Factors Affecting the Efficiency of Islamic and Conventional Banks in Turkey

H. Ali Ata [1]

Mehmet Fatih Buğan [2]

Abstract

In recent years, Islamic finance has raised much interest in Turkey as it has in the rest of the world. Islamic banking has an important role in the injection of savings into the economy and in the rapid and efficient transfer of resources. Therefore, in this study, the objective is to determine the factors that play a role in the efficiency of conventional and participation banks that operate within the Turkish banking system. For this reason, bank efficiencies were first measured with the help of Data Enveloping Analysis (DEA) and then factors that affect bank efficiency were determined by using the Tobit regression model. In the study, it has been concluded that the factors that affect the efficiency of banks are asset size and net interest margin.

1. Introduction

"Participation banking" in Turkey is the application of an interest-free finance system known to the world as interest-free banking or Islamic banking, which has been developed according to Islamic principles. The stress on the interest-free aspect is due to the Islamic religion's prohibition on interest. Accordingly, participation banking

---

1. Professor at the Department of Business Administration, Gaziantep University in Turkey. He received his Ph.D. in Accounting and Finance in 2004 from the Selçuk University

2. PhD candidate at Department of Business Administration, Gaziantep University/Turkey. He wrote his master's thesis in Islamic Finance. Also, he has 4 published articles in internatioal academic journals about Islamic banking and finance.

operates on the basis of the principles of Islamic financing. The most fundamental aspect that distinguishes Islamic finance from the current modern financing is the operation of the system without interest and the lack of cash financing.

In Turkey, Islamic financing first operated under the name of Special Finance Institutions and it first became an issue first in 1983. It was incorporated into the Turkish banking system in 2005 under the name of participation banking. In the recent years, participation banks have rapidly progressed and increased their shares in the Turkish banking sector. Since 2005, the number of branches in the participant banking sector has increased by 341% and the number of personnel has increased by 283%. Between 2005–2014, the asset size of the Turkish banking sector has increased by 390%, while the asset size of the participation banking sector has increased by 948%. While the asset size of participation banks in the sector was 2.44% in 2005, this ratio was 5.19% in June 2015 (Banking Regulation and Supervision Agency [BDDK], 2015).

Generally speaking, banks' intermediation role in the financial system forces them to use their funds efficiently for the sound operation of the system as a whole. Participation banks, which have fewer resources relative to conventional banks, have to use their resources efficiently in order to achieve competitive advantage and to maintain their development. For this reason, the objective of this study is to determine the factors affecting the efficiency of conventional and participation banks. First, we review the relevant literature and provide information on the data set, which has been created by using the financial data of the relevant banks and the statistical methods. In the concluding section, recommendations have been developed in the light of the findings.

2. Literature

Banks, which are one of the indispensable components of the financial system, are intermediaries to transactions taking place in the financial markets. Past global and local financial crises have shown that problems in the banking sector negatively affect the welfare of economic units and national economies. For this reason, the existence of a sound banking system and the efficient use of bank resources are necessary for the effective operation of the financial system.

In many of the studies on efficiency in banking, it is seen that DEA and the Tobit regression model are often used in the determination of efficiency and of factors affecting efficiency (Atan & Çatalbaş, 2005; Casu & Molyneux, 2003; Garza-García, 2012; Gishkori &Ullah,

2013; Ismail et al., 2013; Jackson & Fethi, 2000; Jha et al., 2013; Noor & Ahmad, 2012; Rao & Lakew, 2012; Xiping & Yuesheng, 2007; Yayar & Karaca, 2014).

In the studies that have already been conducted, there is disagreement on the direction of the effect of bank size and capital adequacy on bank efficiency. Jackson and Fethi (2000), Atan and Çatalbaş (2005),Hassan (2006),Xiping and Yuesheng (2007), Tahir et. al. (2011), Noor and Ahmad (2012), Rao and Lakew (2012), Gishkori and Ullah (2013), Ismail et al. (2013) and Yayar and Karaca (2014) all argued that bank size positively affects efficiency, while Darrat et al. (2002) and Jha et al. (2013) argued that it negatively affects efficiency. Similarly, there are different studies that argued that capital adequacy negatively (Atan & Çatalbaş, 2005; Jackson & Fethi, 2000; Yayar & Karaca, 2014) or positively (Casu & Molyneux, 2003; Ismail et al., 2013; Jha et al., 2013; Rao & Lakew, 2012) affects bank efficiency. However, it is a common result of studies that profitability positively affects efficiency (Jackson & Fethi, 2000;Casu &Molyneux, 2003; Brown et. al., 2007; Noor & Ahmad, 2012; Gishkori & Ullah, 2013; Jha et al., 2013; Yayar & Karaca, 2014) and credit quality negatively affects efficiency (Garza-García, 2012; Ismail et al., 2013; Jha et al., 2013; Rao & Lakew, 2012).

However, it is understood that, especially in the studies on the Turkish banking system (Jackson & Fethi, 2000; Isik & Hassan, 2002(a,b); Atan & Çatalbaş, 2005; Yayar & Karaca, 2014) only conventional banks were included and participation banks were excluded from this sort of research. Therefore, in this study, a data set has been created in which participation banks operating in Turkey were also included in the analysis. It is expected that the study will contribute to the current literature in this direction.

3. Data and Method

In the study, financial statement data from 2006–2014 of 11 conventional and 4 participation banks whose stocks are traded at Borsa İstanbul (BIST) have been used. Two different data sets for DEA and the Tobit regression model have been created. The variables used in DEA are shown in Table 1.

Table 1. The variables used in DEA

Input	Output
Deposits	Loans and Receivables
Interest Expenses	Interest Incomes
Non-Interest Expenses	Non-Interest Incomes

According to the intermediation approach, it is accepted that the primary operating activity of banks is intermediation in fund supply and demand. Accordingly, because input and output variables need to be determined based on the banks' fund sources and uses functions, deposits and other liabilities are evaluated as input and loans, and receivables and other assets are evaluated as output. Moreover, expenses that the banks incur to collect funds in order to trade funds are accepted as input while incomes generated as a result of fund allocation are accepted as output. Thus, for the banks that make collected deposits available as loans, interest incomes, and interest expenses (which constitute most incomes and expenses), can be used as output and input variables, respectively. In the intermediation services, which are the primary operating activities of banks, the non-interest expenses incurred and the non-interest incomes generated can be used as input and output. The input and output variables, which have been determined in the light of these presuppositions and assumptions, are also the variables generally used in the literature (Seyrek & Ata, 2010; Bektaş, 2013; Özdemir & Demireli, 2013).

The efficiency scores calculated as a result of DEA are used as dependent variables in the constructed panel Tobit regression model. The independent variables used in the Tobit regression and their explanations are shown in Table 2.

Table 2. The independent variables used in the Tobit regression

Variables	Explanations
Bank size	Natural logarithm of total assets
Operational efficiency	Net interest margin= (interest incomes-interest expenses)/ net profit
Capital adequacy	Total equity to total loans
Credit quality	Non-performing loans/total loans
Expenses	Operating expenses/ total assets

Asset size has been used as an indicator of bank size. Although there are studies in which a significant and positive relationship has been detected between asset size and bank efficiency (Jackson & Fethi, 2000; Hassan et. al., 2004;Atan & Çatalbaş, 2005;Xiping & Yuesheng, 2007; Gishkori & Ullah, 2013), there are also studies that determined a significant and negative relationship between the two (Darrat et al., 2002; Jha et al., 2013). Net interest margin that is calculated as the ratio of net interest income (which banks generate as a result of intermediation that is their primary operating activity)

to net profits, has been used as an indicator of operational efficiency. In this study, a positive relationship is expected between net interest margin and efficiency. The ratio of equity to assets or loans can be used as an indicator of capital adequacy. These ratios are helpful in determining whether equities are sufficient in the face of possible losses caused by the activities of banks. In this study, the ratio of equity to loans has been used and a positive relationship with efficiency is expected. The share of non-performing loans in total loans has been used as an indicator of the credit quality of banks. A negative relationship is expected between efficiency and non-performing loans. The expense item is the ratio of operating expenses to total assets. A negative relationship between this ratio and efficiency is expected.

4. Findings

With the determined input and output variables, DEA's output-focused scale efficiency model has been applied. Average DEA results on a bank-type basis are shown in Table 3.

Table 3. DEA results

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Participation Banks	1	1	1	1	0,985	0,968	1	0,981	1
Conventional Banks	0,953	0,983	0,988	0,970	0,948	0,971	0,977	0,956	0,943

The efficient use of bank resources is either the success of achieving maximum output with a determined level of input or of achieving a determined output level with minimum input. This success involves both the capability to produce at an optimum scale and the administrative capability to manage the inputs. Table 3 shows that the efficiency scores of participation banks are higher than conventional banks. Throughout the analysis period, the only exception is the year 2011. The conclusion is that participation banks are more efficient than conventional banks.

In the study, a panel Tobit regression model in which DEA outputs are dependent variables was also constructed. The model is defined as in Formula 1.

$$DEA_{i,t} = \beta_0 + \beta_1 Asset_{i,t} + \beta_2 NIM_{i,t} + \beta_3 Equity_{i,t} + \beta_4 Credit_{i,t} + \beta_5 Expenses_{i,t} \text{ (I)}$$

In the formula, DEA represents efficiency score, ASSET is the natural logarithm of asset size, NIM (net interest margin) is the net interest margin, EQUITY is the ratio of equity to total loans, CREDIT is the ratio of non-performing loans to total loans, and EXPENSES is the ratio of operating expenses to total assets.

The Tobit regression model outputs, where the banks' efficiency scores are estimated as dependent variables, are shown in Table 4.

Table 4. Tobit regression results

Variables	Coefficient	Stand. error	z-stat	p-value
Constant	-0.251584	0.116079	-0.216735	0.0302**
ASSET	0.234758	0.033508	0.700597	0.0000*
NIM	0.768783	0.284285	0.270427	0.0068*
EQUITY	0.389010	0.911242	0.426901	0.6695
CREDIT	-0.242004	0.191780	-0.126188	0.2070
EXPENSES	-0.269177	0.409631	-0.657121	0.5111

* and ** Indicates significance at the 1% and %5 level, respectively

According to Table 4, there is a significant and positive relationship between bank size and efficiency. The findings show results similar to the previous studies (Atan & Çatalbaş, 2005; Gishkori & Ullah, 2013; Jackson & Fethi, 2000; Xiping & Yuesheng, 2007). This situation shows that bank size is an important factor affecting efficiency. Net interest margin, which is an indicator of operational efficiency, can also serve as an indicator of real operating profitability for banks. When the intermediacy function of banks is considered, the share in bank profits of income generated as a result of real operating activities is expected to be high. The analysis results show a positive and significant relationship between net interest margin and efficiency. According to this result, there is a relationship within the operational scope between banks' real operating profitability and bank efficiency. It can be seen that when profit margin increases as a result of real operating activities, so does efficiency.

Although the Tobit regression results show a positive relationship between bank efficiency and capital adequacy, and a negative relationship with credit quality and expenses, there was not a statistically significant relationship.

Conclusion

In this study, the efficiencies of conventional and participation banks and the factors affecting bank efficiency have been investigated and the efficiencies of 11 conventional and 4 participation banks listed in the BIST have been calculated with DEA for the 2006–2014 time period. The analysis has revealed that the participation banks had a higher efficiency than conventional banks, except for the year 2011.

In addition, the Tobit regression model has been used in order to detect the factors that play a role in the efficiency of banks. At the end of the analysis, a positive and significant relationship has been established between bank efficiencies and asset size and the net interest margin. The effects of other variables are not statistically significant. It has been understood that the factors affecting bank efficiency are bank size and net interest margin. Therefore, we can conclude that as bank size and net interest margin increase, bank efficiencies will also increase.

In the calculation of bank efficiencies, variations in inputs and outputs used in the DEA method directly affect the efficiency result. Therefore, it is possible to produce different efficiency scores with different input and output variables. Accordingly, in future studies, different efficiency scores can be established with the Tobit regression model and the effects of different variables on efficiency can be investigated.

As the number of participation banks operating in Turkey is low, it is not possible to determine factors that affect efficiency on the basis of bank groups. Therefore, in future studies it will be possible to comparatively determine the factors affecting bank efficiency with the help of data from Islamic and conventional banks from different countries.

References

Atan, M. and Çatalbaş, G. K. (2005). "Bankacılıkta etkinlik ve sermaye yapısının bankaların etkinliğine etkisi". *Iktisat Isletme ve Finans*, *20*(237), 49–62.

Bektaş, H. (2013). "Türk Bankacılık Sektöründe Etkinlik Analizi". *SOSYOEKONOMİ*, 277.

BDDK,www.bddk.org.tr.Available athttp://www.bddk.org.tr/WebSitesi/default.aspx.

Brown, K., Hassan, M. K., & Skully, M. (2007). Operational efficiency and performance of Islamic banks. Handbook of Islamic Banking, 96.

Casu, B. and Molyneux, P. (2003). "A comparative study of efficiency in European banking". *Applied Economics*, *35*(17), 1865–1876.

Darrat, A. F., Topuz, C. and Yousef, T. (2002). "Assessing cost and technical efficiency of banks in Kuwait". *Unpublished paper. The ERF 8th Annual Conference, January, Cairo*

Garza-García, J. G. (2012). "Determinants of bank efficiency in Mexico: a two-stage analysis". *Applied Economics Letters*, *19*(17), 1679–1682.

Gishkori, M. A. and Ullah, N. (2013). "Technical Efficiency of Islamic and Commercial Banks: Evidence from Pakistan Using DEA Model (2007-2011)". *Journal of Business and Management (IOSRJBM)*, *7*, 68–76.

Hassan, M. K., Al-Sharkas, A., & Samad, A. (2004). An empirical study of relative efficiency of the Banking Industry in Bahrain. Studies in Economics and Finance, 22(2), 40–69.

Hassan, M. K. (2006). The X-efficiency in Islamic banks. Islamic Economic Studies, 13(2), 49–78.

Ismail, F., Majid, M. S. A. and Rahim, R. A. (2013). "Efficiency of Islamic and conventional banks in Malaysia". *Journal of Financial Reporting and Accounting*, *11*(1), 92–107. doi:10.1108/JFRA-03-2013-0011

Isik, I., & Hassan, M. K. (2002,a). Technical, scale and allocative efficiencies of Turkish banking industry. *Journal of Banking & Finance*, *26*(4), 719–766.

Isik, I., & Hassan, M. K. (2002,b). Cost and profit efficiency of the Turkish banking industry: An empirical investigation. Financial Review, 37(2), 257–279.

Jackson, P. M. and Fethi, M. D. (2000). "Evaluating the efficiency of Turkish commercial banks: An application of DEA and Tobit Analysis". Available at https://lra.le.ac.uk/handle/2381/369.

Jha, S., Hui, X. and Sun, B. (2013). "Commercial banking efficiency in Nepal: application of DEA and Tobit model". *Information Technology Journal*, *12*(2), 306–314.

Noor, M. A., and Ahmad, N. H. (2012). The Determinants of World Islamic Banks' Efficiency: Does Country Income Level have an Impact? *Journal of Islamic Economics, Banking and Finance*, *8*(2), 9–44.

Özdemir, A. and Demireli, E. (2013). "Ağırlık Kısıtlı Veri Zarflama Analizi İle Mevduat Bankalarının Etkinlik Ölçümüne Yönelik Bir Uygulama". *Uluslararası Yönetim İktisat ve İşletme Dergisi*, *9*(19), 215–238.

Rao, K. R. M. and Lakew, T. B. (2012). "Cost Efficiency and Ownership Structure of Commercial Banks in Ethiopia: An application of non-parametric approach". *European Journal of Business and Management*, *4*(10), 36–47.

Seyrek, İ. H. and Ata, H. A. (2010). "Veri Zarflama Analizi ve Veri Madenciliği ile Mevduat Bankalarında Etkinlik Ölçümü". *BDDK Bankacılık ve Finansal Piyasalar*, *4*(2), 67–84.

Tahir, I. M., Bakar, N. B., & Haron, S. (2011). Evaluating Efficiency of Islamic Banks Using Data Envelopment Analysis: International Evidence. *Journal of Islamic Economics, Banking and Finance*, *7*(1), 11–24.

Xiping, W. and Yuesheng, L. (2007). "Banking Efficiency in China: Application of DEA and Tobit Analysis". *International Conference of Management Science and Engineering of IEEE, Available at* http://www.seiofbluemountain.com/upload/product/201001/1263801732sjpnzhnd.pdf

Yayar, R. and Karaca, S. S. (2014). "Türk Bankacılık Sektöründe Etkinlik Analizi". Available at http://acikerisim.nigde.edu.tr:8080/jspui/handle/11480/319.