# The Performance Appraisal of Public and Private Banks in Turkish Banking System after 2008 Financial Crisis

Fatih Konak[1], E. Kübra Çelik[2]

*[1](Hitit University FEAS Department of Business Administration, Turkey)*
*[2](Hitit University Social Sciences Institute, Turkey)*

**Abstract:** *The main purpose of the financial system, the government, is directed to those in need of more funds belonging to companies and households. If the financial system is carried out in a correct and consistent manner also makes a substantial contribution to economic stability and growth in the country. In this study, were the sources of public and private banks operating in Turkey are determined according to various ratios they use effectively and efficiently. Effectiveness and efficiency are the key performance indicators of the company today, the event shows the current level to reach the target efficiency is defined as the ratio of output to input, obtained by available resources. In this study; rapidly growing and evolving 3 in the financial system in Turkey, state-owned commercial banks, 11 private deposit banks, 10 foreign capital established in Turkey deposit banks, and 4 opened a branch office in Turkey to foreign-owned banks as of 28 banks in total, 2008 - effectiveness of activities between 2013 and productivity TOPSIS of multi-criteria decision-making methods has been measured using the technique. According to the results; banks operating nationwide in 2008, which affected the global financial crisis and it is seen that the constant fluctuations in performance scores.*
**Keywords:** *Private-Owned Deposit Banks, Public Deposit Banks, TOPSIS*

## I. Introduction

Shareholders, creditors and investors have always been in search of investments in order to make use of their financial resources much better. In conjunction with the beginning of globalization phase, effectiveness and sufficiency have gained importance within the scope of banking sector that has been progressively growing and rapidly developing all around the world. Additionally, operations of international banks in many countries have also forced the pace of competition [1].Along with the formation and acceleration of a competitive environment, banks, managements and other corporations have been obliged to apply their operative and sufficient labor criteria in order to protect their profits from fluctuations that occur within the market due to the fact that performance analysis is observed as important in terms of crisis periods and acceleration of competition environment [2]. The concept of effectiveness is generally obtainment of maximum output through the use of an input or obtainment of an amount of output through the use of minimum inputs in the phase of production [3]. The concept of effectiveness in banking sector is defined as "collection of savings and turning them into investments". While savings are transformed into investments, use of resources shall remain at minimum level [4].The concept of efficiency is defined through proportioning of output and input. If unit of production uses a single input and obtains single output here, it would be easy to calculate. However, multiple inputs are used in obtainment of outputs in practice. Therefore, the term of efficiency becomes a definition through which inputs and outputs are proportioned to each other [1].When Turkish economy is considered, it is seen that dominance is focused on banking sector. In addition to this, negative and positive conditions in banking sector affect economy directly. Persons who obtain credit from banks and practice economy through banks demand for having information about financial conditions of the banks. Therefore, performance measurements of banks and other foundations are compulsory [5].In our day, in evaluation of economic circumstances of managements, it is observed that ratings that are obtained from financial tables are not solely sufficient. Parallel to this situation, decision methods with multi-criteria have an important role in decision making and have diversified into a wide area. For instance; Du-Pont Analysis, Data Envelopment Analysis, Multi-Criteria Decision Making Models (AHP, TOPSIS, VIKOR, and PROMETHEE etc.) are some of the methods that have developed [6].When literature is inspected, there have been a variety of studies in relation to TOPSIS method on national and international fields. TOPSIS method was primarily developed by Yoon and Hwang in 1981 as an alternative to Electre method [7]. It was used for waste management by Chen and Hwang (1992) in Canada, by referring to the study procured by Yoon and Hwang (1981) [8]. There are a lot of studies that were performed through the implementation of TOPSIS method. For example; in selection of the location of foundation that will minimize the effects occurring due to air pollution [9], in performance measurements of automotive firms [10], in selection of fabric supplier of passenger seats that are placed in public transport vehicles [11], in performance evaluations of performance of public banks [12].Some researchers have examined the application of multi-criteria decision-making problem upon a problem of machine selection in his study and has used Fuzzy TOPSIS.

It has determined significance levels of reliability, confidence, empathy and physical features of the factors that affect service quality of commercial banks in accordance with analytical hierarchy method in their study, and evaluated service performance of commercial banks by using TOPSIS method.Within the scope of this study, it is aimed to measure effectiveness and efficiency of commercial banks that have been rapidly growing and developing within financial system of Turkey between the years of 2009 – 2014 through the use of TOPSIS method. TOPSIS method is one of the methods of multi-criteria decision making. This method has been used on a series of fields such as marketing, health, finance and accounting, etc. The reason and advantage of frequent use of TOPSIS method is the fact that realistic results are obtained by making more reliable and healthy interpretations as a result of the differences between criteria that are found through each variable or alternative's gaining its own value [13].

## II. Methodology And Analysis

### 1.1. Data Set

In this study, effectiveness and efficiency of 28 commercial banks that have been active in Turkey, in relation to the terms of 2009 – 2014 after 2008 Financial Crisis were analyzed. Within this scope, data which is subjected to analysis were obtained from The Banks Association of Turkey. Banks and their categories within the framework of target point of the study are shown in Table 1.

### Table 1: The Banking System in Turkey

| Deposit Banks | Foreign Banks |
|---|---|
| *Public-Owned Deposit Banks* | *Banks Established in Turkey* |
| Turkish Republic Ziraat Bank | Alternatifbank A.Ş. |
| Turkish Republic Halk Bankası | Arap Türk Bankası A.Ş. |
| Turkish Republic Vakıf Bankası | Burgan Bank A.Ş. |
| | Citibank A.Ş |
| *Private-Owned Deposit Banks* | Denizbank A.Ş. |
| | Deutsche Bank A.Ş. |
| Adabank A.Ş. | Finans Bank A.Ş. |
| Akbank A.Ş. | HSBC Bank A.Ş. |
| Anadolubank A.Ş | ING Bank A.Ş. |
| Fibabank A.Ş. | Turkland Bank A.Ş. |
| Şekerbank T.A.Ş. | |
| Tekstil Bank A.Ş. | *Banks with Branches in Turkey* |
| Turkish Bank A.Ş. | |
| Türk Ekonomi Bankı A.Ş. | Bank Mellat |
| Türkiye Garanti Bank A.Ş. | Habib Bank Limited |
| Türkiye İş Bank A.Ş. | Societe Generale (SA) |
| Yapı ve Kredi Bank A.Ş. | The Royal Bank of Scotland Plc. |

Variables that were defined for performance evaluation of the banks that are active in Turkey are shown in Table 2.

**Table 2: Variables Used in the Analysis**

| *Asset Quality* | *Liquidity* |
|---|---|
| Financial Assets (Net) / Total Assets | Liquid Assets / Current Liabilities |
| Total Loans and Receivables / Total Deposits | TP Liquid Assets / Total Assets |
| Fixed Assets / Total Assets | FC Liquid Assets / Total Liabilities |
| *Profitability* | *Income - Expenditure Structure* |
| Net Profit (Loss) / Total Assets | Non-Interest Income (Net) / Total Assets |
| Net Profit (Loss) / Shareholders' Equity | Non-Interest Income / Interest Expense |
| Profit Before Tax / Total Assets | Total Income / Total Expenses |
| *Capital Adequacy* | |
| Equity / ((Required Capital Obligation credit + market + operational risk) * 12.5) * 100 | |
| Equity / (Non-Deposit Resources) | |
| Net On Balance Sheet Position / Shareholders' Equit | |

Weights of variables that were considered in the direction of research method within the scope of the model are given in Table 3.

**Table 3: Weight of Criteria**

| Criteria | Weight Vector |
|---|---|
| *Asset Quality* | |
| Financial Assets (Net) / Total Assets | 0.062 |
| Total Loans and Receivables / Total Deposits | 0.067 |
| Fixed Assets / Total Assets | 0.067 |
| *Liquidity* | |
| Liquid Assets / Current Liabilities | 0.067 |
| TP Liquid Assets / Total Assets | 0.067 |
| FC Liquid Assets / Total Liabilities | 0.067 |
| *Profitability* | |
| Net Profit (Loss) / Total Assets | 0.067 |
| Net Profit (Loss) / Shareholders' Equity | 0.067 |
| Profit Before Tax / Total Assets | 0.067 |
| *Income - Expenditure Structure* | |
| Non-Interest Income (Net) / Total Assets | 0.067 |
| Non-Interest Income / Interest Expense | 0.067 |
| Total Income / Total Expenses | 0.067 |
| *Capital Adequacy* | |
| Equity / ((Required Capital Obligation credit + market + operational risk) * 12.5) * 100 | 0.067 |
| Equity / (Non-Deposit Resources) | 0.067 |
| Net On Balance Sheet Position / Shareholders' Equit | 0.067 |

**1.2. TOPSIS Methodology**

Methodology with reference to TOPSIS method that is the most considered method of Multi-Criteria Decision-Making methods which is also used in our study is as it follows:

**1. Step Decision Matrix**

First step is the formation of decision matrix by the decision maker. In this matrix that is formed with m x p dimension, rows and columns represent different concepts. While rows represent decision points, evaluation factors are placed within columns. According to this method, 6 matrixes were formed between the

terms of 2009 – 2014. In the table; digits that are used in columns figure ratios that belong to the banks, while digits that are used in rows figure the banks.

$$
A_{ij} = \begin{bmatrix}
a_{11} & a_{12} & \ldots & a_{1n} \\
a_{21} & a_{22} & \ldots & a_{2n} \\
. & & & . \\
. & & & . \\
. & & & . \\
a_{m1} & a_{m2} & \ldots & a_{mn}
\end{bmatrix}
$$

### 2. Obtainment of Normalized Matrix

After the formation of decision matrix, standard decision matrix is formed by using formula number 1 that is given below. Through this formula, squares of all columns are added and each of the value that belongs to the column is divided to the square root of the addition of the column and normalization matrix is obtained. With the formula number 2 that is formed in consequence of the used formula, normalized decision matrix is procured.

$$
n_{ij} = \frac{a_{ij}}{\sqrt{\Sigma_{i=1}^{m} a_{ij}^2}} \qquad ( i= 1, \ldots\ldots , m \text{ ve } j=1, \ldots\ldots ,p ) \qquad (1)
$$

Normalized matrix is obtained as it follows;

$$
N = \begin{bmatrix}
r_{11} & r_{12} & \ldots & r_{1n} \\
r_{21} & r_{22} & \ldots & r_{2n} \\
. & & & . \\
. & & & . \\
. & & & . \\
r_{m1} & r_{m2} & \ldots & r_{mn}
\end{bmatrix} \qquad (2)
$$

### 3. Obtainment of Weighted Normalized Matrix

Weighting operation is procured in accordance with significance levels of the factors and executes the subjective side of TOPSIS method. Firstly, certain weights are given to the normalized matrixes. Later, values in each column will be multiplied by the weights by using the formula of $\sum_{i=1}^{m} wi = 1$ ($w_i = 1$) and weighted normalized matrix is procured.

$$
V = \begin{bmatrix}
w_1 r_{11} & w_2 r_{12} & \ldots & w_n r_{1n} \\
w_1 r_{21} & w_2 r_{22} & \ldots & w_n r_{2n} \\
. & & & . \\
. & & & . \\
. & & & . \\
w_1 r_{m1} & w_2 r_{m2} & \ldots & w_n r_{mn}
\end{bmatrix} \qquad (3)
$$

### 4. Obtainment of Ideal and Negative Ideal Solution Values

After procuring weighted normalized matrix at maximum with the value of A$^*$ and minimum with the value of A$^-$ , maximum values shall be determined that belongs to each column in order to obtain the ideal solution. Later, moreover, minimum values that belong to each column shall be identified in order to reach at the negative ideal solution.

**Values of ideal solution;**

$$
A^* = \left\{ (\max_i v_{ij} \mid j \in J),(\min_i v_{ij} \mid j \in J' \right\}
$$

**Values of Negative ideal solution;**

$$A^- = \left\{ (\min_i v_{ij} \mid j \in J), (\max_i v_{ij} \mid j \in J^{'}) \right\}$$

### 5. Calculation of Separation Measures

Value in relation to each decision point in the weighted standard decision matrix is subtracted from the ideal solution of its own column, obtained values are squared, values are added and the value of $S^*$ is procured. By applying the same operations, negative ideal separation $S^-$ is procured. Deviation values of decision points are named as Ideal Separation ($S_i^*$) and Negative Ideal Separation ($S_i^-$) Measures.

**Ideal Separation;**

$$S_i^* = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^*)^2} \qquad (4)$$

**Negative ideal separation;**

$$S_i^- = \sqrt{\sum_{j=1}^{n} (v_{ij} - v_j^-)^2} \qquad (5)$$

Here, amount of $S_i^*$ and $S_i^-$ will equate the number of decisions. .

### 6. Calculation of Relative Closeness to Ideal Solution

For calculation of each decision point's relative closeness to the ideal solution, ideal and negative ideal separation measures are used. In consequence of the operation stated below, the value of $C_i^*$ gains a value between 0 and 1. If the result is $0 \leq C_i^* \leq 1$, the result is close to the ideal solution. In reverse situation, if the result is $C_i^* = 0$, the result is close to the negative solution.

$$C_i^* = \frac{S_i^-}{S_i^- + S_i^*} \qquad (6)$$

**Table 4: Banks Ranking for the Period between 2009 to 2014**

| | *2009* | *2010* | *2011* | *2012* | *2013* | *2014* |
|---|---|---|---|---|---|---|
| **Deposit Banks** | | | | | | |
| *Public-Owned Deposit Banks* | | | | | | |
| Turkish Republic Ziraat Bank | 6 | 9 | 4 | 15 | 15 | 9 |
| Turkish Republic Halk Bankası | 7 | 10 | 8 | 8 | 11 | 7 |
| Turkish Republic Vakıf Bankası | 19 | 21 | 16 | 20 | 23 | 21 |
| *Private-Owned Deposit Banks* | | | | | | |
| Adabank A.Ş. | 1 | 2 | 1 | 1 | 1 | 1 |
| Akbank A.Ş. | 16 | 13 | 9 | 9 | 16 | 8 |
| Anadolubank A.Ş | 12 | 11 | 11 | 19 | 17 | 20 |
| Fibabank A.Ş. | 27 | 28 | 26 | 28 | 28 | 28 |
| Şekerbank T.A.Ş. | 14 | 14 | 15 | 16 | 10 | 16 |
| Tekstil Bank A.Ş. | 25 | 25 | 23 | 24 | 25 | 17 |
| Turkish Bank A.Ş. | 13 | 26 | 24 | 17 | 20 | 25 |
| Türk Ekonomi Bankı A.Ş. | 22 | 22 | 13 | 25 | 22 | 19 |
| Türkiye Garanti Bank A.Ş. | 11 | 12 | 6 | 11 | 18 | 15 |
| Türkiye İş Bank A.Ş. | 8 | 15 | 5 | 13 | 14 | 12 |
| Yapı ve Kredi Bank A.Ş. | 15 | 18 | 7 | 10 | 19 | 6 |
| **Foreign Banks** | | | | | | |
| *Banks Established in Turkey* | | | | | | |
| Alternatifbank A.Ş. | 20 | 20 | 25 | 23 | 21 | 22 |
| Arap Türk Bankası A.Ş. | 28 | 17 | 10 | 12 | 7 | 13 |
| Burgan Bank A.Ş. | 23 | 24 | 19 | 22 | 26 | 27 |
| Citibank A.Ş | 10 | 16 | 17 | 21 | 6 | 11 |
| Denizbank A.Ş. | 21 | 7 | 21 | 6 | 9 | 10 |
| Deutsche Bank A.Ş. | 2 | 3 | 18 | 18 | 3 | 26 |
| Finans Bank A.Ş. | 17 | 6 | 12 | 7 | 12 | 14 |
| HSBC Bank A.Ş. | 18 | 19 | 20 | 14 | 8 | 18 |
| ING Bank A.Ş. | 24 | 23 | 27 | 26 | 24 | 23 |
| Turkland Bank A.Ş. | 26 | 27 | 22 | 27 | 27 | 24 |
| *Banks with Branches in Turkey* | | | | | | |
| Bank Mellat | 5 | 8 | 14 | 5 | 2 | 2 |
| Habib Bank Limited | 3 | 5 | 3 | 3 | 5 | 5 |
| Societe Generale (SA) | 9 | 1 | 28 | 4 | 13 | 3 |
| The Royal Bank of Scotland Plc. | 4 | 4 | 2 | 2 | 4 | 4 |

In Table 4, sequence values of the banks that were active in Turkey between the years of 2009 – 2014 are given in consequence of TOPSIS method. Turkish Republic Ziraat Bank was in the 4th place in 2010 by having the highest effectiveness among the Deposit Banks with Public Capital. Turkish Republic Vakıf Bank, with the lowest effectiveness, was in the 23rd place in the year of 2012.

Due to the crisis that was experienced in 2008, effectiveness of the banks decreased by general means. While Turkish Republic Ziraat Bank was in 6th place in 2008, it reached to the 4th place in 2010 by reaching with record level. Adabank A.Ş. which has the highest efficiency among Deposit Banks with Private Capital was at the 1st place all the time except for the year of 2009. Fibabank A. Ş. With the lowest efficiency rate was at 26th, 27th and 28th places. For example, while Yapı Kredi Bank was in the 15th place in the year of 2008, it leapt to the 6th place with a record level in the year of 2012 due to the crisis that was experienced in 2008. In the same way, while Adabank was in 12th place in 2008, it has raised to 8th place in 2012.

Moreover, in terms of foreign capital banks that were established in Turkey, Deutsche Bank with the highest efficiency level was in the 2nd place in 2008. Turklan Bank was in the 27th place with the lowest efficiency level in the years of 2009, 2011 and 2012. By means of the banks with branches in Turkey, Societe Generale (SA) with the highest effectiveness rate was in 1st place in 2009 while it fell to the 28th place in 2010. Similarly, due to the crisis that was experienced in 2008, while it was in the 9th place in 2008, it has jumped to the 1st place in 2009. The Royal Bank of Scotland Plc. Was in 2nd place in 2010 and 2011.

## III.    Conclusion

Financial performance of banking sector that recently has an important place in financial service sector shall be tracked continually. Financial crisis that was primarily occurred in USA and later became influential all around the world proved the fact that the banking sector shall always be followed. Additionally, as well as performance measurements of banks provide early warnings for crisis, they are also important in terms of competitive capacity.

In compliance with the information obtained, 28 banks that have been rapidly growing and developing within financial system of Turkey, 3 of which are deposit banks with public capital, 11 of which are deposit banks with private capital, 10 of which are deposit banks with foreign capital that are located in Turkey and 4 of which are banks with foreign capital that have branches in Turkey were aimed to be measured in accordance with TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) technique for the years of 2009 – 2014. According to results of analysis; it is obvious that banks that are active all around the country got affected from global financial crisis period of 2008 and there are continuous fluctuations in their performance points.

## References

[1].    Albayrak, Y. E., & Erkut, H. (2005). Banka Performan Değerlendirmede Analitik Hiyerarşi Süreç Yaklaşımı. İstanbul Teknik Üniversitesi Mühendislik Dergisi, 47-58.
[2].    Aydoğan, K., & Çapoğlu, G. (1989). Bankacılık Sistemlerinde Etkinlik ve Verimlilik: Uluslararası Bir Karşılaştırma. Ankara: MPM Yayınları:397.
[3].    Baykara, H. V. (2012). Katılım Bankalarında Etkinlik ve Verimlilik Analizi. Gaziosmanpaşa Üniversitesi Sosyal Bilimler Enstitüsü, 1-121.
[4].    Cingi, S., & Tarım, A. (2000). Türk Banka Sisteminde Performans Ölçümü DEA Malmquist TFV Endeksi Uygulaması. TBB, AraGtırma Tebliğleri Dizisi(1), 2.
[5].    Çetin, A. C., & Bıtırak, İ. A. (2010). Banka Karlılık Performansının Analitik Hiyerarşi Süreci İle Değerlendirilmesi: Ticari Bankalar ile Katılım Bankalarında Bir Uygulama. Alanya İşletme Fakültesi Dergisi, 75-92.
[6].    Demireli, E. (2010). Topsis Çok Kriterli Karar Verme Sistemi: Türkiye'deki Kamu Bankaları Üzerine Bir Uygulama. Girişimcilik ve Kalkınma Dergisi, 101-112.
[7].    Duman, B., & Işık, E. N. (2010). TOPSIS Yöntemi Kullanılarak Toplu Taşıma Araçları için Yolcu Koltuğu Kumaş Tedarikçisi Seçimi. Yöneylem Araştırması ve Endüstri Mühendisliği 30. Ulusal Kongresi.İstanbul: Kadir Has Üniversitesi.
[8].    Kadıoğlu, S. (2012). 02 19, 2016 tarihinde http://www.slideshare.net/SelinKadolu/topsisok-kriterli-karar-verme adresinden alındı
[9].    Maliki, A., Owans, G., & Bruce, D. (2012). Combining AHP and TOPSIS Approaches to Support Site Selection. International Conference on Environmental and Agriculture Engineering , 1-8.
[10].    Saldanlı, A., & Sırma, İ. (2014). Topsis Yönteminin Finansal Performan Olarak Kullanılabilirliği. Marmara Üniversitesi Öneri Dergisi, 185- 200.
[11].    Şamiloğlu, F., Tükenmez , N. M., & Bağcı, H. (2013). Ticari Bankalar ile Katılım Bankalarının Karlılık Performanslarının Topsis Yöntemi İle Karşılaştırılması. 17. Finans Sempozyumu, 263-279.
[12].    Yayar, R., & Baykara, H. V. (2012). TOPSİS Yöntemi ile Katılım Bankalarının Etkinliği ve Verimliliği Üzerine Bir Uygulama. Business and Economics Research Journal, 21-38.
[13].    Yurdakul, M., & İç, Y. T. (2003). Türk Otomotiv Firmalarının Performans Ölçümü Ve Analizine Yönelik Topsis Yöntemini Kullanan Bir Örnek Çalışma. Gazi Üniversitesi Mühendislik ve Mimarlık Fakültesi Dergisi, 1-18.