Efficiency Measurement in Branch Bank Service with Data Envelopment Analysis

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ABSTRACT

Banking is a competitive market since the industry deregulated. Consumers’ demand for convenience services led to an increase in the number of branches to serve a geographically dispersed customer base. Increasing the number of branches indiscriminately is not advisable since more branches increase the cost structure for the bank. Banking executives can evaluate the relative efficiency of branches, segments, and markets using analytical tools such as DEA. This research assists the branch manager with understanding the efficiency of branches and segments using two alternative intermediation models and a profit model. The results show that large markets are more efficient than small or rural markets, and large segments are generally more efficient than small market segments. The methodology employed in this study allows branch managers to proactively work to improve efficiency and control costs by adjusting inputs within the manager’s control, whether efficiency is measured based on profit models or the intermediation models.

Keywords: Banking, Branch Bank Service, Data Envelopment Analysis, Efficiency Measurement, Profit Models

INTRODUCTION

Deregulation in the U.S. banking industry began in the late 1970s. Deregulation, like any legislation, involved major changes in the banking sector. These changes afforded great opportunities to change banks toward a more marketing oriented industry. States began allowing branch banking and later allowed banking across state lines. This led to consolidation within the industry. Much of this consolidation came from merger activity. In 1970, there were 13,511 commercial bank main offices; by 2003, the number of main offices shrunk to 7,782 (FDIC, 2003). During this same period, however, the number of branch banks grew from 21,839 to 66,775. The impetuous for the substantial growth in branch banking was aided by deregulation.

In the 1990s the prevailing belief in the banking industry was that technology would replace much of the human interaction involved in banking transactions. Customers would demand the convenience of online banking.
from their home computers to allow them to transfer money between accounts. Individuals would want to have access to their funds 24 hours per day and would rely upon ATMs for this on-demand service. During the 1990s 190,000 ATMs were added to banking services (Dick, 2008). However, studies find customers prefer face to face interaction with bank personnel; as a result, commercial banks plan to continue to expand branch banking (Najjar & Schniederjans, 2006).

In 2009 major financial institution failures have caused reductions in all banking services and operations in Europe (Safley, 2009) and the US (Barba & McGeer, 2009). As this downturn subsides, banks will once again expand to provide service to a growing base of customers while minimizing capital investment limited by the downturn period. Branch banks are an ideal solution for this type of situation but can many small branches be run as efficiently as commercial banks can run their large main branches? With an increasing emphasis placed on improving shareholder value in the banking industry, commercial banks are striving to determine if there is an optimal number of branch banks in a system, if operational and technical efficiency can be improved, and if the model inputs and outputs impact the findings of branch bank efficiency.

Using data envelopment analysis (DEA) and a data sample from 1997-2004 for eighteen branch banks in a system, we test to measure the comparative efficiency of eighteen markets using the Sturm and Williams (2002) models for measuring efficiency. More recently Coughlan et al. (2010) used DEA to include the customer as resource in efficiency measurement. That study was limited to a large network of branch banks and focused on marketing relationships with organization objectives. We seek to determine the relationship of the size of the bank market and the bank’s services efficiency, both economic efficiency (i.e., based on number of employee; deposits and borrowed funds; equity capital) and profitability efficiency (i.e., based on the profit from marketing services). Our proposed models seek to provide measures branch managers can use to improve the overall efficiency of their markets.

The remainder of this paper is structured as follows. First we review the literature on bank efficiency; the next section details the DEA methodology; then we identify the data; we report the results and present the conclusion.

**REVIEW OF LITERATURE**

The term “banker’s hours” did not originate due to the tremendously long days bankers worked. Rather, during the regulated days of banking, this monopolistic industry set short operating hours available for customers to conduct banking business. That changed with the advent of deregulation and competition. During the 1980’s, banks were allowed to cross state lines thus breaking down the geographic constraint on competition. International banks began operating in the U.S. financial intermediaries and other financial institutions began competing with traditional commercial banks. Increased competition was a major impetus for change in the industry.

Another change agent was technological advancement. The ATM technology revolutionized the way U.S. citizens banked. These technologies lead to another competitive change in banking behavior. “Banker’s hours” became a thing of the past as the internet allowed customers to perform banking transactions from the comfort of their homes, 24 hours a day, 7 days a week.

For banks, these innovations and changes within the industry mandated improvement in efficiencies. For those that did not improve, bank failure became a reality. Over 800 banks failed during the 1980’s (Bauer, Berger, Ferrier, & Humphrey, 1997). Certainly, economic conditions caused some of the bank failures; however, research shows efficiently operating banks can mediate the impact of a downturn in the economy (Barr, Killgo, Siems, & Zimmel, 1999). Banks have tried a number of tactics to improve bank efficiency. One tactic that is common in deregulating industries is to attempt...
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