

# **COST EFFICIENCY LEVEL OF RURAL BANKS IN EAST JAVA**

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**Abstract:** Rural Bank (BPR) was an important part of financial service industry in Indonesia. Their pivotal role on lending to SMEs in the rural area made their existence very strategic to rural development. However, due to its operational scale, rural bank charged higher interest rate than commercial bank. The study estimated the cost efficiency of rural banks using parametric approach. The result found that rural bank efficiency was very high. The two year cost efficiency estimated using frontier 4.1 was 95% and median was 100%. The lowest of cost efficiency level was 32%. It meant cost inefficiency of the banks under investigated was around 10%. The cost efficiency level in 2006 was on average 95% and the median was 100%. It meant that 50% or more of the observation enjoyed 100% cost efficiency. The minimum was only 67%. It meant they operated at very efficient level, leaving only 5% inefficiency. In 2007, a dramatic change on efficiency level was going on. The average efficiency was dropped from 11% to 89.9% due to increase on interest rate and price level.

**Key words:** rural bank, efficiency, cost

Rural banks is a specific entity in the Indonesian Banking system. According to Banking Act #10, 1998, there are two type of banks. Commercial banks is banking institution that can provide full services of banking business. People Credit Bank (BPR) is banking institution that can only provide limited banking service such as loan, deposit and not allowed to provide service in the payment business. People Credit Bank is known as rural bank as it is mostly operated dan servicing customers in the rural area.

The development of rural banks in East Java can be presented below. Based on East Java Financial Statistics published by Bank Indonesia, Surabaya Office. During 2006, there are 337 rural banks with total office 440. Seven of these banks are Islamic rural banks. In 2007, there area 335 rural banks with total office 442. Nine of them are Islamic rural banks. Assets, loan, third party funds, LDR and profit among central bank office are presented in Table 1.

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**Table 1. Rural Bank Indicators of Central Bank Office**

Indicators		March 2008			
		Surabaya	Malang	Kediri	Jember
1	Assets	1,352,256	910,559	1,098,080	447,567
2	Loan	911,892	610,846	783,495	333,456
3	Thirds Party Funds	796,927	620,863	711,836	261,014
4	LDR	114.43%	98.39%	110.07%	127.75%
5	Profit	11,701	7,886	12,904	5,826

Sources: Regional Financial Statistics, Bank Indonesia Surabaya Office, 2008.

Basically all studies on efficiency and productivity at a micro level are based on the assumption laid by Farrell (1957). His contribution highlighted new insights on two issues: how to define efficiency and productivity, and how to calculate the efficiency measures. The fundamental assumption is based on microeconomics assumption on the existence of perfect input-output allocation but to allow for inefficient operations. In this context, inefficiency is defined as a gap of a firm from a frontier production function accepted as the benchmark for efficiency.

In other words, when a firm’s actual production point lies on the frontier it is perfectly efficient. If the production lies below the frontier then it is inefficient. Then the ratio of the actual to potential production defining the level of efficiency of the individual firm. Farrell divided efficiency into technical efficiency and allocative efficiency. The former reflects the ability of a firm to minimize input use as to produce a given amount of output. The latter reflects the ability of a firm to use inputs in optimal proportions, given their respective prices and the production technology. See Jahanshahloo et al. (2008) for technical note of Farrell (1957). Together, these two measures represent a total efficiency measure (Coelli, 1996).

However, implementation of this concept in the banking firms is complicated. According to Resti (1997), how to treat deposits is the main problem. On the one hand, it is argued that they are an input

to the production of loans (intermediation, or asset approach). Yet, other lines of reasoning (value added approach, or user cost approach) suggest that deposits are themselves an output, involving the creation of value added, and for which the customers bear an opportunity-cost.

Favero & Papi (1995) state that there is no simple solution to the problem of output and input specification as reasonable arguments can be made for all approaches. The measures of output used do not take quality into account and as it used balance sheet data, off-balance sheet activities are ignored.

Bulk of literature on banking can be classified into two group. The first is production and the latter is intermediation approach. Berger et al. (1987) defined production approach as bank produce various outputs such as loan and deposit by incurring cost of production. The input is measured by the cost of production; and excludes the interest expenses. Cost of production includes the costs of physical capital and labour. The output is: measured in terms of number of accounts serviced. Intermediation Approach considers banks as financial intermediation institution. It is assumed that banks collect funds such as deposits, interbanks and other borrowings and then transforming these into loans and other productive assets by incurring the cost of production. The inputs for this approach are deposits and the cost of production. Costs are defined to include both interest expense and total costs of production. The output are the volumes of earning assets.

Berger & Humphrey (1997) did a reviews of studies to 130 empirical works on bank efficiency over 21 countries to estimate the efficiency of financial institutions. From this study, financial institutions have an average efficiency of around 77% with a standard deviation of around 13 percentage point. There variety of efficiency level and standard deviation for within-country studies was higher than international average.

Westhuizen (2007) used Data Envelopment Analysis (DEA) to estimate the monthly technical and scale efficiency for the four largest banks over a period of 36 months in South Africa. The study found that Bank B appears to be the most technically efficient bank. However it does not mean this bank fully efficient as it is operating under increasing return to scale zone , implying that it was operating at a scale that is too small. Bank C has an average technical efficiency estimate 0.951 (input-orientated), followed by Bank A with an average technical efficiency estimate of 0.917. Bank D could at no time during the sample period, be regarded as being fully technically efficient. The technical efficiency estimates range from 0.751 to 0.900 with an average value of 0.806 (input-orientated) and from 0.758 to 0.895 with an average value of 0.809 (output-orientated). This bank operated mainly in the region of decreasing return to scale implying that it was operating at a scale that was too large. In conclusion, Westhuizen (2007) said that from an input-orientated perspective, all four banks could reduce their inputs without reducing their outputs.

Study on bank efficiency in Indonesia is relatively scare. Only in recent years some study emerged. Hadad, et al. (2003), using DEA, investigated the efficiency level of Indonesia banks applying asset approach. The input used in the studys are labor cost, capital cost and intrrest expenses. For the output, loan disbursed both for related and unrealated parties and securities are used. In conclusion, joint venture bank is the most

efficient bank. In term of merger, banks are mostly more efficient afterward.

Abidin (2007), using DEA investigated level of efficiency among commecial banks in Indonesia. The inputs for modelling are deposits, interest, other expenses. For outputs are loan, interest income and other income. In conclusion, state bank are more fifthcent than private and regional bank. Similar to Hauer (2004), the bigger bank are more efficient. However, for regional banks, there is tendency of diseconomies.

Almost all studies on bank efficiency focus on the commercial banks. Very limited literature found that use rural bank as research subject. One of the study is done by Desrochers & Lamberte (2003). The study found that agency costs significantly reduce the cost-efficiency of Cooperative Rural Bank (CRB). Corporate governance is important to increase efficiency but less important that agency cost. Manager's compensation significantly improve cost efficiency and it is according to the theory of asymmetric information or expense preference theory. When the compensation is related to expenses or profit, manager tend to reduce expense. The study also found that rural CRB are the most profit efficient as they can charge higher fees to borrowers. However, Big CRB were found to have the lowest average cost efficiency. It means the existece of diseconomies of scale.

A study on rural banks efficiency conducted by Office of Bank Indonesia Kediri (2008) also found very interested result. In term of cost efficiency, rural banks owned by regional government are more effcient (85,69) compared to privately owned (83.61) and cooperative (78.31). It means cooperative rural banks is least efficient . Statistically there is no difference in cost efficiency among banks operating in different regency. However there is variability on its mean value among region. Rural Banks operating in Nganjuk have the most cost efficiency level

97.12%. The most inefficient is rural banks operating in Magetan as its efficiency level is 52.36.

In term of asset size, rural banks under IDR 10 billion (USD 1 millions) is less efficient compare to rural banks that have asset exceed USD 1 million for all efficiency measure. Banks with asset less than USD 1 million have average cost efficiency 80.65, while rural banks with assets equal to or more than USD 1 million have average efficiency level 88.8%. It means 8% difference. In term of soundness rating, there is no correlation towards its efficiency. It is because most of banks are operating at sound level. Asset size is the most important determinant of bank efficiency and the only significant variable.

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**METHOD**

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In this study we apply intermediation approach to calculate efficiency level. The main considerations is rural banks business is mainly a deposit - lending only. Other activities such as payment service is not allowed. It is also very close to asset approach as the output is credit not deposit. We measure cost efficiency (technical efficiency) as how close a bank's cost is to what best practice banks cost would be for producing the same output bundle under the same conditions.

As the costs functions are not directly observable, efficiencies are measured relative to an efficient cost frontier. Most studies on cost efficiency use data envelopment analysis (DEA) or stochastic frontier analysis (SFA). We use stochastic

frontier analysis as it controls for measurement error and other random effects. See Berger & Humphrey (1997) for further reference. The measurement is conducted by comparing bank efficiency to its frontier. Referring to Berger & Mester (1997), cost function can be formulated as:

$$\ln C_{i,t} = C(y_{i,t}, w_{i,t}, b) + u_{i,t} + n_{i,t} \dots \dots \dots (1)$$

Where  $C_{i,t}$  is the total cost bank  $i$  faces at time  $t$  and  $C(y_{i,t}, w_{i,t}, b)$  is the cost frontier. In this model bank efficiency is measured relative to a best-practice frontier. Within the cost frontier,  $y_{i,t}$  represents the logarithm of output of bank  $i$  at time  $t$ ,  $w_{i,t}$  is a vector of the logarithm of input prices of bank  $i$  at time  $t$ , and  $b$  is a vector of all parameters to be estimated. The term  $u_{i,t}$  captures cost inefficiency and is independent identical distributed with a truncated normal distribution. Bank cost efficiency level is then calculated by comparing bank efficiency position to best frontier. Where Cost efficiency is formulated below:

$$CE_k = \frac{\hat{C}_{\min}}{\hat{C}_k} = \frac{\exp\left[\hat{f}(w_k, y_k, z_k)\right] \times \exp\left[\ln \hat{u}_{k_c}\right]}{\exp\left[\hat{f}(w_j, y_j, z_j)\right] \times \exp\left[\ln \hat{v}_{j_c} + \hat{u}_{j_c}\right]}$$

$$CE_j = \frac{1}{\hat{v}_{j_c}} \dots \dots \dots (2)$$

This study uses primary data collected to respondents previously determined randomly. Data and sources of data is presented in Table 2.

**Table 2. Data and Its Sources**

No.	Variable	Unit	Sources	Definition
<b>A</b>	<b>Input:</b>			
1	Labor cost	Rupiah	Mail Survey	Labor cost to total asset
2	Interest cost	Rupiah	Mail Survey	Interst expenses to total debt
3	Physical capital charges	Rupiah	Mail Survey	Othe expsepe to fixed asset
<b>B</b>	<b>Faktor Output :</b>			
1	Cost	Rupiah	Mail Survey	Total operating cost

Sample is allocated base on the portion of rural banks each Bank Indonesia (BI) Office in east java. Each sampple is selected randomly. Total sample for Surabaya is 26, Kediri : 9, Malang: 3 and Bank Indonesia Office Jember: 8 BPR. First we conducted a *mail-out survey* and then direct interview.

analysis although here are 50 banks that responds the questionnaire. However as the two are excluded due to late responses. From the asset side, mean is Rp. 18.87 billions with standard deviation is Rp. 53 billions. It is indicating that the respondents vary widely. The personel expenses also vary widely, from the biggest is Rp 24 billion and the sallest is Rp. 73 million. In term of profitability, the hihgest is Rp. 9 billion and the lowest is loses Rp. 1 billion. Bassicaly the data varies widely.

**RESULT**

Table 3 presents the descriptive variables of the data used. There 48 banks that used for

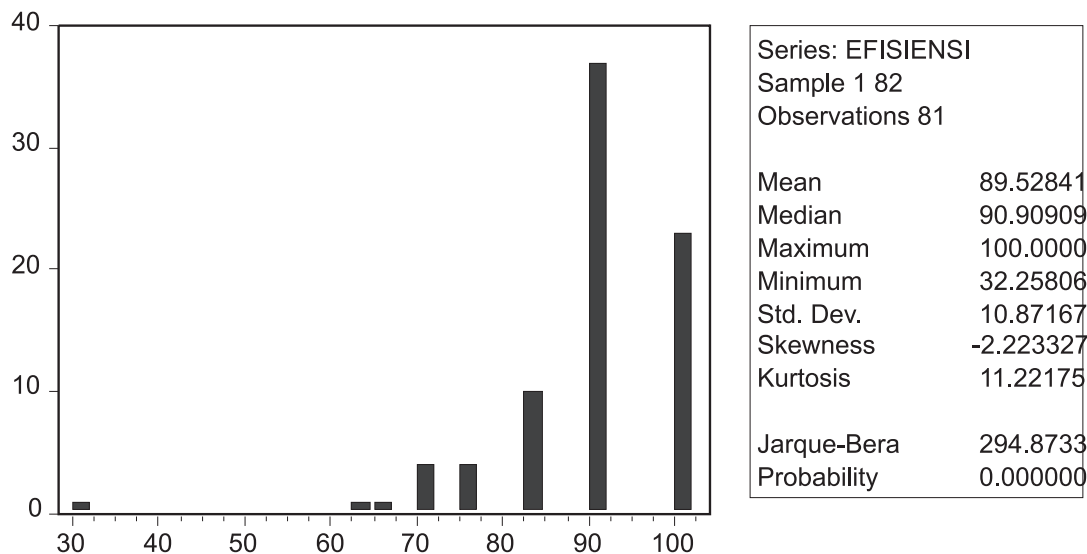
**Table 3. Descriptive Statistics of The Sample**

	Asset	Personel cost	Interest	Administration	Profit
Mean (000)	18.869.125	1.117.005	1.328.729	667.435	580.102
Median(000)	6.106.869	495.325	435.644	277.131	194.742
Maximum(000)	376.518.815	24.334.489	20.465.138	13.300.993	9.112.535
Minimum(000)	575.277	73.477	3.210	20.216	-1.070.604
Std. Dev. (000)	53.155.883	3.107.603	3.118.651	1.882.969	1.418.814
Normality	No	No	No	No	No
Respondent	48	48	48	48	48
Observations	96	96	96	96	96

Sources: Primary Data, 2009.

Figure 1 present the two year cost efficiency estimated using frontier 4.1. The mean is 95% and median is 100%. The lowest is cost efficiency is 32%. Standard deviation is 10%. From the above result we can see that efficiency level is very high

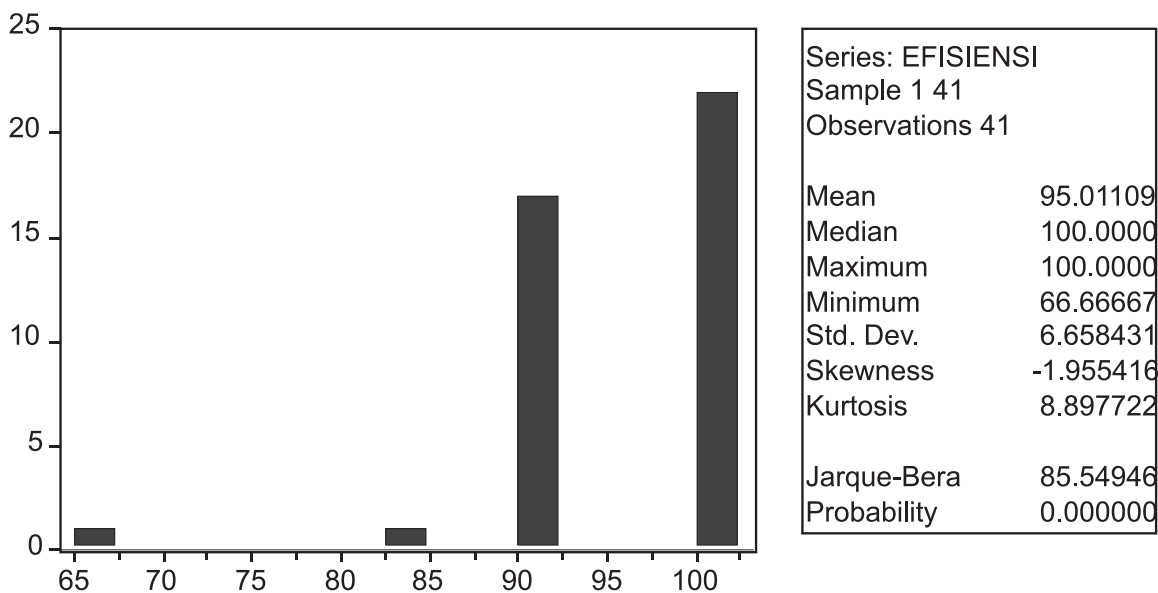
indicating the supremacy of cost efficiency among the rural bank investigate. More that 70% of obseration experiencing efficiency level at least 90%. From the result we can conclude that cost inefficiency of the banks under investigated is around 10%.



**Figure 1. Cost Efficiency Level**  
(Sources: Result from Frontier 4.1)

Comparing year 2006 and 2007, the result indicating a substantial decrease of bank cost efficiency level. Referring to the figure 2, cost efficiency level in 2006 is on average 95%. Median is 100% meaning that 50% or more of the observation enjoying 100% cost efficiency. The minimum is only 67%. The result indicating

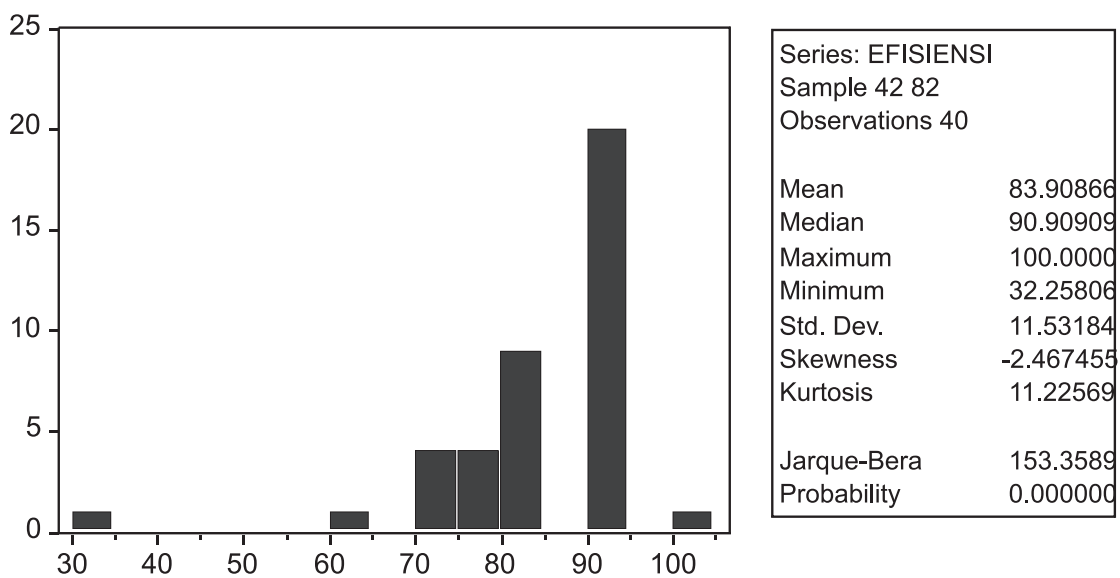
that in the year 2006, banks are operating at very efficient level, leaving only 5% inefficiency. The result exceed efficiency level of Philippine Rural Cooperative Bank that has 91% efficiency level. See Desrochersa and Lamberte (2003) for further reference.



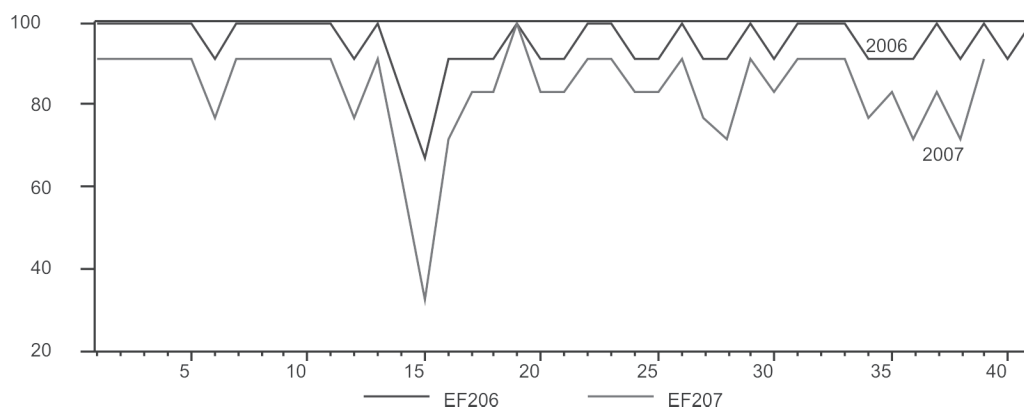
**Figure 2. The Cost Efficiency for 2006**  
(Sources: Result from Frontier 4.1)

In 2007, a dramatic change on efficiency level was going on. The average efficiency dropped by 11% to 89.9%. Mean is 91% compared too 100% a year before. Only one bank is still enjoying 100% efficiency level compared to more than half a year before. This dramatic change is a result of government decision to increase fuel price. The fuel price hike created higher inflation. Then to respnd the inflation, interest rate was increased. Beside increase on interest rate , banks also personell cost. These all factors reduce bank cost efficiency. See figure 3.

Figure 4 present the efficiency level of individual bank. We exclude one bank for estimation cost efficiency level as the bank experienced a substantial external operational risk. From the above figure, clearly evident that all bank experiencing a lower efficiency level except bank number 19. However the pattern does not change from 2006 to 2007 indicating level of bank efficiency is very bank specific. When macro economic variables changes, there is tendency most banks will experience same impact on their efficiency level.



**Figure 3. The Cost Efficiency Level of 2007**  
Sources: Result from Frontier 4.1



**Figure 4. Comparison of Individual Bank Efficiency Level**  
Sources: Result from Frontier 4.1

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**CONCLUSION**

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Rural banks efficiency is vital for its survival. Its ability to serve SMEs in the amidst of rising competition are very crucial too. Using the stochastic frontier approach, we come to conclusion that cost efficiency of the rural banks under investigation is quite high. Average efficiency level for the year 2006-2007 is 90% leaving inefficiency at 10%. The lowest efficiency level is 32%. For the year 2006, average efficiency level is 95% leaving inefficiency level only 5%. At the same time, the lowest efficiency is 66%.

Dramatic change in macro economic condition and higher competition in 2007 has increased rural bank's cost of operation. In average, efficiency level dropped to 83% and the lowest one is 32%. The development leaves only one bank enjoying 100% cost efficiency comparing to 23 banks previous year. In general bank cost efficiency level seems very bank specific. Further study should be directed to investigate efficiency determinant using specific data.

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