A Diagnostic Test for the Distribution-Free Efficiency Estimator: An Example Using U.S. Commercial Bank Data

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Abstract
The "distribution-free approach" (DFA) is one of several statistical techniques currently used by economists to estimate the cost inefficiency of financial institutions. This approach assumes that individual banks exhibit constant inefficiency across time, and that this inefficiency can be revealed by estimating a panel cost (or profit) function and averaging together the annual residuals for individual banks over time.

One advantage of DFA over other techniques is that it uses multiple years of data for each bank -- using more than one year of data helps insure that the expenses associated with an extraordinary event in a single year (say, an acquisition) do not get overemphasized when estimating bank efficiency. On the other hand, a disadvantage of DFA is that key conditions that influence efficiency can change over time (say, the management team) -- in this case, using more than one year of data might mix-up information from different management regimes, thus invalidating the efficiency measurement.

Clearly, the number of years included in the DFA data panel is a crucial decision. However, the existing DFA literature pays little attention to the consequences of including too many, or too few, time series observations. This paper derives a diagnostic test to help researchers determine how many years of data to use in DFA, and uses U.S. commercial bank data from 1984 through 1994 to demonstrate the test.