variables are total deposits and overhead costs, and the output variables are revenues from banks' assets. For the second approach, customer deposits are treated as outputs, and operational costs including employee costs are treated as input. Sathye (2001) treated employee wages, capital, and loanable funds as inputs, whilst loan and customer deposits were the outputs. Loan types were not classified in Sathye's study. The result found that efficiencies of Australian banks were below the average of the world's banks.

Some researchers use the existing DEA who prefer to enter the number of employees or number of the customers instead of the value. On the other hand, some other researchers prefer to use the value in its currency for the following reasons: (i) banks compete for market share in terms of value instead of the number of accounts; (ii) different

accounts have different costs; (iii) banks has multi service which size can be better measure by the value in its currency.

3. Methodology

There are several models developed in the DEA methodology (Charnes et al., 1978 and Banker et al., 1984). Charnes et al., (1978) applied input-oriented models assuming a Constant Return to Scales (CRS). This approach was further developed using output-oriented models with the assumption of Variable Return to Scales (VRS) introduced by Banker, Charnes, and Cooper (1984). The calculation result VRS DEA model is referred to the efficiency of the technique (Technical Efficiency = TE). In measuring the efficiency, each unit of economic activity or Decision Making Unit (DMU) is obtained from the maximisation of a weighted average of the ratio of output to input, which was formulated in the following form (Charnes et al., 1978):

$$\text{Max } h_0 = \frac{\sum_{r=1}^{s} u_r y_{r0}}{\sum_{i=1}^{m} v_i x_{i0}} \qquad (1)$$

s.t

$$= \frac{\sum_{r=1}^{s} u_r y_{r0}}{\sum_{i=1}^{m} v_i x_{i0}} \leq 1; \; j = 1, \ldots, n$$

$u_r, v_i \geq 0; \quad r = 1,...,s; \quad i = 1, ..., m$

In this study, input variables are denoted as x_i from 35 banks units (the third-party savings, interest expense, gift and warranty expense, provision for bad debt expense, employee expenses, general and administrative expenses, and other operational expenses). The output variables are denoted as y_r from 35 unit banks (amount of disbursed KUR, fees revenue, service revenue, and net interest income).

From the two approaches, TE CRS and TE VRS can be formulated as the calculation of the performance efficiencies of scale (Scale Efficiency = SE). Based on both TE scores, efficiency scale can be formulated as:

$$SE = \frac{TE\ CRS}{TE\ VRS} \quad (2)$$

This DEA efficiency value is defined not by absolute standards but relatively amongst bank units. This feature distinguishes the DEA from the parametric approach such as stochastic frontier approach (SFA), which requires some forms of some certain model functions. In addition, DEA is used in this study because each bank unit has similar characteristics. The purpose of DEA is to identify which units operate on the efficient frontier. If both the input and output of the banks unit are located on the frontier set then, the bank unit is considered efficient, and it also becomes the envelope covering the existing data sets. In other words, they cover up other inefficienct bank units which are located within the frontier or in the "envelope".

The relative efficiency in this study to measure the efficiency can be illustrated by output-oriented in Figure 1. If there are two outputs, ie Y1 and Y2, the combination at point A is inefficient because it is below the production possibilities curve. The distance from point A to the frontier in this study is a function of the distance output Farrel (Fo), introduced by Farrell in 1957 (Vennesland, 2005), representing technical inefficiency- the level outputs which should be improved without increasing the current (existing) input. When Fo is equal to 1, then the bank unit is considered efficient. However, if the Fo score is above 1, the bank units is inefficient.

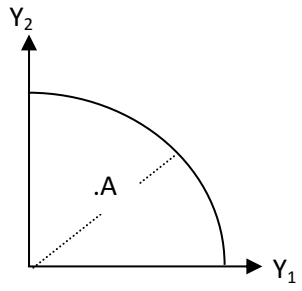

Figure 1: Ilustration of frontier in DEA
Source: Vennesland (2005).

Mathematically, the efficiency model for bank units 'k' can be

observed from the following equations, adopted from Vennesland (2005):

$$Fo\ (X^{k'}\ ,\ Y^{k'} \mid C,S) = \text{Max}\ \lambda_{k'} \tag{3}$$

s.t

$$\sum_{k=1}^{k} Z_k Y_{1,k}\ \geq\ \lambda_k Y_{1,k} \quad \text{(disbursed KUR)} \tag{4}$$

$$\sum_{k=1}^{k} Z_k Y_{2,k} \geq\ \lambda_k Y_{2,k} \quad \text{(Fees Revenue)} \tag{5}$$

$$\sum_{k=1}^{k} Z_k Y_{3,k} \geq\ \lambda_k Y_{3,k} \quad \text{(Services Revenue)} \tag{6}$$

$$\sum_{k=1}^{k} Z_k Y_{4,k} \geq\ \lambda_k Y_{4,k} \quad \text{(Net Income Revenue)} \tag{7}$$

$$\sum_{k=1}^{k} Z_k Y_{1,k}\ \leq X_k Y_{1,k} \quad \text{(The Third-Party Savings)} \tag{8}$$

$$\sum_{k=1}^{k} Z_k Y_{2,k}\ \leq X_k Y_{2,k} \quad \text{(Interest Expense)} \tag{9}$$

$$\sum_{k=1}^{k} Z_k Y_{3,k}\ \leq X_k Y_{3,k} \quad \text{(Gift Expense)} \tag{10}$$

$$\sum_{k=1}^{k} Z_k Y_{4,k}\ \leq X_k Y_{4,k} \quad \text{(Provision for Bad Debt Expense)} \tag{11}$$

$$\sum_{k=1}^{k} Z_k Y_{5,k}\ \leq X_k Y_{5,k} \quad \text{(Employees Expense)} \tag{12}$$

$$\sum_{k=1}^{k} Z_k Y_{6,k}\ \leq X_k Y_{6,k} \quad \text{(General/Administration Expense)} \tag{13}$$

$$\sum_{k=1}^{k} Z_k Y_{7,k}\ \leq X_k Y_{7,k} \quad \text{(Others Operational Expense)} \tag{14}$$

$$Z_k \geq 0 \text{ (CRS)}\ \ k = 1 \ldots K \tag{15}$$

Fo represents the function of output Farrell distance. X denotes

input, whilst Y is denotes output and k' represents each bank unit, C is the CRS. S is the strong disposability of output, meaning that the output can be increased again with the same inputs or no additional cost. Z_k is the intensity variable. The role of Z in this model is to establish a reference technology. Intensity variables make frontier, describe hypothesis from bank units performances which use the same input to produce more output.

4. Result and Discussion

4.1 Descriptive Analysis

The study was conducted upon 35 commercial banks providing KUR, which are appointed by Government in District of Pati. In this study, each bank was represented by an initial. The amount KUR disbursed in Pati between 2013 and 2014 can be shown by Figure 2:

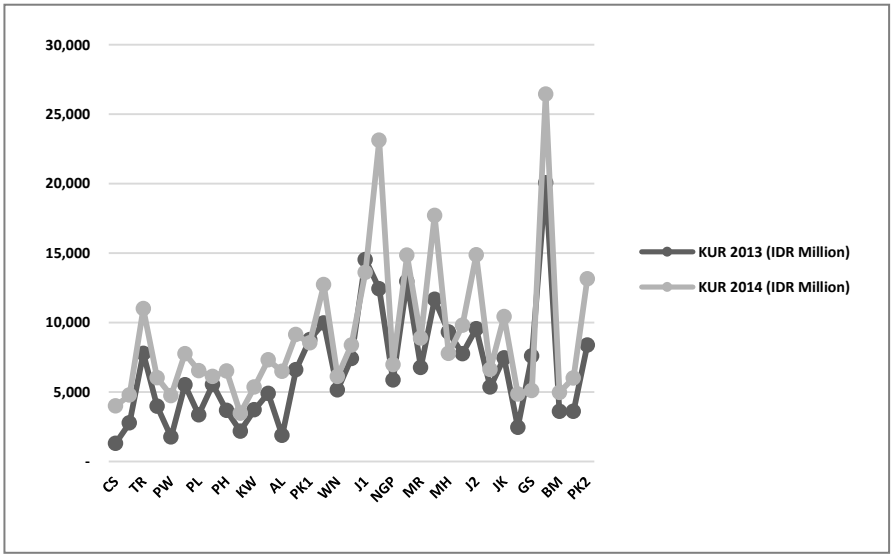

Figure 2: The Amount of KUR Disbursed

Figure 2 shows that majority of bank units in 2014 increased their amount of KUR disbursed KUR from the previous year, but four bank units which experienced a decrease: (i) Pati Kota 1 (PK1); (ii) Juwana 1 (J1); (iii) Mulyoharjo (MH); (iv) Gabus (GS). The decline in Pati Kota 1 was due to decrease in the number of customers even though the average KUR per customer rose from IDR 12.3 million in 2013 to IDR 12.8 million in 2014. In contrast, the number of customers

increased in Juwana I, but its average KUR received customers decreased from IDR 13.4 million in 2013 to IDR 12.3 million in 2014. Meanwhile, Mulyoharjo and Gabus decreased in both the number of customers and average KUR amount per customer. The performance of the bank units can be seen in table 1:

Table 1: Performance of Bank Units Providing KUR

No.	Indicator	Max	Min	Average	Total
1.	Number of customers, 2013	2,481	204	741	25,918
	Number of customers, 2014	3,161	431	893	31,254
	Growth (%)	27.4	111.27	20.51	20.59
2.	KUR disbursed,IDR mill, 2013	20,058	1,288	6,725	235,380
	KUR disbursed,IDR mill, 2014	26,444	3,471	9,141	319,934
	Growth (%)	31.84	169.48	35.93	35.92
3.	KUR per account (IDR million), 2013	13.3	5.9	9.1	9.08
	KUR per account (IDR million), 2014	13.47	7.3	10.2	10.23
	Growth (%)	1.27	23.7	12.0	12.66
4.	NPL value, (IDR mill.), 2013	2,498	0	104	3,629
	NPL value (IDR mill.), 2014	399	0	52	1,818
	Growth (%)	-84	0	-50	-49.9
5.	Number of NPL accounts, 2013	213	0	12	426
	Number of NPL accounts, 2014	33	0	7	229
	Growth (%)	-84.5	0	-41.67	-46.24

The total amount of KUR disbursed in 2014 was IDR 319.9 billion, an increase of 35.92 percent from the previous year. The increase was due to an increase of customers by 20.59 percent from 25,918 customers in 2013 to 31,254 customers in 2014. As an overall, the average KUR per customer in 2014 was IDR 10.2 million, an increase by 12% from IDR 9.1 million in 2013. The percentage of non-performance loan (NPL) also declined from 1.5 % in 2013 to 0.5% in 2014. This figure is far lower than the level of NPL of retail or non-

micro customers at national level of 4 %. In 2014, the largest amount KUR by currency was distributed by unit bank Dukuhseti (DS) by IDR 26.4 billion or 2,631 customers. Unit Sukolilo (SL) had the largest number of customers - 3,161 account or IDR 23.1 billion in 2014. This implies that the average KUR per customer in unit Dukuhseti (DS) was larger than that of unit Sukolilo (SL), IDR 10 million and IDR 7.3 million per customer respectively. The lowest KUR disbursed was unit Ngablak (NG) by IDR 3.4 billion or 467 customers. Unit Gabus (GS) had the least number of customers by 431 customers or IDR 5.0 billion. This implies that the average of KUR per customer in Gabus (GS) was higher than that of Ngablak (NG), IDR 11.8 million and IDR 7.4 million respectively.

The success of bank lending can also be observed from the level of non-performance loan (NPL). NPL in 2014 declined by 49.9% from IDR 3.6 billion in 2013 to IDR 1.8 billion in 2014. Unit Juwana I (J1) had the highest NPL rate in 2014 by IDR 2.4 billion or 213 customers. Meanwhile, in 2014, unit Pati Kota I (PK1) had the highest NPL by IDR 399 million or 33 customers. The best performance by NPL was achieved by unit Sukolilo (SL), which also had the largest number of customers. In addition to KUR disbursed, the performance of bank unit can also be observed from its revenues seen in table 2.

Table 2: Performance of Bank Units Providing KUR by Revenues

No	Indicator	Max	Min	Average	Total
1.	Third party funds or savings (IDR billion), 2013	55.5	3.8	23.9	836.6
	Third party funds or savings (IDR billion), 2014	66.7	6.6	27.7	971.1
	Growth (%)	20.18	73.68	15.9	16.0
2.	Term deposits (IDR billion), 2013	4.9	0.34	1.97	69.2
	Term deposits (IDR billion, 2014	8.5	0.62	2.4	84.9
	Growth (%)	73.4	9.5	21.8	22.68
3.	Interest revenue (IDR billion), 2013	12.79	0.6	5.2	181.99
	Interest revenue (IDR billion, 2014	15.3	1.6	5.9	206

No	Indicator	Max	Min	Average	Total
	Growth (%)	19.6	166.7	13.5	13.19
4.	Provision revenue (IDR million), 2013	376.3	10.0	97.6	3,419.4
	Provision revenue (IDR million), 2014	406.8	20.1	102.3	3,581
	Growth (%)	8.1	101	4.8	4.7
5.	Service revenue (IDR million), 2013	884.9	44.7	392.4	13,734
	Service revenue (IDR million), 2014	965.4	141.3	475	16,626
	Growth (%)	9.0	216.1	21	21
6.	Other operational revenues (IDR million), 2013	146	0.004	47.6	1,668
	Other operational revenues (IDR million), 2014	212.8	0.011	66.9	2,342.9
	Growth (%)	45.7	175	40.5	40.4
7.	Non-operational revenues (IDR million), 2013	1,379.3	19.8	709	24,874
	Non-operational revenues (IDR million), 2014	1,805.8	96.4	907.2	31,753.5
	Growth (%)	30.9	386.6	27.9	27.6

Financial performance of bank units providing KUR showed a significant increase. Third party funds and terms deposits also showed an increase of 16 percent and 22.68 percent respectively. The lowest third-party funds amount was from Cengkal Sewu (CS) and the highest were from Kayen (KY) and Gabus (GS), respectively. In 2014, interest revenue was the largest revenue contributor from the bank units, reaching IDR 206 billon- an increase by 13.19 % from the previous year. Other operating increased the most significantly by 40.4% in 2014 from the previous year. As an overall, total operating revenues from KUR providers showed an increasing trend, but unit of Juwono I (J1), Margorejo (MR), Ngablak (NG) dan Pucakwangi (PW), as shown in figure 3.

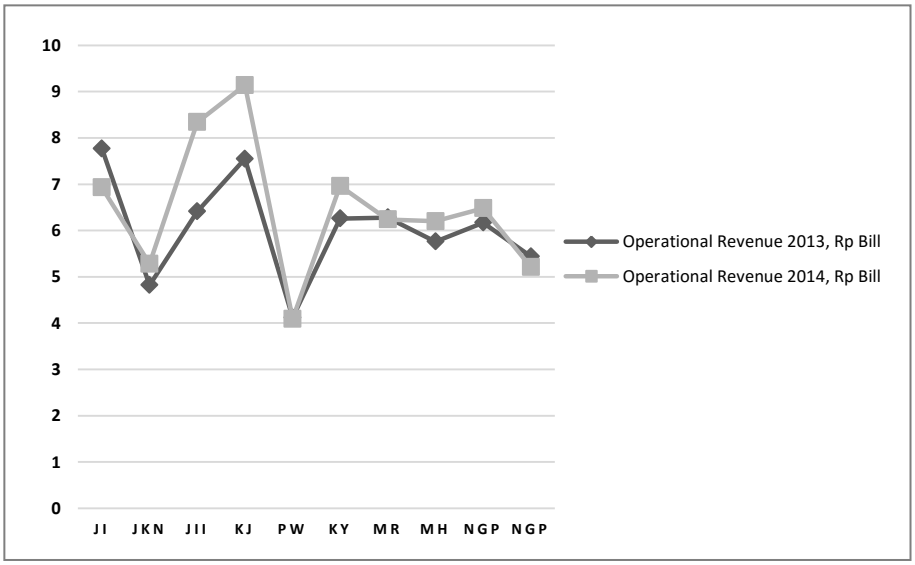

Figure 3: Operational Revenues of Bank Units Providing KUR

Total operating revenues of Juwono I (J1) declined from IDR 7.7 billion in 2013 to IDR 6.9 billion in 2014. The decrease was due to a significant decline in interest income significant from IDR 7.0 billion in 2013 to IDR 6.1 billion in 2014. Margorejo(MR)'s operational revenue decreased slightly from IDR 6.29 billion to IDR 6.25 billion in 2014. The decline was due to a decline of interest revenue, provision revenue and other operating revenue. Operational revenues of Ngablak (NG) declined slightly from IDR 5.44 billion to IDR 5.21 billion, while Pucakwangi (PW) from IDR 4.12 billion to IDR 4.09 billion. Unit Ngablak's operational revenues decreased slightly due to the decrease of interest revenue from IDR 5.0 billion in 2013 to IDR 4.75 billion in 2014, however, provision revenue, service revenue and other operational revenue increased. Unit Pucakwangi's decline was due to the decline of interest revenue and provision revenue, but service revenue and other operational revenue increase significantly.

The growth of non-operating revenue in 2013 and 2014 can be shown in figure 4. Four unit banks decreased, i.e. (i) unit Batangan (BT) from IDR 581 million in 2013 to IDR 538 million in 2014; (ii) Kayen (KY) from IDR 1.0 billion in 2013 to IDR 988 million in 2014; (iii) Margorejo (MR) from IDR 1.37 billion in 2013 to IDR 1.28

billion in 2014; and (iv) Pagerharjo (PH) from IDR 529 million in 2013 to Rp 492 million in 2014. Overall, non-operational revenue rose by 27.6 percent from IDR 24.8 billion in 2013 to IDR 31.7 billion in 2014, with an average non-operational revenue figure of IDR 907.2 million in 2014.

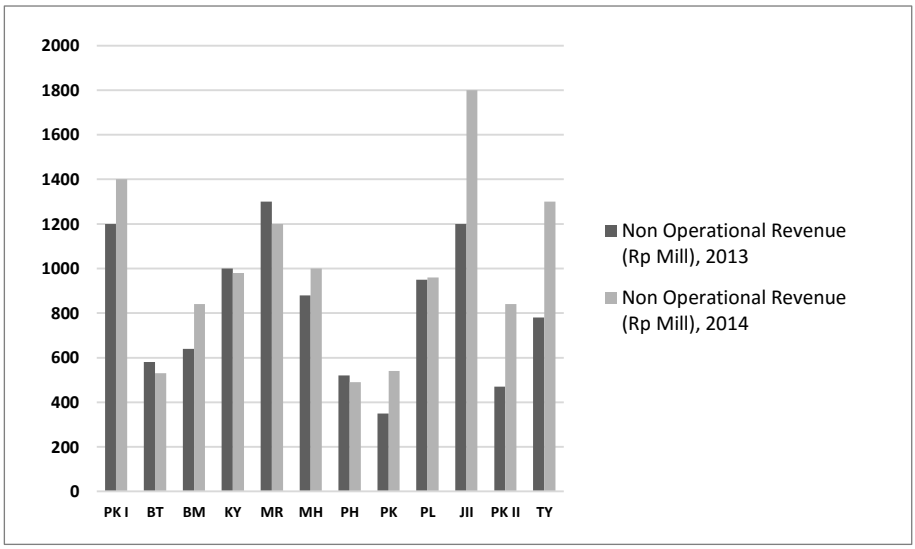

Figure 4: Non-Operational Revenue from Bank Units Providing KUR

Performance of bank units providing KUR observed from type of expenses incurred can be shown in table 3.

Table 3: Performance of bank units providing KUR from operating expenses

No.	Indicator	Max	Min	Average	Total
1.	Interest expense (IDR million), 2013	795	20.4	320.1	11,205.8
	Interest expense (IDR million), 2014	789.4	70	347.6	12,161.1
	Growth (%)	-0.7	243.1	8.5	8.5
2.	Gift and warranty expense (IDR mill.), 2013	137.5	6.1	44.5	1,558.5
	Gift and warranty expense (IDR mill.), 2014	124.8	13.7	55.6	1,947.1
	Growth (%)	-9.2	124.5	24.9	24.9
3.	Bad debt expense (IDR million), 2013	5,087.5	68.2	1,274.7	44,617

No.	Indicator	Max	Min	Average	Total
	Bad debt expense (IDR million), 2014	8,996.1	189.4	1,556.7	54,484.5
	Growth (%)	76.8	177.7	22.1	22.1
4.	Employees expenses (IDR million), 2013	1,088.3	212.3	663.8	23,234.8
	Employees expenses (IDR million), 2014	1,444.3	491.7	900.3	31,513.9
	Growth (%)	32.7	131.6	35.6	35.6
5.	General and administrative expenses (IDR million), 2013	1,433	327.3	709.6	24,838.7
	General and administrative expenses (IDR million), 2014	1,855.7	434,8	808.8	28,309.5
	Growth (%)	29.4	32.8	13.9	13.9
6.	Other operating expenses (IDR million), 2013	2,402.2	46.7	626.3	21,923
	Other operating expenses (IDR million), 2014	2,357.6	154.3	610.9	21,383.5
	Growth (%)	-1.8	230.4	-2.4	-2.4

As an overall trend, operational expenses experienced some increase but other operational expenses declining by 2.4% in 2014 from the previous year. The most significant increase was experienced by the employee expenses by 35.6% from IDR 23.3 billion in 2013 to IDR 31.5 billion in 2014. The highest employee expense can be observed in unit Juwono I (J1). This incremental reflects the inefficiency of employees, as shown from the decline in KUR disbursed and its term deposits. Interest expense also showed an increasing trend as a whole, simultaneous with the incremental in the third-party savings and terms deposits. Figure 5 shows the trend of expenses in each bank unit.

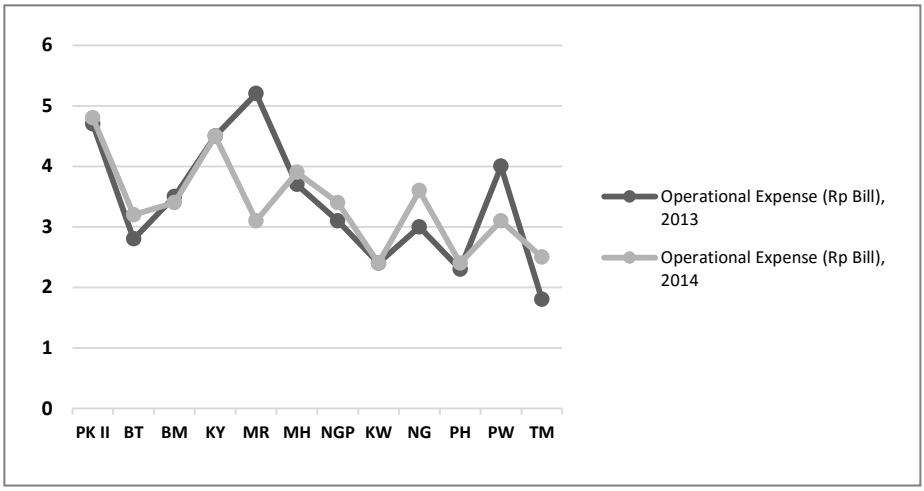

Figure 5: Operational Expenses from Bank Units Providing KUR

Figure 5 depicts the majority increase of expenses in 2014 in bank units, but unit Bulumanis (BM), Kayen (KY), Margorejo (MR), Karangwotan (KW) and Pucakwangi (PW). The decline experienced by unit Pucakwangi (PW) and Margorejo (MR) was parallel with the decline in operational revenues. Meanwhile, the decline of expenses in unit Bulumanis (BM) and Kayen (KY) was due to the decline in bad debt expenses, showing improving credit quality of customers from both units. On the other hand, unit of Karangwotan (KW) expense decline due to the decline in interest expense, bad debt expense, and other operational expense. In this study, the definition of inefficiency ratio is that the total operational expense over total operational revenue. The lower the figure, the more efficient the bank unit. The lowest ratio was 46.4% and the largest 179.4% in 2014. If the figure exceeds 100%, it implies that the unit bears more costs than the revenue it generates. Out of 35 bank units in this study, only one unit with inefficiency ratio exceeding 100%: Juwono I (JI).

4.2 Efficiency Analysis

By Data Envelopment Analysis (DEA) which oriented towards output, the result shows that 18 peers (51.43%) were by CRS (constant return scale) approach and 23 peers (65.71%) were by VRS (variable return scale) approach. Bank units are considered efficient if the efficiency

scale (ES) has the score of 1 (shown in table 4) by CRS or VRS approach. If the ES score is below 1, it shows that the bank unit is inefficient. FO is the distance function output Farrell, or strong disposability of outputs. It implies that the output can be improved with the identical output without an additional cost, the amount of output can be set arbitrarily (Färe and Grosskopf, 2000). If the DMU is not equal to 1, for example DMU number 3 (BM/Bulumanis) having CRSTE of 0.947, it implies that Bulumanis (BM) has to have the capacity to increase the output by 5.5% without an additional input. Other DMU interpretations follow.

Table 4: Result of DEA of Unit Banks Providing KUR

	Dmu	**FO**	**Efficiency Summary**				
No.	**Bank unit**	**Efficiency score**	**CRSTE**	**VRSTE**	**ES**	**RTS**	**Frequency in referent set**
1.	PK2	1	1.000	1.000	1.000	Constant	7
2.	BT	1	1.000	1.000	1.000	Constant	0
3.	BM	1.055	0.947	0.954	0.993	Irs	0
4.	DS	1	1.000	1.000	1.000	Constant	6
5.	GS	1.09	0.917	0.928	0.988	Drs	0
6.	GB	1.052	0.950	0.963	0.987	Drs	0
7.	JK	1.02	0.980	1.000	0.980	Irs	1
8.	JKN	1.16	0.861	1.000	0.861	Irs	0
9.	J2	1	1.000	1.000	1.000	Constant	0
10.	KJ	1	1.000	1.000	1.000	Constant	0
11.	KB	1	1.000	1.000	1.000	Constant	4
12.	KY	1	1.000	1.000	1.000	Constant	11
13.	MR	1.19	0.839	0.847	0.991	Drs	0
14.	MH	1.04	0.961	1.000	0.961	Irs	1
15.	NGP	1	1.000	1.000	1.000	Constant	4
16.	SL	1	1.000	1.000	1.000	Constant	3
17.	TK	1.09	0.915	0.948	0.965	Drs	0

	Dmu	FO	Efficiency Summary				
No.	**Bank unit**	**Efficiency score**	**CRSTE**	**VRSTE**	**ES**	**RTS**	**Frequency in referent set**
18.	WR	1.04	0.961	1.000	0.961	Irs	0
19.	WN	1.12	0.890	0.891	0.999	Irs	0
20	J1	1.06	0.941	0.944	0.997	Drs	0
21.	PK1	1.14	0.877	0.884	0.992	Irs	0
22.	TY	1.08	0.930	0.934	0.996	Irs	0
23.	AL	1	1.000	1.000	1.000	Constant	0
24.	GW	1	1.000	1.000	1.000	Constant	1
25.	KW	1	1.000	1.000	1.000	Constant	4
26.	NG	1.06	0.935	0.948	0.986	Drs	0
27.	PH	1.01	0.989	0.995	0.993	Irs	0
28.	PK	1	1.000	1.000	1.000	Constant	6
29.	PL	1.13	0.883	0.929	0.951	Irs	0
30.	PS	1	1.000	1.000	1.000	Constant	5
31.	PW	1.08	0.926	1.000	0.926	Irs	0
32.	TM	1	1.000	1.000	1.000	Constant	0
33.	TR	1	1.000	1.000	1.000	Constant	1
34.	TH	1	1.000	1.000	1.000	Constant	6
35.	CS	1	1.000	1.000	1.000	Constant	1
	Mean	1.04	0.964	0.976	0.987		

Note:
crste: constant return scala technical efficiency
vrste: variable return scale technical efficiency
se : scale efficiency = crst/vrst, Irs: increasing, Drs: decreasing

Efficient bank units become the reference point and envelop covering the whole existing data for inefficient units. Inefficient units can learn and implement the system of the efficient units. Efficient bank units can be treated as peer for units which share similar characteristics. Table 5 shows peers unit for each bank unit. Inefficient

bank units are able to refer to more than one bank units. For instance, unit of Bulumanis (BM)- an inefficient unit- can refer to unit of Tambaharjo (TH), Pati Kota 2 (PK2), Karang Wotan (KW), Kayen (KY), Dukuhseti (DS), Pakis (PK), and Plaosan (PS).

Table 5: Summary of Peers

No.	Inefficient bank units	Peers
1.	BM	TH, PK2, KW, KY, DS, PK, PS
2.	GS	KB, KY, PK2
3.	GB	PK, PK2, DS, KY, NGP
4.	MR	PK2, KY, DS, PK
5.	TK	KY, KB, SL, NGP
6.	WN	KY, DS, PK, PS, PK2
7.	J1	PK2, KY, PK, DS, TH
8.	PK1	PK2, DS, PK, PS, KY
9.	TY	KY, PK, KW, DS
10.	NG	SL, GW, DS
11.	PH	CS, TR, KB, KY, NGP, SL
12.	PL	KY, KB, DS, KW, KB

Efficient bank units have implemented good systems. Amongst efficient bank units, some have better performance. From the above summary of peers (table 5) or from frequency in referent set in table 4, the most noticeable units are Kayen (KY) by 11 times, unit of Pati Kota 2 (PK2) by 7 times, and unit of Dukuhseti (DS), Pakis (PK), and Tambaharjo (TH) by 6 times each. This shows that unit of Kayen (KY) can produce the most optimum from its output. The most frequent units which show up from the above table shows that the unit is the most efficient, namely unit Kayen (KY). Some of the reasons for Kayen's efficiency are: (i) high absorption of third party funds by IDR 66.7 billion (highest); (ii) high KUR disbursement by IDR 17.7 billion (second highest); (iii) large customer numbers (third largest); (iv) the decrease of expense in the event of increase of revenues. Inefficient bank units should be able to learn from other efficient bank units to optimize their outputs from the inputs they possess.

Returns to scale (RTS) showed that all banks are efficient bank

units (based on a scale of efficiency) operate at the CRS. Inefficient bank units need to make technical changes to improve their output by increasing their KUR disbursement. Therefore it is necessary to know the optimal output level or the amount of disbursable KUR without increasing the existing input. Bank units which KUR disbursements have not reached optimum level need to improve its customer outreach either from quantity or quality side. It is not advisable that quantity is prioritized whilst neglecting quality (delinquency). The extent to which how each bank units need to improve can be show in table 6 below.

Table 6: Optimisation of KUR Disbursement (IDR Million), 2014

No.	Bank Unit	KUR disbursed	Optimum KUR (target)	Potential KUR	Effectiveness (%)
1.	PK2	13,131	13,131	0	100
2.	BT	5,998	5,998	0	100
3.	BM	4,970	10,681	5,711	46.53
4.	DS	26,444	26,444	0	100
5.	GS	5,090	16,464	11,374	30.92
6.	GB	4,845	9,992	5,147	48.49
7.	JK	10,432	10,432	0	100
8.	JKN	6,624	6,624	0	100
9.	J2	14,858	14,858	0	100
10.	KJ	9,792	9,792	0	100
11.	KB	14,838	14,838	0	100
12.	KY	17,707	17,707	0	100
13.	MR	8,878	15,110	6,232	58.76
14.	MH	7,760	7,760	0	100
15.	NGP	6,975	6,975	0	100
16.	SL	23,125	23,125	0	100
17.	TK	12,715	15,196	2,481	83.67
18.	WR	8,372	8,372	0	100
19.	WN	6,119	12,921	6,802	47.36
20	J1	13,608	14,418	810	94.38
21.	PK1	8,530	13,098	4,568	65.12
22.	TY	9,123	16,254	7,131	56.12

No.	Bank Unit	KUR disbursed	Optimum KUR (target)	Potential KUR	Effectiveness (%)
23.	AL	6,481	6,481	0	100
24.	GW	7,301	7,301	0	100
25.	KW	5,349	5,349	0	100
26.	NG	3,471	8,774	5,303	39.56
27.	PH	6,596	7,335	739	89.92
28.	PK	6,111	6,111	0	100
29.	PL	6,537	10,058	3,521	64.99
30.	PS	7,751	7,751	0	100
31.	PW	4,734	4,734	0	100
32.	TM	6,026	6,026	0	100
33.	TR	10,986	10,986	0	100
34.	TH	4,766	4,766	0	100
35.	CS	3,987	3,987	0	100

Table 6 shows that unit of Gabus (GS) has the largest potential to disburse KUR in term of funds. Its capacity to absorb third-party funds (savings) is the second largest amongst 35 bank units. However, its capacity to disburse the credit is far from optimum. Its productivity figure was only 30.92% from existing capacity. This means that Gabus has more challenges to disburse KUR, except that interest expense to third-party funds is higher than its revenue. Gabus' inefficiencies were due to the following reasons: (i) high absorption of third-party funds. It increased from the previous year whilst the KUR disbursement declined; (ii) Decline of customer number in parallel with average KUR per customer; (iii) the least number of customer in comparison with other bank units.

Ngablak (NG) is the second lowest efficient bank unit after Gabus (GS). To reach optimum efficiency, Ngablak needs to disburse more KUR from potential funds it has, because its fund productivity only reached 39.59%. As much as IDR 5.3 billion needed to be disbursed to reach optimum level of efficiency. There were bank units with more funds, however, their percentage of fund productivity were higher than that of Ngablak. This refers to relative efficiency.

5. Conclusion

KUR distribution by majority of bank units has not been efficient. From 35 bank units, only 51.43% reached efficiency; whilst the remaining 48.57% were deem to improve their KUR distribution with existing input. Inefficiencies do not imply that bank units suffer operational losses. Efficiencies in this study are not absolute, but rather relative to other bank units. Only 1 bank unit - Juwono 1 (J1) - had expenses exceeding revenue. The main reason of the inefficiency was the disbursed KUR less than the optimal target. The more optimized the KUR distribution, the more micro-household businesses are served and the more profits are earned. Considering analogous characteristics of the bank units, inefficient units can refer to efficient ones. Unit of Kayen (KY), Pati 2 (PK2), Dukuhseti (DS), Pakis (PS) and Tambaharjo (TH) can be the role models for other units. Furthermore, inefficient units such as unit of Gabus (GS), can potentially improve to become efficient given their adequate inputs-large amount of third-party funds, human capitals with robust recruiting, training and development system similar to efficient units. Employee rotations or trainings can potentially boost the target achievement. This is because the goals of an organization can be achieved depending on the ability of employees to perform tasks and adapt to environmental changes (khanmohammadiotaqsara et al., 2012). Hence, trainings can potentially increase employee productivity.

Outreach, as observed from the size of KUR disbursed, was IDR 10.2 million per customer. This implies that KUR has served its purpose to reach out to micro households. In addition, KUR has good credit quality, as evidenced from NPL of 0.5%. This shows that KUR can be sustainable, with the support of innovation, human capital, and technology. In short, trade-off between outreach and sustainable was not identified in this study, in consistence with study of (Zerai and Rani, 2012) but contradictory with (Hermes et al., 2011). The availability of bank unit in almost every district made it possible to reach customers in rural areas.

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