Application of DEA in Banking Industry

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BUSINESS PROBLEM:

The current banking industry faces numerous challenges, including increasing competition, low margins, large overdue, non-performing assets, a gap between promise and performance, customer wealth advice, customer retention, cross-border transactions, operational and security costs, security breaches, and so on.

We are attempting to solve a few of the problems directly and indirectly through this project.

APPROACH:

We can develop an LP spreadsheet model, using the DEA methodology, to determine whether each bank is efficient in terms of using its inputs to produce its outputs.

The idea is that each bank should be shown in the best possible light. That is, the inputs and outputs should be valued in such a way that a given bank looks as good as possible relative to the other banks. Specifically, to determine whether a bank is efficient, the model determines a price per unit of each output and a cost per unit of each input.

The DEA approach uses the following four ideas to determine whether a bank is efficient.

■ No bank can be more than 100% efficient. Therefore, the efficiency of each bank is constrained to be less than or equal to 1. To make this a linear constraint, it is expressed in the form of **Value of the bank's outputs <= Value of bank inputs**

■ When determining whether a bank is efficient, it is useful to scale input prices so that the value of the bank's inputs equals 1. Any other value would suffice but using 1 causes the efficiency of the bank to be equal to the value of the bank's outputs.

■ To put a given bank in its best light, the input costs and output prices should be chosen to maximize this bank's efficiency. If the bank's efficiency equals 1, the bank is efficient; if the hospital's efficiency is less than 1, the hospital is inefficient.

■ All input costs and output prices must be nonnegative.

RESULT:

To maximize the output value of the selected branch and determine whether the branch is efficient. Only 196 were found to be efficient in this model. So, if we used the model's output to close 125 branches, it could have a severe negative impact on the company because we might close branches that are running efficiently. It would be prudent to supplement our model with an analysis of how JPMorgan compares to other banks to determine what course of action should be taken based on the results of this model. If JPMorgan performs well, look for ways to improve to model the efficient branches. However, if JPMorgan performs poorly, examine how the less efficient branches are held back, and consider closing particularly inefficient branches.

BUSINESS IMPACT:

Finally, we discovered that the model we developed had several very useful applications for JPMorgan or any other large bank. It can accurately determine which bank branches are efficient, allowing the company to make important decisions about these branches. One important way in which this model can be useful is in determining whether some branches are so inefficient that they may need to be shut down. Furthermore, by allowing the company to determine which branches perform best, this model can significantly improve a bank's profits. This way, these branches can be further analyzed to understand how and why they perform better, which can then be applied in the future to improve efficiency in all branches and increase profits.