Statistical Method of Goodness on Quantitative Models of Efficiency and Effectiveness

by

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I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

Motivated by different qualitative constructs of efficiency and effectiveness [Cameron, 1978] and the variety of distinct quantitative models of measuring efficiency and effectiveness derived from them, we propose a statistical method of goodness on these quantitative models in the financial setting. Our statistical method of goodness is based on the semi-strong Efficient Market Hypothesis (EMH) [Ball and Kothari, 1994].

The semi-strong form of the EMH claims that stock prices reflect all publicly available information and that stock prices instantly change to reflect new public information. Financial markets can identify firms that are effective, "doing the right things" and efficient, "doing things right." A firm that is "doing the right things right" is both efficient and effective and the market should value such firms higher than other firms. In our statistical model, we use market information and its derivatives such as stock price, market capital and TobinQ [Perfect and Wiles, 1994] as dependent variables. Efficiency and effectiveness measures are considered as independent variables. Our statistical method finds the best fit model from a family of functions and reports model parameters that are statistically significant. We apply our statistical method of goodness on two case studies of US and Indian bank data. In these case studies, we use existing models of efficiency and effectiveness [Kumar and Gulati, 2009] and explore other [Chu and Lim, 1998] quantitative models of profit maximization and cost minimization efficiency and effectiveness.

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I would like to thank my research advisor Dr. Stanko Dimitrov for guiding and supporting me over the last two years. I am greatly indebted to him for encouraging me and setting an example of excellence as a researcher, mentor, instructor and a role model. I also like to thank my research advisor Dr. Amer Obeidi for his help and support over the last two years as well.

Dedication

This is dedicated to my parents, my wife and my grandmother. I like to thank them for the love, support and constant encouragement over the last two years.

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Chapter 1

Introduction

Ever since the financial crisis of 2008, organizations with seemingly unlimited resources have come to the hard realization that resources are finite. Due to the global economic downturn, many nations must now protect their borders with greater effectiveness using limited resources. Similarly, the financial institutions of the Canadian economy such as the big five banks, must improve their offerings, i.e., become more effective while maintaining and improving their efficiency. The financial services industry has fragmented since the global financial crisis, with banks staking out territories in niche services, regions, and client industries. As banks examine their current state, they are required to make harder choices about allocating limited resources [Stanley, 2015]. Unfortunately, the effectiveness construct is poorly understood among researchers [Steers, 1975]. Researchers agree that it is desirable for a military or a bank to be effective and "do the right things," however, there is no consensus or agreement on the effectiveness criterion, i.e., what are these "right things"? It has rarely been possible to compare studies of effectiveness [Cameron, 1978], since few have used common criteria for indicating effectiveness. As quantitative models are derived from these qualitative models, there are also many different ways of measuring efficiency and effectiveness quantitatively. In this dissertation the following research questions are studied and explained:

1. Propose statistical procedure of goodness on quantitative models of efficiency and effectiveness.
    - Most banking firms are publicly traded firms and disclose their operating parameters in their quarterly financial statements. Further, as these firms are publicly traded, their market value is determined at any point in time. Using

the semi-strong EMH, the financial markets identify firms that are effective, "doing the right things," and efficient, "doing things right." Therefore, with these general definitions of effective and efficient firms, a firm that is "doing the right things right," is both efficient and effective, and the market should value such firms higher than other firms. The proposed statistical procedure that we propose in this dissertation finds the best model from a family of functions and reports statistically significant model parameters. If these statistically significant model parameters have a positive correlation between the selected market valuation and the determined effectiveness and efficiency measures, then the best fit model is consistent with the semi-strong EMH theory. To control for firm size and equities, derivatives of market valuation such as the stock price, market capital and TobinQ are used.

2. Explore all four two-stage Data Envelopment Analysis (DEA) models of efficiency and effectiveness

    - All permutations of profit maximization and cost minimization efficiency and effectiveness are considered:
        (a) Profit maximizing efficiency and profit maximizing effectiveness.
        (b) Profit maximizing efficiency and cost minimizing effectiveness.
        (c) Cost minimizing efficiency and profit maximizing effectiveness.
        (d) Cost minimizing efficiency and cost minimization effectiveness.
    - Using US and Indian banks as case studies, the derived statistical procedure is applied on the above models. In the case studies, we use DEA to measure the bank operational efficiency based on inputs and outputs of the bank's production activities. Financial measures evaluate corporate financial outcomes such as return on assets, return on equity, TobinQ and market capital which are calculated from information in the bank's financial statements. DEA operational efficiency and TobinQ are linked as they assess the firm's activity, but they may not necessarily be consistent with one another. Our statistical procedure finds the best model that fits the sample data and infers whether the correlation among efficiency and effectiveness is consistent with the financial measures of EMH theory.

In the remainder of this dissertation, we first discuss related work in chapter 2. In chapter 3, we present our statistical procedure of goodness based on the semi-strong EMH. In section 4, we apply our statistical procedure using two case studies of Indian and US banks. Finally, we conclude and discuss future work in chapter 5 and 6.

Chapter 2

Related Work

[Konar and Cohen, 2001] discuss whether the market value of firms has any correlation with environmental performance. After controlling for variables that explain firm-level financial performance, they conclude that bad environmental performance is negatively correlated with the intangible asset value of firms. TobinQ (which proxies for a company's valuation) and return on assets (which represents the operating performance and profitability) are used as financial measures. The authors base their rational on two prior established functional forms. However, in this thesis, there is no such prior functional form that can be leveraged. Our statistical approach is used precisely to infer the best functional form from a family of functions.

[Guenster et al., 2011] study the relationship between eco-efficiency and financial performance of firms from 1997 to 2004. They find that eco-efficiency relates positively to operating performance and market value. The researchers get their eco-efficiency measures from 'Innovest Strategic Value Advisors' and use this as independent variables when regressing against financial measures (return on assets and TobinQ). Our proposed statistical approach is independent of how the efficiency and effectiveness measures are generated. Later in our case study see section 4, we use two-stage DEA to calculate the efficiency and effectiveness scores of Indian and U.S banks.

[Steers, 1975] compares and contrasts a qualitatively multivariate effectiveness model from a univariate model by arguing that the former focuses on relationships between important variables that jointly influence organizational success. He claims that these integrative or multivariate models are more comprehensive and account for a greater proportion of the variance in effectiveness. When measuring efficiency and effectiveness quantitatively, the paper mentions that efficiency measures derived using multivariate constructs have advantages over financial ratios (univariate). For example, the selection of the weights of financial ratios may be considered as subjective. [Berger and Humphrey, 1992, Thanassoulis et al., 1996] use the frontier approach accommodating multiple inputs and multiple outputs in their multivariate models. Existing multivariate models that quantitatively measures effectiveness are also mentioned in [Kumar and Gulati, 2009]. [Kumar and Gulati, 2009] creates a multivariate model of effectiveness using interest income of bank, noninterest income of bank, bank advances, and bank investments. We augment the work [Kumar and Gulati, 2009] by exploring all four permutation models of profit maximization efficiency/effectiveness and cost minimization efficiency/effectiveness [Chu and Lim, 1998] using the two-stage DEA model.

[Chu and Lim, 1998] built quantitative models within the Singapore domestic banking sectors and investigates the influence of cost efficiencies and profit efficiencies on the share prices of the banks. In their paper, they claim that shareholders 'should' be more interested in profit efficiency rather than cost efficiency as profits serve as the source of current and future dividend income. Cost efficiency and profit efficiency differ on the selection of either total income or net profit after taxation as the second output variable in the DEA model. We use the same definition in profit maximizing efficiency and effectiveness and cost minimizing efficiency and effectiveness in this dissertation. However, in our research, we also include lag variables of efficiency and effectiveness as dependent variables and also use TobinQ as another financial measure.

[Beccalli et al., 2006] studied banks in five European countries. They calculated the efficiency scores quantitatively using DEA (parametric) and Stochastic Frontier Analysis (SFA, nonparametric), for the year 1999 and 2000. Their results indicate that the percentage change in stock price reflects the percentage change in cost efficiency. Like [Chu and Lim, 1998], this approach is normative and defines effectiveness using a multivariate construct of profit maximization and net interest income. However, the authors also use SFA when measuring quantitatively efficiency and effectiveness. The authors introduce dummy variables in their regression to account for further explanatory variables (a proxy for size, riskiness, and profitability) when examining the relationship between bank efficiency and stock prices behavior across countries. In our case study, data is generated via two-stage DEA only. We do not use SFA in our case study. However, our statistical approach is independent of how the data is generated. Using fixed effects in our dynamic panel regression, we account for any bank specific explanatory variables. [Chu and Lim, 1998] have presented results on cost efficiencies and profit efficiencies of banks in Singapore. Using DEA, they show that cost efficiencies of Singapore banks were higher. Their results are in contrary to [Beccalli et al., 2006] where the percentage change in share prices reflect the percentage change in profit.

[Adenso-Daz and Gascn,] studied the Spanish banking sector and established a link between stock performance and four different measures of efficiency: production costs and branch network distribution (estimated by using DEA); systematic risk and specific risk. Their main findings suggest that the most influential variables in determining stock performance are bank-specific risks. [Muzafar Shah Habibullah, 2005] performed a study on the efficient market hypothesis on Malaysian banks trading on the Kuala Lumpur Stock Exchange (KLSE). Using DEA, they segregated the operating efficiency score into a) pure technical efficiency b) scale efficiency and c) congestion efficiency. They found that the percentage change in the prices of the bank shares in KLSE reflected the percentage change in the overall technical efficiency and concluded that the Malaysias bank stock return price is inefficient. [Fiordelisi and Molyneux, 2010] in their paper have presented a linear model where bank shareholder value creation (SHVC) is a function of various Bank-specific, industry-specific and macroeconomic variables. Similar to [Fiordelisi and Molyneux, 2010] we propose our statistical procedure of goodness in validating efficiency and effectiveness measures that also includes their lags. The statistical procedure that is proposed in this dissertation is based on the EMH and looks for large correlation between the selected market valuation and the determined effectiveness and efficiency measures. Our statistical procedure is general and is not limited to any functional form. It searches for the best fit among a family of functions. In future, we will explore other SHVC besides stock price and market capital such as economic value added, or market to book ratio or return on average equity.

[Fu et al., 2014] studied the and investigated the impact of cost and profit efficiency changes on shareholder value for a large sample of commercial banks in 14 Asia-Pacific economies during the years 2003-2010. Their results suggest that both cost and profit efficiency enhancements are positively related to the bank shareholder value. [Kirkwood and Nahm, 2006] investigated the effects of changes in profit efficiency on stock returns in Australian banks in the period 1995 to 2002. They inferred that changes in profit efficiency were significantly and positively reflected in bank stock returns. Our results generated in case study show similar positive correlations of profit maximization efficiency with share prices on U.S bank data.

There seems to be a well-established and growing literature as mentioned in this section that focuses on different factors influencing the performance of banks. However, few studies compare statistically whether the different forms of quantitative efficiency and effectiveness are consistent as per the EMH theory. To the best of our knowledge, there is no or very little research in proposing statistical procedure of goodness in a financial setting on quantitative models of efficiency and effectiveness.

Chapter 3

General Statistical Method

We now propose the statistical procedure of goodness on quantitative models of efficiency and effectiveness based on the semi-strong EMH. We use the word general in this section for our statistical method because as seen in figure 3.1, our statistical procedure is not tied to any specific information criterion, discrepancy, starting model of step-wise regression or the ending model of step-wise regression.

3.1 Motivation:

Most banking firms are publicly traded firms and disclose their operating parameters, found in their quarterly financial statements. Further, as these firms are publicly traded, their market value is determined at any point in time. Using the semi-strong EMH, one may argue that the financial markets are already able to identify firms that are effective, "doing the right things", and efficient, "doing things right." Therefore, with these general definitions of effective and efficient firms, a firm that is "doing the right things right", is both efficient and effective, and the market should value such firms higher than other firms. To control for firm size and equities, we also use derivatives of their market valuation such as the TobinQ. The statistical procedure that we propose looks for large correlation between the selected market valuation and the determined effectiveness and efficiency measures.

3.2 Model Selection Framework Goal

Suppose a collection of data x has been generated according to some unknown model $g(x)$. We would like to approximate $g(x)$ using a family of functions, $\mathcal{F} = \{\mathcal{F}(k_1), \mathcal{F}(k_2), ..., \mathcal{F}(k_l)\}$, where $\mathcal{F}(k_i)$ contains the best fit function f i.e. $\mathcal{F}(k_i) = \{f(x|\theta_{k_i})\}$ which has k_i independent variables and $\theta_{k_i} \in \mathbb{R}^{k_i}$. Once all of $\mathcal{F}(k_i)$ are determined, then we select the best amongst all $\mathcal{F}$. The comparison is done using a variety of information criteria that we define in section 3.4.1, which trades off the goodness of fit of a model, i.e., how closely it approximate $g(x)$, vs. the number of parameters, k_i, required to achieve this approximation. We determine the best functional fit from the family $\mathcal{F}$ as $\mathcal{F}(\hat{k_i}) = f(x|\hat{\theta}_{k_i})$. $\hat{\theta}_{k_i}$ is determined using either maximum likelihood or least squares.

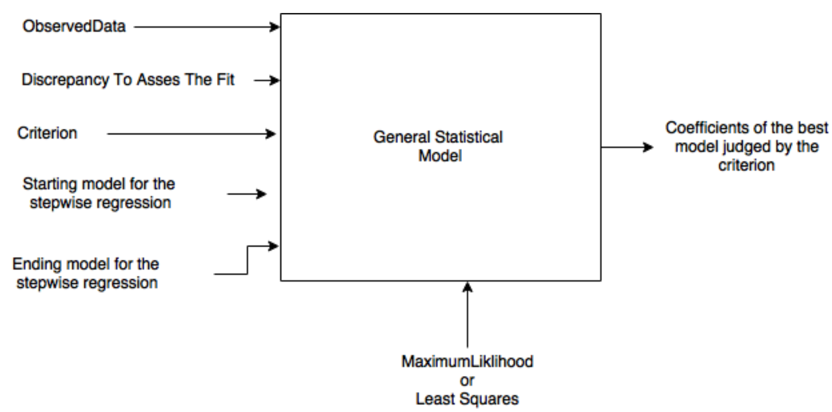

Figure 3.1: Inputs and Output of the proposed general statistical method

3.3 Inputs

3.3.1 Data

Our input data consists of a list of ordered pairs of x and y. The one invariant that we assume holds in the provided data is that $x \in \mathbb{R}^{k_i}$ and $y \in \mathbb{R}$. x is a vector of efficiency and effectiveness measures. y is a scalar consisting of *TobinQ or StockPrice or the Market Capital*. We highlight the fact that the proposed method is agnostic to how the data is generated. As seen previously [Fiordelisi and Molyneux, 2010], input data, x, can be generated via Data Envelopment Analysis (DEA), the Stochastic Frontier Analysis (SFA), or some other method.

When we discuss the case studies in section 4, we note that we separate the input data, x, into two different inputs, *efficiency* and *effectiveness*, and we consider three different outputs for y, *TobinQ, StockPrice, and Market Capital*. All this means is that we run our statistical method three times, once for each output and we combine the “different” inputs, $x_{\text{efficiency}}$ and $x_{\text{effectiveness}}$ into a single input x.

3.3.2 Other inputs:

Our statistical method also takes in as input the information criteria i.e. a way to determine and compare the best fit functions for each k_i, starting and ending model for the stepwise regression. Lastly, we let the user choose whether the parameter estimation must happen via maximum likelihood or least squares.

3.4 Procedure

Find $f_i \in \mathcal{F}$ such that $\Delta(g, f_i)$ is minimum and f_i does not over-fit the data $[(x, y)]$. Let $\hat{f}_i$ be the estimated f_i and $\hat{\theta}_i$ be the parameters of such $\hat{f}_i$.

3.4.1 Technical Considerations:

In this section we describe the information criterion is used to determine the discrepancy between the true and the estimated values. One of the key steps in the proposed method is to determine the best $\mathcal{F}(k_i)$ out of $\mathcal{F}$. We use an appropriate discrepancy [Zucchini, 2000] for selection. [Shmueli, 2010] defines ‘lack of fit’ as *discrepancy* between the true and estimated values and is usually denoted by $\Delta(g, f_{\theta_{k_i}})$, where g and $f_{\theta_{k_i}} = f(x|\theta_{k_i})$ are defined above. There are some popular general-purpose discrepancies that can be used for $\Delta(g, f_{\theta_{k_i}})$ such as the Kullback-Leibler discrepancy [Burnham and Anderson, 2001]:

$$\Delta(g, f_{\theta_{k_i}}) = \Delta_{K-L}(g, f_{\theta_{k_i}}) = -E_{data}[log\ f_{\theta_{k_i}}(x)] = -\int log\ f_{\theta_{k_i}}(x)g(x)\ dx$$

The Pearson chi-squared discrepancy [Dahiya and Gurland, 1972]:

$$\Delta(g, f_{\theta_{k_i}}) = \Delta_P(g, f_{\theta_{k_i}}) = \sum_x \frac{(g(x) - f_{\theta_{k_i}}(x))^2}{f_{\theta_{k_i}}(x)}, f_{\theta_{k_i}}(x) \neq 0$$

The Gauss discrepancy [Tomizawa, 1994]:

$$\Delta(g, f_{\theta_{k_i}}) = \Delta_F(g, f_{\theta_{k_i}}) = \sum_x (g(x) - f_{\theta_{k_i}}(x))^2$$

We cannot compute $\Delta(g, f_{\theta_{k_i}})$ for our observed sample because g is unknown. However, using a *model selection criterion* which is defined as an estimator of the expected discrepancy, i.e., $E_{data}[\Delta(g, f_{\theta_{k_i}})]$, and now rank the $f(x|\hat{\theta}_{k_i})$ in $\mathcal{F}$ using the model selection criterion. One popular criterion is the Akaikie Information Criterion (AIC) [Yamaoka et al., 1978] derived from the Kullback-Leibler discrepancy:

$$AIC = E_{data}[\Delta(g, \hat{f}_{\hat{\theta}_{k_i}})] = -2\ log\ L(\hat{\theta}_{k_i}|Observed\ Data) + 2\hat{k}_i \tag{3.1}$$

In equation (3.1) L is the likelihood function. $\hat{\theta}_{k_i}$ is the maximum likelihood estimate of θ_{k_i}. $\hat{k}_i$ is the number of estimated parameters or the dimension of θ_{k_i}.

AIC value for each k_i is calculated in $\mathcal{F}$, and the best model is the one with minimum AIC value. The value of AIC depends only on the observed data.

3.4.2 Algorithm

We use the step wise linear regression algorithm [Derksen and Keselman, 1992] to find the best fit model. Stepwise regression is a systematic method for adding and removing terms from a multilinear model based on their statistical significance in a regression. The algorithm can be executed either using forward selection or backward elimination techniques. The algorithm begins with an initial model and then compares the explanatory power of incrementally larger (when performed using forward selection) or smaller (when performed using backward elimination) models. At each step, the p-value of the criterion is computed to test models with and without a potential term. If a term is not currently in the model, the null hypothesis is that the term would have a zero coefficient if added to the model. If there is sufficient evidence to reject the null hypothesis, the term is added to the model. Conversely, if a term is currently in the model, the null hypothesis is that the term has a zero coefficient. If there is insufficient evidence to reject the null hypothesis, the term is removed from the model [Draper and Smith, 1981, MATLAB,]. The proposed statistical method uses the forward selection technique of step wise linear regression.

3.5 Outputs and relation with semi-strong EMH

The form of best fitting model $\hat{f}(x|\hat{\theta}_{k_i})$ and the parameters $\hat{\theta}_{k_i}$ that best fit the model.

The coefficients of the parameters are checked if they are statistically significant at $1\%, 5\%, 10\%$ and whether the inferred correlations are consistent as per the semi-strong EMH theory.

3.6 Dynamic Panel Regression Techniques

Our statistical method also factors in any fixed effects that may be prevalent in the dataset. It is assumed for this discussion that the function $f(data|\beta_k)$ where $k = 2$ that is being fitted is a linear function of the following form:

$$y_{i,t} = \beta_{1,i} + \beta_{2,i}x_{2,i,t} + \beta_{3,i}x_{3,i,t} + e_{i,t} \tag{3.2}$$

An i subscript refers to a single decision-making unit (DMU). The 't' subscript refers to the time period. This implies that $\beta_{1,i}$ and $\beta_{2,i}$ and $\beta_{3,i}$ can be potentially different for each DMU_i. However, the above model is not suitable for many instances because the observed data for any single DMU across some time period is small (i.e. we have few observation per DMU). As an example for the case studies that follows up on the next section, we observed only five values at different time period for Indian banks. The resulting estimates would not be precise when estimating three coefficients using only five observations. A popular fixed effect technique is to keep the β_2 and β_3 constant for all DMU and vary the intercept $\beta_{1,i}$ for each DMU. Hence with this simplification, our model is now as follows:

$$y_{i,t} = \beta_{1,i} + \beta_2 x_{2,i,t} + \beta_3 x_{3,i,t} + e_{i,t} \tag{3.3}$$

With the above-simplified model, all behavioral differences between DMU referred to as firm heterogeneity are assumed to be captured by the intercept. $x_{2,i,t}$ refers to the efficiency score of firm i at time period t. $x_{3,i,t}$ refers to the effectiveness score of firm i at time period t.

Averaging the data across time, i.e., summing both sides and dividing by T:

$$\frac{1}{T}\sum_t y_{i,t} = \frac{1}{T}\sum_t \beta_{1,i} + \frac{1}{T}\sum_t \beta_2 x_{2,i,t} + \frac{1}{T}\sum_t \beta_3 x_{3,i,t} + \frac{1}{T}\sum_t e_{i,t} \tag{3.4}$$

Simplifying the time invariant $\beta's$ result in:

$$\bar{y_i} = \frac{1}{T}\sum_{t=1}^{T} y_{i,t} = \beta_{1,i} + \beta_2 \frac{1}{T}\sum_{t=1}^{T} x_{2,i,t} + \beta_3 \frac{1}{T}\sum_{t=1}^{T} x_{3,i,t} + \frac{1}{T}\sum_{t=1}^{T} e_{i,t} \tag{3.5}$$

$$\bar{y_i} = \beta_{1,i} + \beta_2 \bar{x_{2,i}} + \beta_3 \bar{x_{3,i}} + \bar{e_i} \tag{3.6}$$

Note that $\bar{y_i}$ refers to the mean of the values $y_{i,t}$ over time. Subtracting the two equations (3.3) and (3.6) we get the following:

$$y_{i,t} - \bar{y_i} = \beta_2 \left(-\bar{x_{2,i}} + x_{2,i,t}\right) + \beta_3 \left(-\bar{x_{3,i}} + x_{3,i,t}\right) + \left(e_{i,t} - \bar{e_i}\right) \tag{3.7}$$

In equation (3.7), individual bank specific intercept parameters $\beta_{1,i}$ have dropped. Least square regression technique is now executed on to infer the model parameters β_2 and β_3. Unlike other researchers that may be interested in the effect of bank specific parameters such as (bank risk, bank location, etc.) and may use different dummy variables to model these, we use fixed effects in aggregating all bank specific parameters in a single bank specific intercept term.

Chapter 4

Case Study

We now present results of running our proposed statistical procedure on two case studies of Indian and American banks. We generate the efficiency and effectiveness measures using two-stage DEA [Charnes et al., 1978] model. We use the same definition of efficiency and effectiveness as defined in [Kumar and Gulati, 2009]. The appendix in 1 presents the scores for the two different interpretations of efficiency (cost minimization and profit maximization) and effectiveness (cost minimization and profit maximization) of Indian and American banks. We like to again remind the reader, that our proposed statistical procedure is independent of how the efficiency and effectiveness scores are generated. We happen to use the two-stage DEA model in our case study.

4.1 Two stage DEA model:

DEA [Charnes et al., 1978] is a parametric approach to evaluating the performance of a set of peer called Decision Making Unit (DMU). The performance of DMU is measured across multiple input and output indicators. For each DMU, DEA infers an efficiency and effectiveness score defined by the ratio of a weighted sum of its output to a weighted sum of its input subject to the constraint that the ratio does not exceed 1 for any DMU. To calculate the efficiency and effectiveness scores of Indian banks, we use the two-stage DEA evaluation model [Ho and Zhu, 2004, Kumar and Gulati, 2009]. The first stage of the DEA model is used to calculate the efficiency scores and the second stage of the DEA model is used to calculate the effectiveness scores. The figure in 4.1 shows the two-stage DEA evaluation model for calculating the efficiency and effectiveness measures with the respective input and output variables. Two (profit maximization and cost minimization) sets of efficiency scores and effectiveness scores are calculated. In our study, we use the same definition as [Kumar and Gulati, 2009] in measuring efficiency and effectiveness scores.

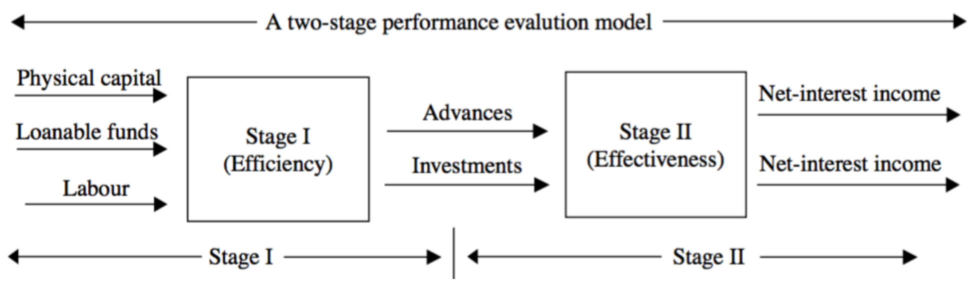

Figure 4.1: Two Stage DEA model from [Kumar and Gulati, 2009]

1. In *stage I* (for efficiency), the selected inputs used for computing the efficiency scores are:
   (a) physical capital
   (b) labour
   (c) loanable funds
2. In *stage I* (for efficiency), the selected output variables are:
   (a) advances
   (b) investments
   (c) profit after taxation (we include this when calculating profit maximization efficiency)
3. In *stage II* (for effectiveness), the selected input variables are:
   (a) advances
   (b) investments
4. In *stage II* (for effectiveness), the selected output variables are:
   (a) net interest income
   (b) net non interest income

(c) profit after taxation (we include this when calculating profit maximization effectiveness)

In the *stage II* of effectiveness scores calculation, we use the exact effectiveness criterion as outlined by [Kumar and Gulati, 2009]. The effectiveness criterion is a measure of the extent to which policy objectives of an organization are achieved. In the years after 1992, i.e. the post-reform period in India, strong competition in the Indian banking forced backs to reduce all the non-essential costs to the minimum and earn maximum incomes from traditional and non-traditional activities with fewer inputs. [Mohan and Ray, 2004] rightly remarked that in the post-reforms period, Indian banks are putting all their efforts in the business of maximizing incomes from all possible sources. As per [Kumar and Gulati, 2009] we can infer that in the post-liberalization period, the main policy objective of Indian banks is to maximize the interest and non-interest incomes to the maximum. [Kumar and Gulati, 2009] have selected: net interest income and non-interest income as the output variables in the *stage II* of the performance evaluation model.

The cost minimization and profit maximization differs in the selection of net profit after taxation as the extra output variable [Chu and Lim, 1998]. Based on the above set of variables, the DEA model on each stage is as follows:

$$\big(Efficiency\ or\ Effectiveness\big) = Max \quad \phi_0 \tag{4.1}$$

$$s.t \quad \phi_0 Y_0 - \sum_{j=1}^{n} \lambda_j Y_j + S^+ = 0 \tag{4.2}$$

$$\sum_{j=1}^{n} \lambda_j X_j - X_0 + S^- = 0 \tag{4.3}$$

$$\lambda_j, S^+, S^- \geq 0 \tag{4.4}$$

In the above set of equations from (4.1) to (4.4), subscript 0 refers to the current DMU under evaluation. The variables X_j and Y_j refer to the vectors of input and output for bank j. The variable j runs from 1 to 28 for Indian Banks and from 1 to 43 for American banks. The number of Indian banks in this study is 28. The number of American banks is 43. The weights λ_j refer to the weights when inferring the efficiency or the effectiveness of the current DMU. The excess slack and the shortfall slack are represented by the vectors S^- and S^+.

Rewriting the above set of equations now in matrix form and replacing the equality of slack variables with inequality for implementation purposes in Matlab:

$$\big(Efficiency\ or\ Effectiveness\big) = Max \quad \phi_0 \tag{4.5}$$

$$s.t \quad \phi_0 Y_0 \leq \lambda^T Y \tag{4.6}$$

$$x_0 \geq \lambda^T X \tag{4.7}$$

$$\lambda \geq 0 \tag{4.8}$$

λ is a $n\ X\ 1$ vector and ϕ is a scalar. The basic idea is that on the range of the matrix i.e. $\lambda^T X$, we calculate the maximal proportional output vector such that the current DMU_0 does not cross the production frontier.

4.2 Using DEA on Indian and U.S. Banks

The appendix contains a total of 8 tables i.e. four each for Indian banks and American banks. These tables list the efficiency and effectiveness scores calculated using DEA model across all the orientations as defined in the 'Introduction' section of this dissertation, point 2.

4.3 Results from four orientations of efficiency and effectiveness

For all the four orientation we now present results of regressing independent variables (efficiency, effectiveness and their lags) against dependent financial measures of (stock price, market capital and TobinQ).

- Shareholder value at time t regressed against two-year lagged $t, t-1, t-2$ efficiency and effectiveness. We use up to two lags in our model similar to the study in [Jung, 1986] because we notice no significant difference between two and three lags model. However, [Berger and DeYoung, 1997] have shown in their study that three and four lags model do not significantly differ from each other. [Liew, 2004] have presented guidelines regarding the use of lag length selection criteria. They have concluded that the AIC is superior to most other information criterion in determining the true lag length. In this case study, we use the AIC information criterion in our statistical method when determining the lag length. We notice no significant difference between two and three lag models.

- We use the forward selection technique of step wise linear regression. The forward selection technique involves starting with no variables in the model and tests the addition of each variable using some chosen information criterion and adds the variable if it improves the model. The starting model of the forward selection technique is set to model with no variables. The ending model is set to linear.

- Parameter estimation is carried out via ordinary least square.

- Kullback Leibler is used as divergence.

- AIC criterion is used as the model selection criterion for model selection. AIC is a measure of the relative quality of statistical models for a given observed set of data. Given a family of models for the data, AIC estimates the quality of each model, relative to each of the other models. Given a set of candidate models for the data, the preferred model is the one with the minimum AIC value. Hence AIC rewards goodness of fit (as assessed by the likelihood function), but it also includes a penalty that is an increasing function of the number of estimated parameters. The penalty discourages overfitting of data [Stone, 1979]. In the case study, we do not use R^2 because by definition R^2 is the fraction of the total squared error that is explained by the model. One can easily reduce R^2 by adding more independent variables and overfit the data. This model that solely depends on R^2 will perhaps not explain or predict well for data that was not observed.

We state our null hypothesis H_0 as follows: There is no effect of efficiency or effectiveness on shareholder value.

Detail break down of these results are presented in the appendix in 1. From the results we notice that the tuple of efficiency and effectiveness is positive and statistically significant only for the following two:

- Orientation 2 (Cost minimization efficiency and profit maximization effectiveness) on American banks with TobinQ as the financial measure that efficiency and effectiveness are positive and statistically significant. See table 14 for the model parameters.

- Orientation 4 (Profit maximization efficiency and profit maximization effectiveness) on American banks with TobinQ as the financial measure that efficiency and effectiveness are positive and statistically significant. We see the same behavior with lag variables present. See table 21 and table 22 for the model parameters.

4.3.1 Summary of findings across three different shareholder values

We summarize the finding of our results across the three different shareholders and invite the reader to read the detailed breakdown that follows in 1.

1. Stock Price:
   - Indian Banks:
     (a) Profit maximization effectiveness at t and effectiveness at $t-1$ are positively related to the stock price and statistically significant at $\alpha = 5\%$ when regressed with cost minimization efficiency and its lags.
   - American Banks:
     (a) Cost minimization efficiency and profit maximization efficiency are statistically significant positively related to the stock price. This behavior is seen with profit maximization effectiveness or costs minimization effectiveness as the other regressor. Cost minimization effectiveness is negatively related to the stock price and is statistically significant $\alpha = 1\%$. This behavior is seen with profit maximization efficiency or cost minimization efficiency as the other regressor.
2. Market Capital:
   - Indian Banks:
     (a) Cost minimization effectiveness at time t is positively related to market capital and cost minimization effectiveness at time $t-1$ is negatively related to market capital. This behavior is seen with cost minimization efficiency and its lags or profit maximization efficiency and its lags as the other regressor. Profit maximization effectiveness at time t is positively related with market capital and profit maximization effectiveness at time $t-1$ is negatively related to market capital. This behavior is seen with cost minimization efficiency and its lag or profit maximization efficiency and its lag as the other regressor. Both these results are statistically significant at $\alpha = 5\%$.

- American Banks:

  (a) No Lag Variables: Cost minimization effectiveness is negatively related to market capital when either of the two efficiencies is used as the other regressor $\alpha = 1\%$. Cost minimization efficiency is positively related to the market capital with profit maximization effectiveness as the other regressor $\alpha = 2\%$. Profit maximization efficiency and profit maximization effectiveness are positively related with market capital $\alpha = 1\%$ when regressed together.

3. TobinQ:

- Indian Banks:

  (a) No statistical relationship of any kind inferred.

- American Banks:

  (a) With cost minimization efficiency and cost minimization effectiveness regressed together, cost minimization efficiency is positively related with TobinQ and is statistically significant $\alpha = 1\%$. Cost minimization effectiveness is negatively related and is significant $\alpha = 1\%$.
  With cost minimization efficiency and profit maximization effectiveness regressed together, cost minimization efficiency is positively related $\alpha = 1\%$, and profit maximization effectiveness is positively related $\alpha = 1\%$.
  With profit maximization efficiency and cost minimization effectiveness regressed together, efficiency is positively related, and effectiveness is negatively related with $\alpha = 1\%$.
  With profit max efficiency and profit max effectiveness regressed together, efficiency is positively related, and effectiveness is positively related with $\alpha = 1\%$.

Chapter 5

Future Work

Why is there no consensus on the efficiency and the effectiveness construct? Is it because the effectiveness construct is invalid? Or perhaps the relevant observable variables have not yet been discovered? We like to hope it is the latter and not the former. I plan to discover (if any?) the set of relevant variables that define the effectiveness and the efficiency construct and use the proposed statistical procedure in this manuscript for validation. I will traverse the search space of variables and select various combinations of inputs x and output y in the two-stage DEA model and create many more models of *efficiency* and *effectiveness*. We then plan to run these new proposed model of efficiency and effectiveness against our statistical procedure and find if any positive statistical correlations for some country also holds for some other country? If we do find some consensus then perhaps these x and y are the dimensions that define the efficiency and effectiveness constructs.

Chapter 6

Conclusion

According to EMH, capital markets are informationally efficient, and stock prices fully and correctly reflect the available information to the values of stocks. In this dissertation, we present a statistical procedure of goodness that finds the best fit model whether the correlation of financial measures is consistent with the efficiency and effectiveness scores? Applying this statistical procedure to two case studies of Indian and U.S. banks may demonstrate its practicality as a tool for analyzing financial measures and the relationship among operational performance. My dissertation fills a void in the literature and provides a statistical framework conditioned on the semi-strong EMH that future researchers can use to validate their quantitative efficiency and effectiveness measures. We examine 28 Indian banks from the period 2009 to 2013 and 43 American banks from the quarterly period of 2007 to 2015. Our general statistical procedure searches a family of functions and finds the best model in some dimension. On the best fit model, we present all coefficients that are statistically significant. We find results that are consistent with previous literature that cost-minimizing efficiency is positively related to all three SHVC for American banks. For Indian banks, we find the profit maximizing effectiveness is positively related to the stock price and the market capital. However, we see no statistically significant relation of efficiency and any shareholder value with Indian banks. This raises interesting side question whether the current models of calculating efficiency on Indian banks is efficient and a good metric to measure efficiency?

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APPENDICES

1 Detailed Case Study Results

In this section we present the results of our case studies in greater detail. We first present the efficiency and effectiveness scores for the two different interpretations of efficiency (cost minimization and profit maximization) and effectiveness (cost minimization and profit maximization) of the two banking systems we consider, India and United States of America. This makes a total of eight tables. Using this data, we present the output of our statistical measure in subsequent sections.

	2009	2010	2011	2012	2013
Bank1	1.0000	0.9868	1.0000	0.8477	0.2313
Bank2	0.9777	1.0000	1.0000	1.0000	0.9902
Bank3	0.9816	1.0000	1.0000	0.4478	0.4641
Bank4	1.0000	1.0000	1.0000	0.2579	0.3463
Bank5	0.9828	0.9448	0.9545	0.7021	0.7369
Bank6	0.9539	0.9377	1.0000	1.0000	1.0000
Bank7	0.9572	0.9587	0.9494	0.7186	0.8422
Bank8	0.9539	0.9357	0.9201	0.6185	0.6334
Bank9	0.9866	0.8900	0.9612	0.6695	0.4455
Bank10	0.9463	0.9737	0.9570	0.6228	0.6762
Bank11	0.9487	0.8680	0.9397	0.4831	0.5060
Bank12	1.0000	0.9382	1.0000	0.8161	0.5385
Bank13	1.0000	0.9501	1.0000	0.5057	0.5565
Bank14	0.9912	1.0000	1.0000	0.4958	0.6358
Bank15	0.9408	0.9246	0.9689	0.5849	0.5988
Bank16	0.9665	0.9314	0.9307	0.6862	0.8131
Bank17	0.9505	0.9712	0.9522	0.2199	0.1995
Bank18	0.9059	0.9806	0.9732	1.0000	1.0000
Bank19	0.8984	0.9630	1.0000	0.6281	0.7077
Bank20	0.9174	0.9291	1.0000	0.7833	0.9134
Bank21	0.9147	1.0000	0.9610	0.6182	0.6525
Bank22	0.9482	1.0000	0.9847	0.6209	0.6621
Bank23	0.9964	1.0000	1.0000	0.7720	0.7555
Bank24	0.8815	1.0000	1.0000	0.9890	1.0000
Bank25	1.0000	1.0000	1.0000	1.0000	1.0000
Bank26	1.0000	1.0000	1.0000	0.6967	0.6548
Bank27	0.9270	1.0000	1.0000	0.4827	0.2990
Bank28	1.0000	1.0000	1.0000	1.0000	1.0000

Table 1: Indian Banks: Cost Minimization Efficiency Scores

	2009	2010	2011	2012	2013
Bank1	1.0000	0.9868	1.0000	0.8477	0.4333
Bank2	0.9777	1.0000	1.0000	1.0000	1.0000
Bank3	0.9816	1.0000	1.0000	0.6784	0.6784
Bank4	1.0000	1.0000	1.0000	0.3389	0.3833
Bank5	0.9828	0.9448	0.9545	0.7357	0.7369
Bank6	0.9539	0.9479	1.0000	1.0000	1.0000
Bank7	0.9572	0.9609	0.9767	0.8008	0.8422
Bank8	0.9854	0.9357	0.9201	0.6185	0.6334
Bank9	0.9866	0.8900	0.9612	0.6695	0.4455
Bank10	0.9463	0.9763	0.9620	0.6228	0.6762
Bank11	0.9487	0.8680	0.9397	0.4831	0.5060
Bank12	1.0000	0.9382	1.0000	0.8194	0.5385
Bank13	1.0000	0.9501	1.0000	0.5057	0.5565
Bank14	1.0000	1.0000	1.0000	0.5730	0.6358
Bank15	0.9443	0.9246	0.9689	0.5849	0.5988
Bank16	0.9665	0.9314	0.9307	0.6862	0.8131
Bank17	0.9677	0.9835	0.9522	0.2199	0.1995
Bank18	0.9059	0.9806	0.9968	1.0000	1.0000
Bank19	0.8984	0.9630	1.0000	0.6281	0.7077
Bank20	0.9174	0.9302	1.0000	0.7833	0.9134
Bank21	0.9147	1.0000	0.9610	0.6182	0.6525
Bank22	0.9482	1.0000	1.0000	0.7488	0.7280
Bank23	1.0000	1.0000	1.0000	0.8656	0.7719
Bank24	0.8815	1.0000	1.0000	1.0000	1.0000
Bank25	1.0000	1.0000	1.0000	1.0000	1.0000
Bank26	1.0000	1.0000	1.0000	0.8405	0.6668
Bank27	0.9270	1.0000	1.0000	1.0000	0.2990
Bank28	1.0000	1.0000	1.0000	1.0000	1.0000

Table 2: Indian Banks: Profit Maximization Efficiency Scores

	2009	2010	2011	2012	2013
Bank1	0.7800	0.9015	0.9647	0.7992	0.9382
Bank2	1.0000	0.8831	1.0000	0.6310	0.9143
Bank3	0.9046	0.9396	0.9918	0.6142	0.8815
Bank4	0.9435	0.8745	0.9336	0.4566	0.8415
Bank5	0.8347	0.8933	0.9275	0.4535	0.8727
Bank6	0.9362	0.8957	0.9892	0.5140	0.8688
Bank7	0.8914	0.7896	0.8657	0.7179	0.7128
Bank8	0.9789	0.8226	0.8323	0.6680	0.8558
Bank9	0.8059	0.8618	0.9349	0.4361	0.8343
Bank10	0.9119	0.8510	0.8902	0.5038	0.8981
Bank11	0.8156	0.8423	0.9430	0.4179	0.8313
Bank12	0.8644	0.8518	0.9048	0.4456	0.8578
Bank13	0.7667	0.8160	0.9448	0.4467	0.8207
Bank14	0.9484	0.9542	0.9807	0.5687	0.8670
Bank15	0.9493	0.9562	0.8625	0.5315	0.8534
Bank16	0.9544	0.9337	1.0000	0.4383	0.8888
Bank17	0.9291	0.8960	0.9195	0.3989	0.9284
Bank18	0.9133	0.8806	0.9199	0.5979	0.8876
Bank19	0.8596	0.8471	0.9211	0.4684	0.9213
Bank20	0.8776	0.8329	0.9141	0.3921	0.8578
Bank21	0.9996	1.0000	0.9334	0.4434	0.8607
Bank22	1.0000	1.0000	1.0000	1.0000	1.0000
Bank23	0.9482	0.6626	1.0000	0.5370	0.8983
Bank24	0.9425	0.8935	0.7107	0.4162	0.9537
Bank25	1.0000	0.9592	1.0000	0.6011	0.9437
Bank26	0.9811	1.0000	0.9943	0.5829	0.9272
Bank27	0.9400	0.8926	0.9493	1.0000	1.0000
Bank28	1.0000	0.9159	0.9541	0.7773	1.0000

Table 3: Indian Banks: Cost Minimization Effectiveness Scores

	2009	2010	2011	2012	2013
Bank1	0.7814	0.9015	0.9647	0.7992	1.0000
Bank2	1.0000	0.9035	1.0000	0.6310	1.0000
Bank3	0.9046	0.9735	0.9920	0.7869	1.0000
Bank4	0.9732	0.9246	0.9354	0.6090	0.9055
Bank5	0.8347	0.8938	0.9275	0.4559	0.8727
Bank6	0.9463	1.0000	1.0000	0.5149	0.8995
Bank7	0.9028	0.9597	1.0000	0.7268	0.7553
Bank8	1.0000	0.8247	0.8323	0.6680	0.8650
Bank9	0.8059	0.8618	0.9349	0.4361	0.8451
Bank10	0.9129	0.9064	0.9030	0.5038	0.9009
Bank11	0.8156	0.8423	0.9430	0.4179	0.8313
Bank12	0.8644	0.8624	0.9048	0.4456	0.8619
Bank13	0.7667	0.8160	0.9448	0.4467	0.8207
Bank14	1.0000	1.0000	0.9997	0.5724	0.9051
Bank15	0.9590	0.9562	0.8625	0.5315	0.8534
Bank16	0.9544	0.9371	1.0000	0.4383	0.8918
Bank17	0.9713	0.9689	0.9195	0.3989	0.9284
Bank18	0.9133	0.8808	0.9340	0.5980	0.9223
Bank19	0.8596	0.8471	0.9211	0.4684	0.9532
Bank20	0.8869	0.8587	0.9141	0.3921	0.8578
Bank21	0.9996	1.0000	0.9334	0.4434	0.8607
Bank22	1.0000	1.0000	1.0000	1.0000	1.0000
Bank23	0.9509	0.6626	1.0000	0.5537	0.9400
Bank24	0.9425	0.9315	0.7107	0.6160	0.9973
Bank25	1.0000	1.0000	1.0000	0.6011	0.9476
Bank26	1.0000	1.0000	1.0000	0.5882	0.9674
Bank27	0.9400	0.9542	0.9493	1.0000	1.0000
Bank28	1.0000	0.9200	0.9566	0.8014	1.0000

Table 4: Indian Banks: Profit Maximization Effectiveness Scores

	2007Q1	2007Q2	2007Q3	2007Q4	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009Q3	2009Q4	2010Q1	2010Q2	2010Q3	2010Q4	2011Q1	2011Q2	2011Q3	2011Q4	2012Q1	2012Q2	2012Q3	2012Q4	2013Q1	2013Q2	2013Q3	2013Q4	2014Q1	2014Q2	2014Q3	2014Q4	2015Q1
Bank1	0.8092	0.7754	0.7875	0.7418	0.7260	0.6883	0.6963	0.8103	0.8125	0.8423	0.8481	0.8153	0.8753	0.8496	0.8808	0.8450	0.8868	0.9163	0.9258	0.9271	0.9350	0.9350	0.8995	0.9390	0.9210	0.9392	0.9507	0.9575	0.9801	0.9449	0.9486	0.9620	0.9258
Bank2	0.8764	0.8910	0.8900	0.8641	0.8705	0.8489	0.8545	0.8362	0.8529	0.8710	0.8574	0.8835	0.9099	0.9192	0.9299	0.9277	0.9300	0.9230	0.9366	0.9333	0.9362	0.9362	0.9407	0.9497	0.9636	0.9526	0.9598	0.9618	0.9723	0.9546	0.9576	0.9374	0.9469
Bank3	0.8133	0.8140	0.8097	0.8008	0.7847	0.7814	0.7817	0.7783	0.7651	0.8161	0.8417	0.8439	0.8584	0.8268	0.8285	0.8374	0.8333	0.8550	0.8663	0.8775	0.8890	0.8890	0.8709	0.8811	0.8888	0.8882	0.8755	0.8636	0.8826	0.8914	0.8954	0.8970	0.8973
Bank4	0.9247	0.9279	0.9099	0.8887	0.8929	0.8951	0.8830	0.8986	0.9139	0.9245	0.9138	0.9194	0.9224	0.9102	0.9266	0.9164	0.9607	0.9582	0.9608	0.9619	0.9771	0.9771	0.9563	0.9458	0.9739	0.9336	0.9276	0.9564	0.9438	0.9125	0.9211	0.9185	0.9311
Bank5	1.0000	0.9821	0.9869	0.9882	0.9858	0.9815	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9929	0.9899	0.9925	0.9919	0.9864	0.9853	0.9820	0.9859	0.9830	0.9830	0.9759	0.9656	0.9690	0.9683	0.9679	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank6	0.7358	0.7314	0.7059	0.7266	0.7361	0.7559	0.8157	0.8548	0.8401	0.9912	0.9494	0.9641	0.9688	0.9347	0.8681	0.9064	0.9473	0.9774	1.0000	1.0000	1.0000	1.0000	1.0000	0.9681	0.9748	0.9283	0.9583	0.9555	0.9014	1.0000	0.9675	0.9985	0.9258
Bank7	0.8996	0.8914	0.8560	0.8450	0.8532	0.8632	0.9045	0.8925	0.9032	0.8947	0.8869	0.9153	0.9168	0.8850	0.8743	0.9803	0.9783	0.9843	0.9648	0.8605	0.9764	0.9764	0.8781	0.7999	0.9321	0.8854	0.9854	0.9904	0.9712	0.9109	0.8570	0.8603	0.8878
Bank8	0.8714	0.8488	0.8790	0.8726	0.8420	0.8461	0.8360	0.8605	0.8688	0.8722	0.8684	0.8773	0.8872	0.8600	0.8556	0.8556	0.8482	0.8463	0.8458	0.8436	0.8456	0.8456	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.8683
Bank9	0.8405	0.8103	0.8020	0.7858	0.7943	0.7761	0.7949	0.7746	0.8250	0.8092	0.7792	0.8230	0.8831	0.9065	0.9009	0.9075	0.8926	0.9030	0.8943	0.9117	0.9206	0.9206	0.9074	0.9082	0.9318	0.9417	0.9357	0.9492	0.9445	0.9217	0.9207	0.9194	0.9278
Bank10	0.8760	0.9115	0.8569	0.7787	0.8129	0.8081	0.7985	0.9058	0.9007	0.9266	0.8348	0.8906	0.7051	0.7083	0.6914	0.6847	0.6779	0.7087	0.6958	0.7106	0.7933	0.7933	0.9470	0.9510	0.9478	0.9588	0.9611	0.9322	0.9716	0.9575	0.9577	0.9075	0.9277
Bank11	0.9650	0.9570	0.9309	0.9276	0.9128	0.8774	0.8792	0.9673	0.9447	0.9513	0.8761	0.9662	0.9604	0.9430	0.9535	0.9479	0.9571	0.9618	0.9830	0.9705	0.9842	0.9842	0.9278	0.9179	0.9301	0.8964	0.9164	0.9311	0.9211	0.9140	0.9124	0.8960	0.9494
Bank12	0.9788	0.9835	0.9659	0.8797	0.9452	0.9436	0.9544	0.9721	0.9758	0.9634	0.9281	0.9921	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9983	1.0000	1.0000	1.0000	0.9977	0.9830	0.9987	0.9756	0.9667	0.9970	0.9895	0.9949	0.9726	0.9938	0.9990
Bank13	0.9297	0.9103	0.8852	0.8791	0.9230	0.8770	0.8808	0.8354	0.8741	0.8912	0.8789	0.8897	0.9192	0.9151	0.8899	0.8766	0.9134	0.9215	0.9178	0.9140	0.9469	0.9469	0.9250	0.9359	0.9546	0.9415	0.9423	0.9500	0.9625	0.9402	0.9133	0.9157	0.9449
Bank14	0.8469	0.8459	0.8881	0.8908	0.9042	0.8759	0.8868	0.8781	0.9047	0.9234	0.9121	0.9048	0.9367	0.9070	0.9011	0.9267	0.9340	0.9308	0.9501	0.9553	0.9553	0.9553	0.9017	0.9199	0.9297	0.8777	0.8509	0.8323	0.8417	0.8464	0.8475	0.8486	0.8469
Bank15	0.8982	0.9136	0.9053	0.8599	0.9081	0.9154	0.9350	0.9130	0.9441	0.9353	0.9795	0.8209	0.9019	0.8986	0.9096	0.9368	0.9388	0.9409	0.9477	0.8819	0.9710	0.9710	0.9346	0.9046	0.9529	0.9588	0.9105	0.9646	0.9953	0.9463	0.9735	0.9365	0.9724
Bank16	0.8506	0.8704	0.8403	0.8408	0.8419	0.8580	0.8462	0.8711	0.9337	0.8484	0.8671	0.8721	0.8806	0.8273	0.8584	0.8499	0.8569	0.8534	0.8626	0.8803	0.8944	0.8944	0.9574	0.9524	0.9591	0.9635	0.9622	0.9747	0.9826	0.9895	0.9749	0.9823	0.9742
Bank17	0.7982	0.8237	0.8143	0.8093	0.8110	0.8340	0.8383	0.7871	0.8611	0.8779	0.8989	0.8983	0.9098	0.9021	0.8975	0.9199	0.9170	0.9180	0.9141	0.9014	0.9149	0.9149	0.9055	0.9250	0.9196	0.9171	0.9251	0.9220	0.9254	0.9226	0.9197	0.9313	0.9464
Bank18	0.9096	0.8889	0.9191	0.9172	0.8906	0.8708	0.8658	0.7742	0.7632	0.7272	0.6989	0.7774	0.7960	0.8391	0.9118	0.9529	0.9485	0.9489	0.9720	0.9660	0.9668	0.9668	0.9679	0.9721	0.9645	0.9627	0.9641	0.9603	0.9682	0.9708	0.9685	0.9445	0.9390
Bank19	0.9291	0.9153	0.8977	0.8756	0.8946	0.9193	0.9367	0.9271	0.9458	0.9436	0.9450	0.9601	0.9731	0.9546	0.9426	0.9406	0.9405	0.9577	0.9783	0.9860	1.0000	1.0000	0.9819	0.9624	0.9947	0.9932	0.9749	0.9950	0.9978	0.9932	0.9884	0.9734	0.9804
Bank20	0.8794	0.8280	0.8301	0.8102	0.8556	0.8711	0.8395	0.8951	0.9218	0.9180	0.9336	0.9236	0.9514	0.9521	0.9554	0.9553	0.9554	0.9539	0.9564	0.9508	0.9693	0.9693	0.9362	0.9548	0.9591	0.9682	0.9700	0.9377	0.9460	0.9222	0.9306	0.9312	0.9418
Bank21	0.9788	0.9869	0.9325	0.8609	0.8486	0.8650	0.8110	0.8868	0.7974	0.8067	0.8215	0.8526	0.8231	0.8810	0.8577	0.8548	0.8709	0.8676	0.8810	0.8603	0.8367	0.8367	0.7932	0.8339	0.8573	0.8073	0.9325	0.9317	0.9131	0.8311	0.8705	0.8771	0.9411
Bank22	1.0000	0.9848	0.9719	0.9695	0.9412	0.9087	0.8916	0.9067	0.9719	0.9795	0.9816	0.9874	0.9808	0.9747	0.9834	0.9720	0.9875	0.9920	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9991	0.9734	0.9491	0.9639	0.9766	0.9783	0.9515	0.9520
Bank23	0.8218	0.8164	0.8158	0.7851	0.7792	0.7419	0.7792	0.7676	0.7974	0.8429	0.8841	0.8875	0.9437	0.9163	0.9200	0.8788	0.8485	0.8215	0.8507	0.8671	0.8887	0.8887	0.8925	0.8717	0.9019	0.8745	0.9204	0.8599	0.8475	0.8177	0.8505	0.8486	0.8787
Bank24	0.6657	0.6538	0.5896	0.5466	0.5197	0.5372	0.5468	0.6355	0.6481	0.7080	0.7344	0.7535	0.7563	0.7458	0.7716	0.7935	0.8000	0.8036	0.7835	0.8254	0.8232	0.8232	0.7835	0.7935	0.7930	0.8197	0.8173	0.8659	0.8694	0.8524	0.8607	0.8651	0.8738
Bank25	0.7188	0.6930	0.6667	0.6885	0.6525	0.7083	0.7012	0.7200	0.7390	0.7912	0.9222	0.9364	0.9575	0.9467	0.9436	0.9523	0.9505	0.9379	0.9156	0.9415	0.9496	0.9496	0.9194	0.9170	0.9420	0.9364	0.9283	0.9398	0.9308	0.9190	0.9174	0.9269	0.9237
Bank26	0.7676	0.7670	0.7422	0.7366	0.7927	0.7724	0.7692	0.7585	0.8248	0.8269	0.8132	0.8370	0.8056	0.8099	0.7870	0.8034	0.8312	0.8204	0.8381	0.8407	0.8698	0.8698	0.8603	0.8810	0.9086	0.8975	0.9058	0.9137	0.9323	0.9126	0.9407	0.9215	0.9445
Bank27	0.9287	0.9302	0.9176	0.9009	0.9504	0.9501	0.9681	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9941	1.0000	1.0000	0.9988	1.0000	0.9688	0.9975	0.9998	0.9998	0.9758	0.9469	0.9600	0.9731	0.9706	0.9868	1.0000	0.9985	0.9826	0.9724	0.9550
Bank28	0.9241	0.8519	0.8410	0.8528	0.8490	0.8862	0.8996	0.9250	0.9298	0.9701	0.9519	0.9654	0.9737	0.9645	0.9586	0.9646	0.9632	0.9624	0.9581	0.9612	0.9547	0.9547	0.9464	0.9337	0.9483	0.9364	0.9283	0.9091	0.9170	0.9093	0.9399	0.9308	0.9435
Bank29	0.9439	0.9652	0.9691	0.9375	0.9357	0.9221	0.9407	0.9395	0.9353	0.9611	0.9289	0.9490	0.9763	0.9577	0.9549	0.9549	0.9577	0.9650	0.9630	0.9593	0.9743	0.9743	0.9713	0.9727	0.9742	0.9620	0.9678	0.9655	0.9593	0.9634	0.9774	0.9662	0.9719
Bank30	0.9911	0.9764	0.9555	0.9824	0.9185	0.9112	0.9698	0.9964	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9986	1.0000	1.0000	0.9709	0.9610	0.9609	0.9667	0.9667	0.9563	0.9505	0.9721	0.9916	0.9806	0.9655	0.9941	1.0000	1.0000	1.0000	1.0000
Bank31	0.9826	0.9425	0.9270	0.9268	0.9764	1.0000	1.0000	1.0000	0.9206	0.9604	0.9641	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank32	0.7875	0.7871	0.7812	0.7544	0.7748	0.7731	0.7849	0.8020	0.8716	0.8847	0.8865	0.8952	0.8804	0.8426	0.8507	0.8493	0.8549	0.8592	0.8704	0.8782	0.8923	0.8923	0.9046	0.9004	0.8901	0.9025	0.9166	0.9125	0.9223	0.9164	0.9348	0.9392	0.9241
Bank33	1.0000	0.9952	0.9899	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9912	1.0000	1.0000	1.0000	0.9757	0.9860	0.9931	0.9851	0.9813	0.9651	0.9783	0.9806	0.9806	0.9757	0.9945	0.9935	0.9958	0.9440	0.9947	0.9931	0.9686	0.9353	0.9795	0.9609
Bank34	0.7998	0.7705	0.7633	0.7492	0.7363	0.7400	0.7494	0.7844	0.7684	0.7882	0.7767	0.8766	0.8848	0.8691	0.8865	0.8865	0.8909	0.8798	0.8943	0.8861	0.8801	0.8801	0.8542	0.8643	0.8707	0.8634	0.8675	0.8594	0.8597	0.8573	0.8477	0.8465	0.8385
Bank35	0.8994	1.0000	1.0000	1.0000	1.0000	1.0000	0.9036	0.9974	1.0000	1.0000	0.8891	0.8422	0.9476	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9987	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank36	0.9196	0.8957	0.9134	0.8263	0.8418	0.8827	0.8472	0.8067	0.7560	0.8526	0.8932	0.8625	0.9595	0.9702	1.0000	0.9850	1.0000	0.9404	0.8341	0.8038	0.8419	0.8419	0.8029	0.8237	0.9175	0.8687	0.9732	0.9241	0.9652	0.9461	0.9506	0.9382	0.9376
Bank37	0.8741	0.8765	0.8740	0.8674	0.8664	0.8945	0.8971	0.8903	0.9086	0.9152	0.8997	0.9049	0.9193	0.9117	0.9043	0.9200	0.9220	0.9207	0.9089	0.9185	0.9281	0.9281	0.9146	0.9066	0.9221	0.9199	0.9069	0.9048	0.9068	0.8897	0.8834	0.8646	0.8807
Bank38	1.0000	0.8777	1.0000	1.0000	0.9845	0.9781	1.0000	0.9825	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9830	1.0000	0.9615	1.0000	1.0000	0.8982	0.9237	0.9453	0.9687	0.9637	0.9696	1.0000	1.0000	0.9726	0.9510	0.9802
Bank39	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5452	0.6502	1.0000	0.7370	1.0000	1.0001	0.8421	0.8149	0.8055	0.7806	0.9284	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank40	0.8946	0.8990	0.8805	0.8779	0.8277	0.8472	0.8402	0.7953	0.8467	0.8577	0.8718	0.8876	0.9260	0.9121	0.9180	0.9098	0.9159	0.9220	0.9334	0.9472	0.9604	0.9604	0.9449	0.9465	0.9494	0.9369	0.9503	0.9526	0.9624	0.9684	0.9675	0.9594	0.9634
Bank41	0.8995	0.8707	0.8560	0.8370	0.8493	0.9211	0.9224	0.9118	0.8022	0.8306	0.8177	0.8109	0.8769	0.8333	0.8390	0.8863	0.8738	0.9001	0.9029	0.9772	0.9620	0.9620	0.9666	0.9728	0.9609	0.9390	0.9577	0.9608	0.9848	0.9828	0.9562	0.9600	0.9321
Bank42	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9368	0.9679	0.9960
Bank43	0.9340	0.9188	0.9249	0.8696	0.8984	0.8819	0.8576	0.8444	0.8706	0.9216	0.9795	0.9897	0.9965	0.9823	0.9828	0.9817	0.9429	0.9382	0.9439	0.9499	0.9472	0.9472	0.9392	0.9427	0.9329	0.9260	0.9364	0.9002	0.9426	0.9478	0.9333	0.9394	0.9306

Table 5: American Banks: Cost minimizing Efficiency Scores

	2007Q1	2007Q2	2007Q3	2007Q4	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009Q3	2009Q4	2010Q1	2010Q2	2010Q3	2010Q4
Bank1	0.8224	0.8472	0.8498	0.8628	0.8567	0.8076	0.8112	0.8814	0.8985	0.9902	0.9693	1.0000	1.0000	0.9727	1.0000	0.9847
Bank2	1.0000	1.0000	1.0000	0.9652	1.0000	0.9402	1.0000	0.9902	0.9186	0.9233	0.9022	0.9187	0.9331	0.9473	0.9499	0.9639
Bank3	0.8114	0.8152	0.8124	0.8051	0.7893	0.7804	0.7878	0.7783	0.7725	0.8256	0.8433	0.8439	0.8584	0.8348	0.8359	0.8442
Bank4	0.9247	0.9323	0.9183	0.8887	0.8929	0.8951	0.8830	0.8986	0.9139	0.9318	0.9138	0.9194	0.9224	0.9175	0.9314	0.9184
Bank5	1.0000	0.9936	0.9988	1.0000	0.9981	0.9815	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9929	0.9917	0.9942	0.9937
Bank6	0.7357	0.7360	0.7121	0.7528	0.7703	0.7612	0.8331	0.8548	0.8401	0.9912	0.9494	0.9641	0.9688	0.9347	0.8681	0.9064
Bank7	0.9691	0.9435	0.9140	0.9095	0.9029	0.9047	0.9123	0.8925	0.9144	0.9287	0.9144	0.9251	0.9336	0.9007	0.9163	0.9803
Bank8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank9	0.8405	0.8174	0.8173	0.8002	0.8087	0.7803	0.7963	0.7746	0.8333	0.8296	0.7948	0.8235	0.8845	0.9068	0.9032	0.9104
Bank10	0.8760	0.9157	0.8628	0.7922	0.8211	0.8081	0.8140	0.9058	0.9042	0.9383	0.8576	0.8906	0.7108	0.7122	0.6962	0.6927
Bank11	0.9721	0.9926	0.9681	0.9735	0.9436	0.9012	0.9356	0.9673	0.9465	0.9619	0.8861	0.9662	0.9604	0.9485	0.9540	0.9492
Bank12	0.9791	0.9949	0.9893	0.9121	0.9641	0.9610	0.9732	0.9721	1.0000	1.0000	0.9592	0.9922	1.0000	1.0000	1.0000	1.0000
Bank13	0.9297	0.9125	0.8900	0.8791	0.9230	0.8770	0.8808	0.8354	0.8802	0.9057	0.9047	0.8992	0.9192	0.9281	0.8986	0.8867
Bank14	0.8469	0.8498	0.8907	0.9015	0.9102	0.8759	0.8874	0.8781	0.9089	0.9348	0.9275	0.9048	0.9367	0.9104	0.9048	0.9307
Bank15	0.9529	0.9849	0.9759	0.9311	0.9730	0.9736	0.9963	0.9160	0.9730	0.9700	0.9795	0.8209	0.9019	0.9009	0.9109	0.9386
Bank16	0.8506	0.8718	0.8446	0.8408	0.8458	0.8580	0.8462	0.8711	0.9337	0.8492	0.8671	0.8721	0.8806	0.8273	0.8584	0.8499
Bank17	0.8185	0.8610	0.8510	0.8561	0.8571	0.8620	0.8843	0.7871	0.8710	0.9104	0.9356	0.9220	0.9233	0.9279	0.9118	0.9297
Bank18	0.9096	0.8936	0.9306	0.9172	0.8906	0.8708	0.8658	0.7742	0.7632	0.7407	0.7006	0.7774	0.7960	0.8429	0.9118	0.9529
Bank19	0.9291	0.9244	0.9162	0.8897	0.9040	0.9231	0.9367	0.9271	0.9458	0.9558	0.9450	0.9601	0.9731	0.9546	0.9431	0.9407
Bank20	0.8794	0.8296	0.8339	0.8337	0.8836	0.8933	0.9112	0.9076	0.9709	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank21	0.9788	0.9959	0.9512	0.8609	0.8486	0.8650	0.8110	0.8868	0.8227	0.8229	0.8273	0.8564	0.8231	0.8914	0.8654	0.8614
Bank22	1.0000	0.9965	0.9890	0.9762	0.9498	0.9127	0.8916	0.9067	0.9719	0.9873	0.9816	0.9874	0.9808	0.9747	0.9834	0.9720
Bank23	0.8218	0.8177	0.8197	0.7943	0.7878	0.7419	0.7904	0.7676	0.8051	0.8597	0.9087	0.8889	0.9437	0.9245	0.9267	0.8834
Bank24	0.6849	0.6812	0.6231	0.5764	0.5593	0.5975	0.6730	0.7680	0.7807	0.8070	0.7980	0.8481	0.8262	0.8049	0.8241	0.8036
Bank25	0.7502	0.7353	0.7093	0.7318	0.7043	0.7386	0.7519	0.7200	0.7745	0.8566	0.9800	0.9880	0.9879	0.9795	0.9655	0.9620
Bank26	0.7676	0.7728	0.7526	0.7394	0.7984	0.7728	0.7692	0.7585	0.8248	0.8341	0.8132	0.8370	0.8063	0.8099	0.7872	0.8034
Bank27	0.9287	0.9310	0.9205	0.9009	0.9543	0.9501	0.9681	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9941	1.0000	1.0000
Bank28	0.9850	0.9144	0.8961	0.9028	0.9047	0.9229	0.9483	0.9658	0.9979	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9777
Bank29	0.9439	0.9672	0.9731	0.9375	0.9357	0.9221	0.9407	0.9395	0.9353	0.9611	0.9289	0.9490	0.9763	0.9577	0.9549	0.9549
Bank30	0.9911	0.9777	0.9572	0.9944	0.9291	0.9112	0.9787	0.9964	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9986	1.0000
Bank31	1.0000	1.0000	0.9822	0.9735	1.0000	1.0000	1.0000	1.0000	0.9370	0.9636	0.9676	1.0000	1.0000	1.0000	1.0000	1.0000
Bank32	0.8134	0.8468	0.8426	0.8201	0.8380	0.8039	0.8249	0.8020	0.8941	0.9147	0.9009	0.9014	0.8841	0.8633	0.8648	0.8607
Bank33	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank34	0.8129	0.8198	0.7985	0.7907	0.7543	0.7435	0.7680	0.7863	0.7733	0.7935	0.7940	0.8766	0.8848	0.8762	0.8949	0.8969
Bank35	0.9670	1.0000	1.0000	1.0000	1.0000	1.0000	0.9824	0.9974	1.0000	1.0000	0.8891	0.8422	0.9476	1.0000	1.0000	1.0000
Bank36	0.9196	0.9066	0.9308	0.8655	0.8592	0.8835	0.8893	0.8067	0.7749	0.8909	0.9333	0.9047	0.9868	0.9936	1.0000	1.0000
Bank37	0.8741	0.8777	0.8767	0.8674	0.8664	0.8945	0.8971	0.8903	0.9086	0.9190	0.8997	0.9049	0.9193	0.9149	0.9065	0.9224
Bank38	1.0000	0.8777	1.0000	1.0000	0.9845	0.9781	1.0000	0.9825	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank39	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5452	0.6502	1.0000	0.7370	1.0000	1.0000	1.0000	1.0000	1.0000
Bank40	0.8946	0.9139	0.8974	0.8866	0.8464	0.8478	0.8566	0.7953	0.8585	0.8579	0.8718	0.8876	0.9260	0.9121	0.9180	0.9098
Bank41	0.9100	0.9277	0.9063	0.9121	0.8900	0.9501	0.9620	0.9188	0.8526	0.8934	0.8826	0.8739	0.9280	0.8883	0.8991	0.9405
Bank42	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank43	0.9340	0.9188	0.9254	0.8696	0.8984	0.8819	0.8576	0.8444	0.8706	0.9216	0.9795	0.9897	0.9965	0.9823	0.9828	0.9817

	2011Q1	2011Q2	2011Q3	2011Q4	2012Q1	2012Q2	2012Q3	2012Q4	2013Q1	2013Q2	2013Q3	2013Q4	2014Q1	2014Q2	2014Q3	2014Q4	2015Q1
Bank1	1.0000	0.9166	0.9258	0.9271	0.9350	0.9350	0.8996	0.9391	0.9210	0.9392	0.9507	0.9575	0.9802	0.9452	0.9542	0.9628	0.9284
Bank2	0.9493	0.9407	0.9654	0.9566	0.9565	0.9565	0.9407	0.9497	0.9640	0.9544	0.9816	0.9911	0.9905	0.9950	0.9926	0.9678	0.9776
Bank3	0.8425	0.8637	0.8778	0.8851	0.8934	0.8934	0.8729	0.8811	0.8888	0.8882	0.8771	0.8643	0.8922	0.9050	0.9043	0.9021	0.9082
Bank4	0.9607	0.9582	0.9617	0.9619	0.9771	0.9771	0.9603	0.9543	0.9739	0.9336	0.9276	0.9564	0.9438	0.9125	0.9211	0.9185	0.9315
Bank5	0.9889	0.9873	0.9854	0.9884	0.9859	0.9859	0.9759	0.9656	0.9690	0.9683	0.9679	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank6	0.9473	0.9774	1.0000	1.0000	1.0000	1.0000	1.0000	0.9681	0.9748	0.9283	0.9583	0.9555	0.9014	1.0000	0.9675	0.9985	0.9258
Bank7	0.9783	0.9843	0.9655	0.8605	0.9764	0.9764	0.8786	0.7999	0.9321	0.8854	0.9854	0.9904	0.9712	0.9109	0.8570	0.8603	0.8880
Bank8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.8751
Bank9	0.8967	0.9068	0.9000	0.9166	0.9231	0.9231	0.9106	0.9163	0.9318	0.9417	0.9357	0.9492	0.9465	0.9285	0.9317	0.9274	0.9493
Bank10	0.6874	0.7345	0.7504	0.7476	0.8332	0.8332	0.9529	0.9568	0.9663	0.9588	0.9739	0.9378	0.9829	0.9801	0.9710	0.9191	0.9408
Bank11	0.9571	0.9640	0.9834	0.9705	0.9842	0.9842	0.9315	0.9246	0.9301	0.8964	0.9191	0.9311	0.9258	0.9231	0.9230	0.9032	0.9625
Bank12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9914	0.9987	0.9756	0.9667	0.9970	0.9960	1.0000	0.9805	0.9938	1.0000
Bank13	0.9273	0.9350	0.9375	0.9295	0.9615	0.9615	0.9250	0.9359	0.9546	0.9415	0.9441	0.9511	0.9636	0.9480	0.9250	0.9224	0.9553
Bank14	0.9385	0.9349	0.9572	0.9594	0.9586	0.9586	0.9018	0.9200	0.9297	0.8777	0.8513	0.8341	0.8434	0.8466	0.8484	0.8490	0.8481
Bank15	0.9418	0.9437	0.9493	0.8852	0.9710	0.9710	0.9352	0.9046	0.9529	0.9588	0.9105	0.9646	0.9953	0.9463	0.9735	0.9365	0.9726
Bank16	0.8569	0.8534	0.8632	0.8803	0.8944	0.8944	0.9624	0.9592	0.9591	0.9635	0.9622	0.9747	0.9832	0.9895	0.9749	0.9823	0.9761
Bank17	0.9278	0.9287	0.9321	0.9160	0.9269	0.9269	0.9063	0.9258	0.9298	0.9175	0.9389	0.9362	0.9441	0.9476	0.9346	0.9425	0.9714
Bank18	0.9485	0.9489	0.9765	0.9660	0.9668	0.9668	0.9689	0.9721	0.9645	0.9627	0.9641	0.9603	0.9682	0.9708	0.9685	0.9445	0.9391
Bank19	0.9405	0.9594	0.9794	0.9997	1.0000	1.0000	0.9918	0.9754	0.9947	0.9932	0.9749	0.9950	0.9984	0.9932	0.9884	0.9734	0.9878
Bank20	0.9670	0.9637	0.9770	0.9693	0.9816	0.9816	0.9366	0.9553	0.9591	0.9682	0.9700	0.9377	0.9480	0.9265	0.9344	0.9348	0.9482
Bank21	0.8774	0.8774	0.8932	0.8683	0.8447	0.8447	0.7942	0.8339	0.8573	0.8073	0.9325	0.9317	0.9131	0.8361	0.8751	0.8831	0.9489
Bank22	0.9875	0.9920	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9991	0.9734	0.9491	0.9639	0.9766	0.9783	0.9515	0.9520
Bank23	0.8551	0.8279	0.8602	0.8751	0.8967	0.8967	0.8925	0.8717	0.9019	0.8745	0.9211	0.8658	0.8526	0.8256	0.8546	0.8492	0.8822
Bank24	0.8113	0.8144	0.8078	0.8404	0.8371	0.8371	0.7842	0.7940	0.7930	0.8197	0.8214	0.8810	0.8781	0.8763	0.8765	0.8716	0.8851
Bank25	0.9633	0.9481	0.9301	0.9541	0.9611	0.9611	0.9203	0.9182	0.9420	0.9364	0.9308	0.9458	0.9401	0.9340	0.9246	0.9315	0.9359
Bank26	0.8312	0.8224	0.8395	0.8445	0.8701	0.8701	0.8725	0.8974	0.9086	0.8975	0.9058	0.9137	0.9324	0.9126	0.9407	0.9215	0.9501
Bank27	0.9988	1.0000	0.9688	0.9975	0.9998	0.9998	0.9758	0.9469	0.9600	0.9731	0.9706	0.9868	1.0000	0.9985	0.9826	0.9724	0.9550
Bank28	0.9812	0.9799	0.9835	0.9814	0.9743	0.9743	0.9464	0.9337	0.9500	0.9388	0.9581	0.9497	0.9372	0.9532	0.9789	0.9730	0.9819
Bank29	0.9577	0.9650	0.9630	0.9593	0.9743	0.9743	0.9713	0.9727	0.9742	0.9620	0.9678	0.9655	0.9593	0.9634	0.9774	0.9662	0.9719
Bank30	1.0000	0.9734	0.9610	0.9609	0.9667	0.9667	0.9563	0.9505	0.9721	0.9916	0.9806	0.9655	0.9942	1.0000	1.0000	1.0000	1.0000
Bank31	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank32	0.8691	0.8833	0.9241	0.9059	0.9101	0.9101	0.9072	0.9004	0.8901	0.9025	0.9174	0.9125	0.9292	0.9281	0.9477	0.9407	0.9361
Bank33	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9787	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank34	0.9001	0.8877	0.9060	0.8953	0.8873	0.8873	0.8553	0.8654	0.8707	0.8634	0.8710	0.8646	0.8668	0.8674	0.8524	0.8486	0.8436
Bank35	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9987	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank36	1.0000	0.9975	0.9359	0.8944	0.9240	0.9240	0.8927	0.9057	1.0000	0.9549	1.0000	0.9874	1.0000	1.0000	1.0000	0.9892	0.9802
Bank37	0.9261	0.9238	0.9129	0.9218	0.9320	0.9320	0.9146	0.9066	0.9221	0.9199	0.9071	0.9053	0.9082	0.8903	0.8834	0.8646	0.8807
Bank38	1.0000	0.9832	1.0000	0.9615	1.0000	1.0000	0.8982	0.9240	0.9453	0.9687	0.9646	0.9696	1.0000	1.0000	0.9728	0.9510	0.9802
Bank39	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank40	0.9159	0.9220	0.9334	0.9472	0.9604	0.9604	0.9460	0.9478	0.9494	0.9369	0.9503	0.9526	0.9624	0.9684	0.9675	0.9594	0.9634
Bank41	0.9354	0.9973	1.0000	0.9959	0.9779	0.9779	0.9786	0.9872	0.9937	0.9526	0.9682	0.9666	0.9978	0.9907	0.9666	0.9669	0.9489
Bank42	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9368	0.9679	0.9960
Bank43	0.9429	0.9382	0.9439	0.9499	0.9472	0.9472	0.9392	0.9427	0.9329	0.9260	0.9364	0.9002	0.9426	0.9478	0.9333	0.9394	0.9306

Table 6: American Banks: Profit Maximizing Efficiency Scores

	2007Q1	2007Q2	2007Q3	2007Q4	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009Q3
Bank1	0.9167	0.8824	0.8837	0.8714	0.8798	0.8984	0.9273	0.8424	0.9188	0.8769	0.8802
Bank2	0.7250	0.7101	0.6218	0.5790	0.6462	0.7090	0.7069	0.7892	0.7577	0.8074	0.8749
Bank3	0.8325	0.7794	0.6806	0.6384	0.6954	0.7549	0.7574	0.7681	0.9034	0.8167	0.7741
Bank4	0.8233	0.7959	0.7806	0.7378	0.7783	0.8304	0.8364	0.8407	0.8896	0.8829	0.9146
Bank5	0.7326	0.6801	0.5951	0.5530	0.6078	0.6070	0.5649	0.6136	0.7670	0.7690	0.7600
Bank6	0.8178	0.8171	0.8371	0.8760	0.7936	0.7792	0.7980	0.7729	0.8463	0.8982	0.8519
Bank7	0.7453	0.8429	0.8287	0.8356	0.9046	0.9146	1.0000	1.0000	1.0000	0.9965	0.9865
Bank8	0.8850	0.9317	0.7701	0.7159	0.7870	0.8340	0.8295	0.8713	0.8626	0.9138	0.9412
Bank9	1.0000	1.0000	1.0000	0.9809	0.8935	0.9113	0.9227	0.9412	0.8789	0.8985	0.9500
Bank10	0.9890	0.9292	0.9092	0.8084	0.8350	0.8648	0.8578	0.8184	0.7542	0.7404	1.0000
Bank11	0.8129	0.8074	0.7723	0.7624	0.7468	0.6625	0.6827	0.6805	0.8181	0.8541	0.9321
Bank12	0.8899	0.8395	0.8194	0.7837	0.7848	0.7899	0.7960	0.7395	0.8072	0.8548	0.8793
Bank13	0.6857	0.6970	0.6605	0.6190	0.6386	0.7021	0.7145	0.7252	0.8156	0.8234	0.8879
Bank14	0.7698	0.7801	0.5690	0.5396	0.6285	0.6735	0.6633	0.7083	0.7569	0.7515	0.7884
Bank15	1.0000	1.0000	1.0000	0.9584	1.0000	1.0000	1.0000	1.0000	0.8210	0.9186	1.0000
Bank16	1.0000	1.0000	0.9942	0.9407	0.9204	0.9282	1.0000	0.9941	0.9813	0.9284	0.8874
Bank17	0.7699	0.7496	0.6787	0.6234	0.6440	0.6758	0.6693	0.7220	0.7297	0.7422	0.7546
Bank18	0.7996	0.7722	0.7469	0.7323	0.7115	0.7399	0.7712	0.7211	0.6727	0.8015	0.8386
Bank19	0.9053	0.8897	0.9078	0.9294	0.9504	0.9397	0.9065	0.9427	0.9427	0.9226	0.8918
Bank20	0.6920	0.7095	0.6643	0.6201	0.6928	0.7167	0.7407	0.7556	0.7472	0.7707	0.7214
Bank21	0.9091	0.8936	0.9044	0.8340	0.8498	0.8738	0.8711	0.7092	1.0000	1.0000	1.0000
Bank22	0.9043	0.8660	0.8654	0.8604	0.8399	0.8552	0.8629	0.8708	0.8163	0.8700	0.8798
Bank23	0.8336	0.8091	0.7030	0.6666	0.7190	0.7532	0.7123	0.7615	0.8134	0.7892	0.8009
Bank24	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9557	1.0000
Bank25	1.0000	1.0000	1.0000	1.0000	0.9949	0.9427	0.9559	1.0000	0.9127	1.0000	0.8653
Bank26	0.8879	0.9502	1.0000	0.9137	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank27	0.8233	0.8175	0.8232	0.8482	0.9316	0.9485	0.9572	0.8843	1.0000	1.0000	1.0000
Bank28	0.6996	0.7329	0.7451	0.7049	0.7277	0.6963	0.6992	0.7245	0.7325	0.7359	0.7880
Bank29	0.8867	0.7492	0.7350	0.6906	0.7291	0.7886	0.8070	0.8281	0.8561	0.8617	0.8682
Bank30	0.7660	0.7452	0.7320	0.7266	0.6287	0.6624	0.6743	0.6521	0.6654	0.6841	0.7208
Bank31	0.8638	0.8086	0.7885	0.6892	0.6069	0.5416	0.5565	0.5637	0.7281	0.7100	0.6796
Bank32	0.9318	0.9270	0.9001	0.8428	0.7728	0.7449	0.7842	0.7664	0.7961	0.7715	0.7713
Bank33	0.6110	0.6415	0.6038	0.5705	0.6230	0.6825	0.6959	0.6867	0.7221	0.8062	0.7833
Bank34	0.8525	0.8694	0.5886	0.5725	0.6769	0.7394	0.7315	0.7927	0.7982	0.8089	0.8138
Bank35	0.7288	0.2403	0.3414	0.3936	0.6689	0.6725	0.5793	0.6625	0.8659	0.9141	0.9932
Bank36	0.9165	0.8826	0.8379	0.8143	0.7995	0.7591	0.7868	0.8132	0.9073	0.8376	0.8340
Bank37	0.7233	0.6992	0.6313	0.5857	0.6550	0.5636	0.5658	0.6451	0.7270	0.7145	0.7682
Bank38	0.7486	0.7242	0.6841	0.6435	0.8077	0.7628	0.6556	0.6945	0.9856	1.0000	0.9825
Bank39	0.5434	0.5447	0.5583	0.6203	0.4333	0.3982	0.4498	0.2012	1.0000	1.0000	1.0000
Bank40	0.8166	0.7748	0.6769	0.6095	0.6577	0.6197	0.5896	0.7310	0.7455	0.7553	0.7510
Bank41	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.7711	0.5883	0.4753
Bank42	0.8719	0.8682	0.8673	0.8424	0.7232	0.8175	0.6249	0.6669	0.6668	0.6544	0.7305
Bank43	0.9665	0.9647	0.9096	0.8580	0.8479	0.9133	0.9109	1.0000	1.0000	1.0000	1.0000

	2009Q4	2010Q1	2010Q2	2010Q3	2010Q4	2011Q1	2011Q2	2011Q3	2011Q4	2012Q1	2012Q2
Bank1	0.8870	0.7307	0.7411	0.7297	0.7364	0.7597	0.7693	0.7888	0.7468	0.8087	0.8087
Bank2	0.8078	0.7034	0.7147	0.6957	0.6717	0.6487	0.7307	0.6996	0.7218	0.7866	0.7866
Bank3	0.7533	0.6742	0.7748	0.7529	0.7277	0.7083	0.7552	0.7012	0.6915	0.8065	0.8065
Bank4	0.8838	0.7489	0.7295	0.7110	0.7049	0.7258	0.7629	0.7611	0.7664	0.8226	0.8226
Bank5	0.6713	0.6153	0.6344	0.6178	0.6077	0.6392	0.7418	0.7129	0.7601	0.8235	0.8235
Bank6	0.7858	0.5415	0.5902	0.5859	0.5561	0.5130	0.5459	0.3553	0.3457	0.3669	0.3669
Bank7	0.9377	0.8612	0.8306	0.7887	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank8	0.8573	0.7284	0.7406	0.7648	0.7271	0.7456	0.8122	0.8469	0.8636	0.7395	0.7395
Bank9	0.9151	0.6646	0.5527	0.5878	0.6518	0.7468	0.7695	0.7844	0.7800	0.8238	0.8238
Bank10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.8414	0.8414
Bank11	0.8867	0.6641	0.7142	0.7092	0.6982	0.7936	0.8393	0.8163	0.7803	0.9328	0.9328
Bank12	0.7898	0.6933	0.6996	0.6982	0.7046	0.7985	0.8128	0.8378	0.6826	0.8645	0.8645
Bank13	0.7997	0.6781	0.7081	0.7195	0.7013	0.6735	0.7326	0.7315	0.7558	0.7861	0.7861
Bank14	0.7072	0.6250	0.6572	0.6511	0.5988	0.5940	0.6493	0.5438	0.6169	0.7893	0.7893
Bank15	0.9202	0.7688	0.7622	0.7374	0.6867	0.7192	0.8471	0.8134	0.7448	0.9546	0.9546
Bank16	0.9098	0.7591	0.7561	0.7373	0.7805	0.8294	0.8152	0.8265	0.7206	0.8056	0.8056
Bank17	0.7244	0.5872	0.6213	0.6247	0.5994	0.6070	0.6660	0.6726	0.6820	0.7575	0.7575
Bank18	0.7791	0.7351	0.7002	0.6073	0.6268	0.8451	0.8067	0.7993	0.7691	0.7600	0.7600
Bank19	0.8845	0.8255	0.6943	0.6857	0.7450	0.8277	0.8089	0.8068	0.7342	0.8296	0.8296
Bank20	0.5436	0.6128	0.5835	0.5857	0.5998	0.5987	0.5785	0.5994	0.6336	0.7495	0.7495
Bank21	1.0000	1.0000	1.0000	1.0000	1.0000	0.9376	1.0000	1.0000	1.0000	1.0000	1.0000
Bank22	1.0000	1.0000	1.0000	1.0000	0.6782	0.6922	0.7564	0.8094	0.7579	0.8148	0.8148
Bank23	0.7429	0.5515	0.5771	0.5753	0.6082	0.6388	0.7137	0.6889	0.6963	0.7513	0.7513
Bank24	0.9685	0.7796	0.8317	0.8229	0.7816	0.7745	0.7899	0.7998	0.7803	0.7915	0.7915
Bank25	0.7950	0.6399	0.7038	0.7175	0.6875	0.6878	0.7576	0.7373	0.7135	0.8029	0.8029
Bank26	0.9815	0.8281	0.8747	0.8787	0.9291	0.9656	0.9504	0.9475	0.8967	0.9364	0.9364
Bank27	1.0000	0.8425	0.8784	0.9343	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank28	0.7086	0.6547	0.6865	0.7026	0.6820	0.6752	0.7649	0.7760	0.7794	0.8540	0.8540
Bank29	0.8446	0.6721	0.6869	0.7011	0.7058	0.6610	0.7613	0.7350	0.7826	0.8779	0.8779
Bank30	0.6768	0.5885	0.6024	0.5977	0.6169	0.7824	0.7563	0.6828	0.6729	0.9445	0.9445
Bank31	0.6583	0.5561	0.5912	0.5870	0.5905	0.6061	0.6362	0.6431	0.6510	0.7445	0.7445
Bank32	0.7745	0.5957	0.6524	0.6516	0.6490	0.6301	0.6767	0.6584	0.6615	0.7019	0.7019
Bank33	0.7545	0.6288	0.7039	0.6553	0.6212	0.6296	0.6678	0.6785	0.6930	0.7573	0.7573
Bank34	0.8484	0.7260	0.7852	0.7573	0.7075	0.7187	0.7741	0.7339	0.7542	0.8006	0.8006
Bank35	1.0000	0.8696	0.7721	0.7388	0.7255	0.6711	0.7837	0.7498	0.8135	0.9010	0.9010
Bank36	0.8088	0.6725	0.6774	0.6866	0.7042	0.7734	0.7884	0.8071	0.8346	1.0000	1.0000
Bank37	0.6963	0.6058	0.6344	0.6244	0.5969	0.5900	0.6519	0.6508	0.6818	0.7088	0.7088
Bank38	0.8959	0.7863	0.8415	0.8267	0.7998	0.8402	0.9510	0.9216	0.9486	1.0000	1.0000
Bank39	1.0000	1.0000	1.0000	1.0000	0.8695	0.9802	0.9738	0.7733	0.5257	0.4639	0.4639
Bank40	0.6835	0.5508	0.5783	0.5800	0.5702	0.5685	0.6166	0.6142	0.6319	0.6567	0.6567
Bank41	0.3992	0.7700	0.6716	0.5840	0.4284	0.4381	0.4378	0.4643	0.4187	0.3951	0.3951
Bank42	0.6514	0.8269	0.8465	0.8069	0.8054	0.7234	0.8062	0.7252	0.6319	0.8155	0.8155
Bank43	0.9219	0.6760	0.6432	0.6465	0.6751	0.5820	0.6636	0.6017	0.6466	0.6768	0.6768

	2012Q3	2012Q4	2013Q1	2013Q2	2013Q3	2013Q4	2014Q1	2014Q2	2014Q3	2014Q4	2015Q1
Bank1	0.7845	0.7179	0.6933	0.7126	0.7108	0.6991	0.7280	0.7603	0.7247	0.7017	0.7808
Bank2	0.7350	0.7064	0.6662	0.6662	0.7100	0.7428	0.7496	0.6970	0.7205	0.7399	0.6831
Bank3	0.7538	0.7612	0.6858	0.6836	0.7699	0.7929	0.7662	0.6706	0.6897	0.6968	0.7179
Bank4	0.7860	0.7674	0.7123	0.7483	0.7822	0.7462	0.8502	0.8289	0.8342	0.8305	0.8793
Bank5	0.7504	0.7958	0.6928	0.6948	0.7770	0.8277	0.9037	0.6774	0.7739	0.8240	0.9674
Bank6	0.3923	0.4179	0.3453	0.3662	0.4067	0.4155	0.4498	0.3832	0.4074	0.3910	0.4412
Bank7	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank8	0.7002	0.7041	0.4764	0.4993	0.5594	0.5782	0.5295	0.5202	0.5787	0.5642	0.9300
Bank9	0.8112	0.7989	0.7224	0.5674	0.6645	0.7172	0.8070	0.7832	0.7935	0.7942	0.7964
Bank10	0.7094	0.7072	0.6565	0.6619	0.7108	0.7401	0.7296	0.6582	0.6915	0.6958	0.7600
Bank11	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9380	0.9196	0.9416	0.9326
Bank12	0.8301	0.8226	0.7477	0.7743	0.8334	0.8240	0.9028	0.8698	0.8795	0.8413	0.9066
Bank13	0.7577	0.7935	0.5884	0.6264	0.7030	0.7393	0.7291	0.7373	0.7861	0.7742	0.7865
Bank14	0.7281	0.6990	0.7443	0.7847	0.8620	0.8886	0.8469	0.7550	0.7724	0.7758	0.8440
Bank15	0.8933	0.8852	0.8458	0.8378	0.9148	0.8670	0.9214	0.9419	0.9185	0.8987	0.9606
Bank16	0.7027	0.6569	0.6707	0.6606	0.6917	0.6697	0.7201	0.6713	0.6894	0.6725	0.7176
Bank17	0.7148	0.7297	0.6330	0.6241	0.6867	0.7102	0.7146	0.6474	0.6560	0.6485	0.6491
Bank18	0.7818	0.8030	0.7341	0.7484	0.8359	0.8557	0.8656	0.6832	0.7810	0.8018	0.9714
Bank19	0.7646	0.7366	0.7202	0.7507	0.7823	0.6783	0.8813	0.8566	0.8542	0.8611	0.9108
Bank20	0.7001	0.6831	0.6021	0.6147	0.6504	0.6987	0.7587	0.6699	0.6989	0.7162	0.8045
Bank21	1.0000	0.1096	1.0000	1.0000	0.9078	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank22	0.7839	0.7428	0.7634	0.7643	0.7589	0.8102	0.7938	0.7507	0.7572	0.7612	0.7982
Bank23	0.6543	0.6962	0.6000	0.6061	0.6335	0.7094	0.7384	0.6727	0.6766	0.6672	0.6961
Bank24	0.7668	0.8260	0.7004	0.6566	0.7941	0.7986	0.7683	0.7061	0.7312	0.6655	0.7116
Bank25	0.7616	0.7811	0.6703	0.6510	0.7472	0.7382	0.7585	0.6908	0.7081	0.6884	0.6914
Bank26	0.8783	0.8339	0.8602	0.8703	0.9189	0.8766	0.8715	0.8152	0.8027	0.8099	0.8205
Bank27	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank28	0.7920	0.8419	0.7275	0.7206	0.8242	0.8625	0.8577	0.7651	0.7882	0.8032	0.8349
Bank29	0.8272	0.8593	0.7571	0.7728	0.8258	0.8400	0.8832	0.7872	0.8179	0.8450	0.8472
Bank30	0.9214	0.9100	0.8135	0.7786	0.8144	0.8165	0.8078	0.9250	0.8735	0.8120	0.7252
Bank31	0.6795	0.6505	0.6406	0.6512	0.6725	0.6949	0.7635	0.7288	0.7210	0.7229	0.7777
Bank32	0.6498	0.6648	0.6028	0.5864	0.6328	0.6450	0.6599	0.6229	0.6319	0.6124	0.6611
Bank33	0.7352	0.7261	0.6607	0.6163	0.7763	0.7137	0.8147	0.7569	0.8271	0.7742	0.8784
Bank34	0.7875	0.8210	0.7364	0.7004	0.7671	0.7804	0.7698	0.6848	0.6932	0.6798	0.7171
Bank35	0.8211	0.8575	0.7937	0.7960	0.7969	0.8509	0.8681	0.8022	0.8000	0.8228	0.8618
Bank36	0.9261	0.8641	0.8320	0.8403	0.8344	0.8373	0.9148	0.8258	0.8035	0.7539	0.8092
Bank37	0.6736	0.7143	0.6233	0.5996	0.6615	0.6739	0.7170	0.6645	0.6772	0.7020	0.7754
Bank38	1.0000	0.8337	0.8392	0.8301	0.9255	0.9495	0.8854	0.7953	0.8235	0.8387	0.8928
Bank39	0.3247	0.3233	0.2928	0.2816	0.3822	0.4070	0.4402	0.3679	0.3463	0.3536	0.4518
Bank40	0.6420	0.6809	0.5843	0.5859	0.6600	0.6893	0.6951	0.6116	0.6289	0.6377	0.6652
Bank41	0.3623	0.3504	0.3439	0.3860	0.4118	0.4217	0.5300	0.4833	0.4624	0.4623	0.4069
Bank42	0.5852	0.6625	0.7008	0.6969	0.7602	0.7733	0.8827	0.7711	0.7962	0.7642	0.8757
Bank43	0.6437	0.6497	0.5662	0.5703	0.6591	0.7516	0.7853	0.6958	0.6948	0.6584	0.7134

Table 7: American Banks: Cost Minimizing Effectiveness Scores

	2007Q1	2007Q2	2007Q3	2007Q4	2008Q1	2008Q2	2008Q3	2008Q4	2009Q1	2009Q2	2009Q3	2009Q4	2010Q1	2010Q2	2010Q3	2010Q4	2011Q1	2011Q2	2011Q3	2011Q4	2012Q1	2012Q2	2012Q3	2012Q4	2013Q1	2013Q2	2013Q3	2013Q4	2014Q1	2014Q2	2014Q3	2014Q4	2015Q1
Bank1	0.9298	0.8968	0.8964	0.9179	0.9156	0.9347	0.9497	0.9141	0.9828	0.8969	0.8915	0.9697	0.8796	0.8962	0.8938	1.0000	0.9593	0.7693	0.7888	0.7468	0.8087	0.8087	0.7845	0.7227	0.6944	0.7243	0.7189	0.7096	0.7496	0.8121	0.7917	0.7610	0.8263
Bank2	1.0000	1.0000	1.0000	1.0000	0.9932	0.8310	0.8416	0.8787	0.8508	0.8686	0.9149	0.9611	0.8747	0.8768	0.8463	0.8632	0.8423	0.8609	0.8804	0.8214	0.9207	0.9207	0.9024	0.8706	0.8475	0.8967	0.8191	0.8959	0.8526	0.8616	0.8335	0.9063	0.7459
Bank3	0.8325	0.7794	0.6806	0.6384	0.6954	0.7549	0.7574	0.7681	0.9210	0.8302	0.7843	0.7852	0.6869	0.7925	0.7574	0.7277	0.7083	0.7552	0.7012	0.6915	0.8065	0.8065	0.7538	0.7627	0.7104	0.7003	0.7699	0.7982	0.7824	0.7204	0.7238	0.7405	0.7398
Bank4	0.8233	0.7959	0.7806	0.7378	0.7783	0.8304	0.8364	0.8407	0.9132	0.9103	0.9414	0.9364	0.8059	0.7782	0.7470	0.7391	0.7308	0.7693	0.7738	0.7799	0.8232	0.8232	0.8066	0.7922	0.7493	0.7854	0.8034	0.7694	0.8758	0.8974	0.9079	0.9003	0.9339
Bank5	0.7326	0.6801	0.5951	0.5530	0.6078	0.6070	0.5649	0.6137	0.8040	0.7797	0.7718	0.6987	0.6153	0.6344	0.6178	0.6077	0.6392	0.7418	0.7129	0.7601	0.8235	0.8235	0.7504	0.7958	0.6928	0.6948	0.7770	0.8277	0.9037	0.6774	0.7739	0.8240	0.9674
Bank6	0.8178	0.8171	0.8371	0.8760	0.7936	0.7792	0.7980	0.7729	0.8463	0.8982	0.8520	0.7858	0.5415	0.5902	0.5859	0.5561	0.5130	0.5459	0.3573	0.3524	0.3770	0.3770	0.3942	0.4299	0.3763	0.3874	0.4067	0.4156	0.4521	0.4023	0.4283	0.4086	0.4495
Bank7	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9143	0.8947	0.8848	0.8790	0.8646	0.8629	0.8485	0.8482	0.9817
Bank9	1.0000	1.0000	1.0000	0.9809	0.9146	0.9444	0.9361	0.9761	0.9150	0.9196	0.9670	0.9746	0.8879	0.6800	0.6986	0.7492	0.8062	0.8234	0.8273	0.8419	0.8848	0.8848	0.8997	0.8966	0.8525	0.6439	0.6805	0.7441	0.8149	0.8357	0.8513	0.8531	0.8418
Bank10	0.9890	0.9292	0.9092	0.8084	0.8350	0.8648	0.8578	0.8184	0.7612	0.7485	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9088	0.9088	0.8426	0.8565	0.8524	0.8578	0.8299	0.8702	0.8531	0.8364	0.8403	0.8636	0.8628
Bank11	0.8129	0.8074	0.7723	0.7754	0.7470	0.6625	0.6827	0.6825	0.8364	0.8575	0.9362	0.9086	0.6641	0.7167	0.7117	0.7597	0.8312	0.8626	0.8755	0.8516	0.9440	0.9440	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9986
Bank12	0.9350	0.9023	0.8968	0.8949	0.8687	0.8856	0.8890	0.8778	0.8986	0.8878	0.9107	0.8795	0.9317	0.9123	0.8922	0.9873	1.0000	1.0000	1.0000	0.8063	0.9541	0.9541	0.9538	0.9533	0.9461	0.9590	0.9674	0.9768	1.0000	1.0000	1.0000	0.9992	1.0000
Bank13	0.6857	0.6970	0.6605	0.6190	0.6386	0.7021	0.7145	0.7255	0.8678	0.8614	0.9133	0.8871	0.7788	0.8164	0.8206	0.8173	0.7743	0.8024	0.8340	0.8119	0.8580	0.8580	0.8804	0.9213	0.7179	0.7601	0.7582	0.8194	0.7939	0.8297	0.8650	0.8738	0.8452
Bank14	0.7698	0.7801	0.5690	0.5396	0.6285	0.6735	0.6633	0.7084	0.7945	0.7740	0.8081	0.7386	0.6250	0.6572	0.6511	0.5988	0.5940	0.6493	0.5438	0.6169	0.7893	0.7893	0.7281	0.6990	0.7443	0.7847	0.8620	0.8886	0.8469	0.7697	0.7918	0.7912	0.8600
Bank15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.8581	0.9220	1.0000	0.9354	0.7688	0.7622	0.7374	0.6867	0.7192	0.8471	0.8134	0.7448	0.9546	0.9546	0.8933	0.8852	0.8458	0.8378	0.9148	0.8670	0.9293	0.9705	0.9654	0.9330	1.0000
Bank16	1.0000	1.0000	0.9942	0.9407	0.9204	0.9282	1.0000	0.9941	0.9813	0.9284	0.8874	0.9121	0.7591	0.7789	0.7698	0.8272	0.8537	0.8707	0.8760	0.7967	0.8401	0.8401	0.8045	0.7805	0.7754	0.7653	0.7755	0.7850	0.8287	0.8389	0.8493	0.8363	0.8664
Bank17	0.7699	0.7496	0.6787	0.6370	0.6473	0.6758	0.6693	0.7237	0.7590	0.7651	0.7719	0.7747	0.6524	0.6939	0.6914	0.6690	0.6619	0.7020	0.7284	0.7095	0.7975	0.7975	0.7952	0.8143	0.7594	0.7742	0.7438	0.7841	0.7823	0.7546	0.7288	0.7609	0.7031
Bank18	0.7996	0.7722	0.7469	0.7323	0.7115	0.7399	0.7712	0.7212	0.6800	0.8247	0.8561	0.8244	0.7658	0.7402	0.6412	0.6552	0.8721	0.8361	0.8271	0.8267	0.7671	0.7671	0.7991	0.8437	0.7888	0.7930	0.8392	0.8557	0.8656	0.7102	0.8087	0.8231	0.9926
Bank19	0.9260	0.9064	0.9179	0.9534	0.9617	0.9854	0.9065	0.9427	0.9427	0.9246	0.9029	0.9218	0.9100	0.7766	0.7939	0.9157	0.9481	0.9466	0.9342	0.9542	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.8556	0.9971	1.0000	1.0000	1.0000	1.0000
Bank20	0.6920	0.7095	0.6643	0.6201	0.6928	0.7167	0.7407	0.7558	0.7934	0.7973	0.7355	0.7279	0.7030	0.6943	0.6877	0.7332	0.6732	0.6199	0.6509	0.6640	0.7913	0.7913	0.7530	0.7451	0.6810	0.6875	0.6894	0.7409	0.7844	0.7270	0.7576	0.7733	0.8516
Bank21	0.9106	0.8961	0.9072	0.8374	0.8498	0.9069	0.8827	0.7344	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.1096	1.0000	1.0000	0.9078	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank22	0.9623	0.9343	0.8654	0.8604	0.8415	0.8564	0.8634	0.8825	0.8400	0.8710	0.8824	1.0000	1.0000	1.0000	1.0000	0.6782	0.6922	0.7564	0.8094	0.7579	0.8148	0.8148	0.7839	0.7428	0.7634	0.7643	0.7589	0.8102	0.7938	0.7507	0.7572	0.7612	0.7982
Bank23	0.8336	0.8091	0.7030	0.6666	0.7190	0.7532	0.7123	0.7615	0.8576	0.8169	0.8198	0.7795	0.5600	0.5911	0.5845	0.6082	0.6435	0.7152	0.6919	0.6977	0.7624	0.7624	0.7049	0.7290	0.6089	0.6061	0.6335	0.7100	0.7384	0.7053	0.6994	0.6841	0.7168
Bank24	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9995	1.0000	1.0000	0.8857	0.9274	0.9375	0.8502	0.8410	0.8463	0.8885	0.8160	0.8515	0.8515	0.8384	0.8987	0.7881	0.7599	0.8047	0.8348	0.8267	0.8163	0.8004	0.7357	0.7382
Bank25	1.0000	1.0000	1.0000	1.0000	0.9949	0.9555	0.9813	1.0000	1.0000	1.0000	0.8682	0.8299	0.7323	0.7838	0.7997	0.7296	0.7240	0.7789	0.7373	0.7135	0.8059	0.8059	0.8064	0.7909	0.7059	0.7154	0.7519	0.7521	0.7755	0.7535	0.7493	0.7407	0.7243
Bank26	0.8895	0.9510	1.0000	0.9137	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9468	0.9868	0.9867	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank27	0.8233	0.8175	0.8232	0.8482	0.9316	0.9485	0.9572	0.8843	1.0000	1.0000	1.0000	1.0000	0.8425	0.8784	0.9343	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank28	0.9417	0.9288	0.9448	0.9475	0.9370	0.7873	0.7944	0.8450	0.8100	0.7880	0.8264	0.8437	0.8731	0.8853	0.8921	0.8438	0.8360	0.8779	0.9389	0.8769	0.9900	0.9900	0.9722	1.0000	0.9270	0.9666	0.9394	1.0000	0.9791	0.9397	0.9073	1.0000	0.9143
Bank29	0.8867	0.7492	0.7350	0.6906	0.7291	0.7886	0.8070	0.8281	0.8564	0.8617	0.8682	0.8446	0.6721	0.6869	0.7011	0.7058	0.6610	0.7613	0.7350	0.7826	0.8779	0.8779	0.8272	0.8593	0.7571	0.7728	0.8258	0.8400	0.8832	0.7872	0.8179	0.8450	0.8472
Bank30	0.7660	0.7452	0.7320	0.7266	0.6287	0.6624	0.6743	0.6521	0.6719	0.6855	0.7243	0.6890	0.5885	0.6024	0.6022	0.6436	0.8052	0.7877	0.7294	0.7048	0.9445	0.9445	0.9236	0.9100	0.8323	0.8082	0.8244	0.8165	0.8127	0.9549	0.9134	0.8445	0.7563
Bank31	0.8638	0.8086	0.7885	0.7104	0.6069	0.5416	0.5565	0.5637	0.7426	0.7177	0.6832	0.6742	0.5561	0.5912	0.5870	0.5905	0.6061	0.6362	0.6431	0.6510	0.7445	0.7445	0.6795	0.6579	0.6579	0.6625	0.6764	0.7083	0.7635	0.7766	0.7850	0.7782	0.8299
Bank32	0.9796	0.9733	0.9612	0.9491	0.8671	0.8280	0.8276	0.8183	0.8173	0.7883	0.7816	0.8161	0.6570	0.7281	0.7285	0.7528	0.7531	0.7693	0.7936	0.7357	0.7995	0.7995	0.7345	0.7572	0.7349	0.7396	0.7181	0.7376	0.7496	0.7388	0.7287	0.7265	0.7251
Bank33	0.8153	0.8058	0.8149	0.8174	0.8244	0.8243	0.8331	0.8364	0.8443	0.8520	0.8542	0.8608	0.8650	0.9110	0.8751	0.8924	0.9008	0.9131	1.0000	0.9518	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank34	0.8986	0.9026	0.5886	0.5889	0.6769	0.7394	0.7315	0.7927	0.7982	0.8181	0.8263	0.8658	0.7260	0.7863	0.7662	0.7075	0.7203	0.7741	0.7339	0.7542	0.8033	0.8033	0.8045	0.8228	0.7539	0.7082	0.7671	0.7820	0.7725	0.7267	0.7229	0.7034	0.7400
Bank35	0.8796	0.2403	0.3414	0.3936	0.6689	0.6725	0.5793	0.6625	0.8675	0.9146	0.9984	1.0000	0.8696	0.7721	0.7388	0.7255	0.6711	0.7837	0.7498	0.8135	0.9010	0.9010	0.8211	0.8575	0.7937	0.7960	0.7969	0.8509	0.8681	0.8022	0.8023	0.8228	0.8655
Bank36	0.9165	0.8826	0.8379	0.8143	0.7995	0.7591	0.7868	0.8135	0.9721	0.8597	0.8513	0.8597	0.7245	0.7222	0.7462	0.8264	0.8433	0.8483	0.8470	0.8687	1.0000	1.0000	1.0000	0.9899	0.9633	0.9754	0.9681	0.9884	1.0000	0.9382	0.9147	0.8606	0.8785
Bank37	0.7233	0.6992	0.6313	0.5857	0.6550	0.5636	0.5658	0.6456	0.7478	0.7288	0.7777	0.7227	0.6058	0.6344	0.6244	0.5969	0.5900	0.6519	0.6508	0.6818	0.7088	0.7088	0.6736	0.7143	0.6233	0.5996	0.6615	0.6739	0.7170	0.6692	0.6804	0.7024	0.7792
Bank38	0.7486	0.7242	0.6841	0.6435	0.8077	0.7628	0.6556	0.6945	0.9856	1.0000	0.9825	0.8959	0.7863	0.8415	0.8267	0.7998	0.8402	0.9510	0.9216	0.9486	1.0000	1.0000	1.0000	0.8337	0.8392	0.8301	0.9255	0.9495	0.8854	0.7953	0.8235	0.8387	0.8928
Bank39	0.5434	0.5447	0.5583	0.6203	0.4333	0.3982	0.4498	0.2012	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9615	1.0000	0.7804	0.9369	0.8813	1.0000	1.0000	1.0000	1.0000	1.0000	0.8672
Bank40	0.8166	0.7748	0.6769	0.6095	0.6577	0.6197	0.5896	0.7310	0.7455	0.7553	0.7510	0.6835	0.5508	0.5783	0.5800	0.5702	0.5685	0.6166	0.6142	0.6319	0.6567	0.6567	0.6420	0.6809	0.5843	0.5859	0.6600	0.6893	0.6951	0.6116	0.6289	0.6377	0.6652
Bank41	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9406	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9255	0.9203	0.9203	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Bank42	0.8719	0.8682	0.8673	0.8424	0.7232	0.8175	0.6249	0.6669	0.7027	0.7344	0.7669	0.6656	0.8269	0.8465	0.8069	0.8054	0.7234	0.8062	0.7252	0.6319	0.8155	0.8155	0.6324	0.6625	0.7008	0.6969	0.7602	0.7733	0.8827	0.7795	0.7973	0.7642	0.8792
Bank43	0.9665	0.9647	0.9096	0.8580	0.8479	0.9133	0.9109	1.0000	1.0000	1.0000	1.0000	0.9219	0.6760	0.6432	0.6465	0.6751	0.5820	0.6636	0.6017	0.6466	0.6768	0.6768	0.6437	0.6497	0.5662	0.5703	0.6591	0.7516	0.7853	0.6958	0.6948	0.6584	0.7134

Table 8: American Banks: Profit Maximizing Effectiveness Scores

1.1 Orientation 1: Cost Minimization Efficiency and Cost Minimization Effectiveness:

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	0.2523	206000000.0000**	44.643
$Effi_t$	1.9237	63100000.0000	23.926
$Effi_{t-1}$	0.0514	12500000.0000	-10.501
$Effi_{t-2}$	-0.6034		44.699
$Effe_t$	-0.5813	-53800000.0000	-33.595
$Effe_{t-1}$		-17300000.0000	
$Effe_{t-2}$	-1.0046	-121000000.0000*	-22.755

Table 9: American Banks: Three different financial measures against Cost Minimizing Efficiency and Cost Minimizing Effectiveness. Financial Measures recorded one day before release of public information.

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	-0.3487	140000000.0000*	37.923
$Effi_t$	1.9268***	-2660000.0000	70.871*
$Effe_t$	-1.3270****	-150000000.0000****	-83.856****

Table 10: American Banks: Three different financial measures against Cost Minimizing Efficiency and Cost Minimizing Effectiveness. Financial Measures recorded same day as release of public information.

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	3.6225	84000000.0000	-689.81
$Effi_t$	-0.4918	12000000.0000	-99.605
$Effe_t$	0.7782	75100000.0000*	248.8

Table 11: Indian Banks: Three different financial measures against Cost Minimizing Efficiency and Cost Minimizing Effectiveness. Financial Measures recorded one day before release of public information.

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	1.4474**	-25900000.0000	233.23**
$Effi_t$	-0.3824	30400000.0000	-74.174
$Effe_t$	-0.1139	20300000.0000	115.09

Table 12: Indian Banks: Three different financial measures against Cost Minimizing Efficiency and Cost Minimizing Effectiveness. Financial measures recorded on same day as release of public information.

1.2 Orientation 2: Cost Minimization Efficiency and Profit Maximization Effectiveness:

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	-3.8076****	-222000000.0000***	-66.627
$Effi_t$	2.1381	88600000.0000	38.515
$Effi_{t-1}$	0.7093	84300000.0000	5.1258
$Effi_{t-2}$		-51000000.0000	61.047
$Effe_t$	1.5145*	149000000.0000**	18.684
$Effe_{t-1}$	0.7922	76600000.0000	
$Effe_{t-2}$			8.0651

Table 13: American Banks: Three different financial measures against Cost Minimizing Efficiency and Profit Maximizing Effectiveness. Financial Measures recorded one day before release of public information.

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	-4.0233****	-221000000.0000*	-65.468*
$Effi_t$	3.1886****	125000000.0000	113.68****
$Effe_t$	1.8129****	157000000.0000****	-0.30117

Table 14: American Banks: Three different financial measures against Cost Minimizing Efficiency and Profit Maximizing Effectiveness. Financial Measures recorded on same day release of public information.

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	2.3510	76400000.0000**	-859.95
$Effi_t$	-0.5158	13000000.0000	-117.91
$Effi_{t-1}$	0.0968		5.5316
$Effi_{t-2}$	-2.3016	-38400000.0000	442.49
$Effe_t$	0.9656	69800000.0000**	337.48*

Table 15: Indian Banks: Three different financial measures against Cost Minimizing Efficiency and Profit Maximizing Effectiveness. Financial Measures recorded one day before release of public information.

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	1.2138*	-29300000.0000	165.76
$Effi_t$	-0.5071	29400000.0000	-104.31
$Effe_t$	0.2856	24900000.0000	221.64

Table 16: Indian Banks: Three different financial measures against Cost Minimizing Efficiency and Profit Maximizing Effectiveness. Financial Measures recorded on same day release of public information.

1.3 Orientation 3: Profit Maximization Efficiency and Cost Minimization Effectiveness:

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	-0.9776	96800000.0000	38.681
$Effi_t$	3.3073	181000000.0000	44.892
$Effe_t$	-0.4772	-46000000.0000	-31.74

Table 17: American Banks: Three different financial measures against Profit Maximizing Efficiency and Cost Minimizing Effectiveness. Financial Measures recorded one day before release of public information.

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	-1.4730*	40500000.0000	32.459
$Effi_t$	3.0289****	94600000.0000	76.36*
$Effe_t$	-1.2317****	-138000000.0000*****	-84.686****

Table 18: American Banks: Three different financial measures against Profit Maximizing Efficiency and Cost Minimizing Effectiveness. Financial Measures recorded on same day release of public information..

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	1.6999	52700000.0000	-1040.4
$Effi_t$	-0.5864	8870000.0000	-80.363
$Effi_{t-1}$	0.1761	-3040000.0000	
$Effi_{t-2}$	0.8368		1132.6
$Effe_t$	0.7528	75000000.0000*	224.73
$Effe_{t-1}$	0.4815	48400000.0000	271.44

Table 19: Indian Banks: Three different financial measures against Profit Maximizing Efficiency and Cost Minimizing Effectiveness. Financial Measures recorded one day before release of public information.

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	1.4900*	-27200000.0000	220.29
$Effi_t$	-0.4547	31600000.0000	-42.768
$Effi_{t-1}$	.1761	-3040000.0000	4.8029
$Effe_t$	-0.0829	20000000.0000	99.315

Table 20: Indian Banks: Three different financial measures against Profit Maximizing Efficiency and Cost Minimizing Effectiveness. Financial Data recorded on same day release of public information.

1.4 Orientation 4: Profit Maximization Efficiency and Profit Maximization Effectiveness:

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	-4.3763****	-278000000.0000****	-65.57
$Effi_t$	3.1731*	171000000.0000	53.543
$Effi_{t-2}$	-0.9842	-113000000.0000	44.46
$Effe_t$	1.5250*	152000000.0000*	
$Effe_{t-1}$	0.7009	69800000.0000	-20.748

Table 21: American Banks: Three different financial measures against Profit Maximizing Efficiency and Profit Maximizing Effectiveness. Financial data recorded one day before release of public information

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	-4.5461****	-273000000.0000****	-65.325
$Effi_t$	3.8625****	184000000.0000****	118.08****
$Effe_t$	1.6338****	151000000.0000****	-7.3591

Table 22: American Banks: Three different financial measures against Profit Maximizing Efficiency and Profit Maximizing Effectiveness. Financial data recorded on same day as release of public information.

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	0.2663	33800000.0000	-1234
$Effi_t$	-0.6160	11700000.0000	-112.16
$Effe_t$	0.9162	67000000.0000	318.29

Table 23: Indian Banks: Three different financial measures against Profit Maximizing Efficiency and Profit Maximizing Effectiveness. Financial Measures recorded one day before release of public information.

	Est. TobinQ	Est. Market Cap	Est. Stock-price
(Intercept)	1.2659*	-30000000.0000	156.78
$Effi_t$	-0.6108	30300000.0000	-83.453
$Effe_t$	0.3389	24200000.0000	212.79

Table 24: Indian Banks: Three different financial measures against Profit Maximizing Efficiency and Profit Maximizing Effectiveness. Financial Data recorded on same day release of public information.