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RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ

# Determining and Examining the Performance Index of Dual Banking System: A Panel Data Comparative Analyse for Turkey

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**ABSTRACT**

In addition to basic financial transactions, the banks generate a variety of financial instruments and exploits the advantages associated with the globalization trend. It is not realistic to speak of an alternative that would end the domination of the interest-based conventional system in the global economy. However, Islamic banking, operating based on the profit and loss share, has become popular despite the fact that it has been introduced only some decades ago in some Muslim countries. The Islamic banking system has been in recent years compared to the conventional banking system. Measures taken in light of findings based on studies focusing on different variables and datasets will help minimize the impacts of the recessions and crises in the near future. This study analyzes the performance of three Islamic and nine conventional banks in Turkey after the 2008 global financial crisis (in the period of 2010-2015) by reliance on the panel data model. The findings in the study reveal that the conventional bank performance affects the banksize, reserves, real effective exchange rate and real interest rate whereas the impact has been greater in the case of Islamic banks upon banksize, deposit rate, reserves, market concentration, real effective exchange rate and real interest rate.

**Keywords:** Islamic Finance, conventional banks, performance index
**JEL Codes:** G21, C58

**ÖZ**

**Dual Bankacılık Sisteminin Performans Endeksinin Oluşturulması ve İncelenmesi: Türkiye İçin Karşılaştırmalı Panel Veri Analizi**

Bankalar temel finansal işlemlerin dışında pek çok farklı çeşidi olan finansal enstrümanlarda üretmekte, vadeli işlem piyasalarından-hisse senedi piyasalarına kadar uzanan oldukça

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geniş yelpazade faaliyet göstermektedirler. Küreselleşme trendinin avantajlarından fazlasıyla istifade eden ve giderek sofisteki hale gelen finans sektörünün lokomotifi, mevduat bankacılığı olarak da bilinen, konvansiyonel bankacılık sistemidir. Faiz tabanlı konvansiyonel sistemin küresel ekonomi üzerindeki hegomanyasını sona erdirebilecek bir alternatiften, en azından yakın gelecekte, söz etmek mümkün değildir. Öte yandan bir kaç on yıl önce islam ülkelerinde temelleri atılan ve faizsiz karzarar ortaklığı (PLS) prensibi üzerine inşa edilen İslami bankacılık alternatif olarak öne çıkmakta ve giderek artan oranda konvensiyonel bankalarla karşılaştırmalı analizlere konu olmaktadır. Farklı değişken ve veri setlerinin yardımıyla yapılan çalışmalar sonucu elde edilen bulgular ışığında alınan tedbirler, yakın gelecekteki resesyon ve krizlerin olumsuz etkilerini minimize etmeye yardımcı olur. Bu çalışmada Türkiye'de faaliyet gösteren üç İslami ve dokuz konvansiyonel bankanın, 2008 küresel finans krizi sonrası döneminde, 2010-2015 yılları arasındaki performasnlarını panel data modeli yardımıyla analiz edilmiştir. Analiz sonucunda konvansiyonel bankaların performaslarını banka büyüklüğü, reservler, reel efektif döviz kuru, reel faiz oranı değişkenlerinin etkilediği görülürken, İslami bankaları banka büyüklüğü, mevduat oranı, rezervler, pazar yoğunluğu, , reel efektif döviz kuru, reel faiz oranı değişkenlerinin daha fazla etkilediği sonucuna varılmıştır.

**Anahtar kelimeler:** İslami Finans, konvansiyonel bankalar, performans analizi
**JEL Sınıflandırması:** G21, C58

## EXTENDED ABSTRACT

Financial institutions collect excessive resources of what saving holders have accumulated and distribute these funds to those who in the real sector are in need of them. By doing so, they make sure that saving holders make revenue out of their investments and allow the real sector to perform large scale production via efficient investments. The better the relationship between these two sectors in an economy, the higher the welfare level will be. The capital stock that grows via channeling savings towards investments reduces the costs of knowledge and transaction. For this reason, particularly in developing nations, saving deficit causes serious problems in financing the real sector. This eventually leads to an underachievement of the growth potential, a key to the welfare level of society.

Even though there is a disagreement in the literature as to whether the real sector leads to growth in financial markets or the financial markets to the real sector, the views on the banking sector are clear. Financial stability, one of the main elements of the economic climate, is attained via strong and sound financial instutions. Some nations have alternatives other than conventional models. Islamic Finance is the most important alternative in this regard. The most

instrumental financial options in these institutions are interest-free banks. For instance, in some countries including Malaysia, Indonesia, United Arab Emirates, Yemen, Bangladesh, Jordan, Egypt and Turkey, both participation banks and conventional banks work at the same time. In some countries hosting dual banking system, conventional banks are allowed to provide Islamic banking services; but some others including Turkey do not let conventional banks act like an Islamic Finance institution. The greatest advantage of the countries with a dual system is that the participation banks attract idle funds that holders keep due to the religious restrictions on taking interest. The interaction between the two systems directly affects the structuring of the institutions that take lead in various initiatives in these countries.

The economic circumstances of the global markets force the banks to use the funds most effectively. To do this, the banks have to evaluate their performance in sectors where they compete and improve their ability and skills of competition and effectiveness. Efficiency and productivity analyses are very important managerial tools to measure the performance of the banks in terms of competitiveness and effectiveness. In this regard, the banking sector is central in economic development. The analysis of effectiveness and efficiency criteria is essential for a better performance analysis of the banking sector. There are a number of scholarly works on the efficiency and effectiveness of the banking system. In the literature, models are used to estimate whether or not costs are minimized or the profits are maximized. In the current financial markets where competitiveness becomes bitter and changes are observed rapidly, managers, investors and banks ponder over how to make the financial products and services more efficient. In general, efficiency methods in the banking sector are divided into three groups: ratio analysis, parametrc methods and non-parametric methods. Ratio analysis is performed by observation of the mathematical relation that occurred by the ratio of one input to the outputs. The most popular method of this sort is CAMEL analysis. The Camels analysis, utilized by the rating institutions in assessing performance of the banks, is an evaluation system that attracts a great deal of attention and acceptance in a number of countries by the national auditing authorities to determine the track of the general outlook.

The focus of this study is the analysis of the performance of the Islamic and conventional banks in Turkey by reliance on a panel data model where performance index (PI) serves as dependent variable and overhead ratio, banksize, deposit ratio, reserves, market concentration, real effective exchange rate and real interest rate are independent variables. The diverse internal and external criteria affecting the performance of the banks (financial and local economic macro indicators) make it hard to develop effective solutions in times of recession. For this reason, identification of domestic and external factors affecting bank performance is very important for establishment of a strong banking structure.

## Introduction

The Islamic finance system (IF) which has become extremely popular in different parts of the world particularly because of the prohibition of interest under the precepts of Islam is now able to compete with the conventional financial system that operates on the principles of minimum risk and maximum profitability. Islamic banking completes the conventional system by adding depth to the financial sector because all banking transactions have to be interest-free. The main distinction between Islamic finance and conventional finance is that it rejects the idea of relying on speculative and potentially destructive instruments as well as situations as it refers to the principle of avoiding gharar (extreme uncertainty), maysir (gambling) and excessive risks. Under the scheme of Islamic finance, regulated by the main principles of Islamic law, the parties have the right to conclude a variety of agreements based on risk sharing and the provision of funds in the presence of assets. For this reason, the repayment of loans is almost guaranteed in this system.

IF considers universal ethical values as a source of operations; from this perspective, it offers a moral ground for the customers as well as the market players. Because risk is mostly associated with the real changes in the interest rates in conventional system, the banks face moral hazard or assymetric problems in case of returning loans (Yanpar, 2015). On the other side, PLS models in loaning activities minimizes the loan risks by creating advantages in terms of the loan risk

premiums that the banks have to reserve (Mills & Presley, 1999). IF also ensures additional revenue for the saving holders by taking the idle funds to the system, regulates the distribution of income, channels sources to the real sector, contributes to public finance through payment of taxes and supports socio-cultural activities.

It could be argued that the success of IF in recent years could be attributed to its performance during the 2008 global economic crisis. Given that the world interest system is interest-based, it is not easy to think that the long-term interest-based fund offered by conventional banking system would prevent damages in times of crisis. Most of the time, the entire economy pays for the repercussions of the crisis as in the one in 2008 because any problem in the financial system will have a chain reaction to other sectors. For this reason, regulating the financial sector takes priority in the administration of the economic policies.

This study deals with the developments and crises in the banking sector in Turkey in recent decades and further analyzes the evolution of IF. The empirical part of the study is focused on the measurement of the performance of the banking sector in several sectors. Accordingly, a performance index of the conventional and IF banks in Turkey is offered for a comparative analysis of some variables.

**Financial crises and Islamic Finance in Turkey**

IF which has become an important part of the financial system in Turkey was incorporated into the banking legal system through an amendment in 2005 and renamed participation banks. The main goal of the banks was to contribute to the development of national economy through attracting the idle funds of the people who did not trust conventional system due to religious sensitivities to the economy (Doğan, 2013). Currently there are six participation banks active in the financial system of Turkey. Number of branches increased from 225 in 2004 to 1080 in 2015. The size of the actives rose from 7.3 billion TL in 2004 to 133 billion in 2017. The main indicator is their 5 pct share within the financial sector.

Currently, there are three types of banks in Turkey: saving, development and investment banks. Saving banks, the most common type of conventional banking, accept deposits from individuals and offer loans for those who want to use larger amount of funds. The main function of the development and investment banks is to provide funds for the economies lacking sufficient amount of capitals for investment. These banks make huge contribution to the implementation of development policies. Conventional banks are the most important, among these three types. However, their domination in the sector often led to serious crises in the past. Yet Turkey seems to have drawn lessons from the past and introduced proper measures for stability in the conventional banking system.

The conventional banking can be traced back to the Ottoman times whereas IF was first introduced three decades ago. Huge progress has been made in the banking sector after the introduction of financial liberalization policies in the 1980s. The involvement of the foreign banks in investment activities in Turkey led to product diversity in the financial sector. But in the 1990s, fluctuations in the system deeply affected the economy. The sector became extremely fragile due to the lack of capitals and the weakness of internal auditing systems associated with the financial liberalization process. Some banks, affected by the crises, halted their operations in the 1994 economic crisis.

The growing amount of foreign investments offered an opportunity for the banks to diversify their products towards greater profitability. In general, the amplification of investment opportunities reduces risks. However, this was not the case in Turkey. Poor regulative arrangements made the banks greedier. However, lack of strong regulations and the banks' eagerness for greater profits led to huge problems (Sevim & Eyüboğlu, 2016). Chronic structural problems have become irresolvable in the 2000s. The financial sector has experienced serious crises due to political instability and failed economic policies. The increased interest rates caused serious problems in the economy, forcing the banks to go banckrupt. A number of banks, in this unstable environment, were confiscated by the state (Sarıtaş, Uyar, & Gökçe, 2016). This trigerred a crisis which became evident in 2001. The financial crisis experienced in 2001 was the most severe one in the history of the nation.

The Turkish banking sector had its greatest test in November 2000 and February 2001 when Turkey encountered serious problems due to the lack of liquidity and interest risk. To ensure that the conventional banking system would become more durable, a program was introduced for restructuring the banking sector in May 2001. The program aimed at strengthening the banking sector and financial system through regulations to maintain efficiency, flexibility and transparency. As part of the program, the banking law was significantly amended (Pehlivan, 2015). To maintain control over the sector, banking regulation and supervision board was established. Additional measures were further taken to ensure success of the reform program (Sarıtaş et al., 2016).

The average annual growth in the sector has been 20 pct mostly because of the valued Turkish currency. Some additional positive developments have taken place in terms of deposits, loan volume and movable assets. The size of loans has expanded thanks to the decreased inflation and interest rates and the positive expectations; their share within the banking sector has also declined (Ata, 2009). The balance of sheets of the conventional banks showed some serious improvement after these measures. It was interesting to note that despite that most conventional banks were transferred to the state authorities due to poor management, no participation bank faced this measure. This indicated that the IF institutions survived the most destructive crisis in the history of Turkey.

Similar problems were experienced in the global economic crisis in 2008. Conventional financial institutions have gone bankrupt in different parts of the world whereas the IF institutions survived the crisis with minimum damage. These experiences attracted attention towards the two structural features of IF. IF uses the funds in supporting firms active in the real sector rather than investing in the risk-involving financial markets; this alleviates the impact of a crisis. Most of the usable resources are offered for the real sector players in different ways including production support, financial leasing and PLS. The funds offered on a project basis make a positive contribution to the economy. In a real economy, the chance of a bubble is often low because there will be no serious risk for a financial crisis. A second important feature of IF is its ability to channel idle funds in Islamic countries

to the economy. Most economists agree that the main reason for the relative underdevelopment in the Muslim world could be attributed to lack of a developed financial system. People avoid offering their savings to the financial system in Islamic countries mostly due to religious reasons, causing a serious financial problem in the economy. IF deals with the problem and offers a reliable ground for the customers so they would channel their funds to the economic system.

Despite some criticisms, IF appears to be an alternative to the mainstream conventional system. A number of countries, including some non-Muslim ones, offer new regulations to attract the IF investments. On the other hand, some economists are of the view that this is a temporary attention, noting that IF will become less popular once the oil revenues decline in the Gulf States. But despite this criticism and argument, IF is growing its market share in different parts of the world including Turkey.

**Performance evaluation in banking sector**

In modern economies, all sectors have to be focused on productivity and efficiency in order to stand against loss of profits caused by internal and external factors. For this reason, performance analysis involving elements of efficiency has gained growing importance in business enterprises. A number of banks make efforts to establish financial monitoring and measurement systems because relevant stakeholders including customers, investors and depositors would like to become familiar with how their bank is doing financially.

But due to the complexity of the process and the need for considering a wide range of elements and variables, performance measurement is not an easy task today. It is particularly harder in the banking sector because performance is measured by both financial and non-financial criteria. The performance measurement of the service systems requires consideration of some abstract variables including financial indicators, service quality, customer satisfaction and staff satisfaction (Albayrak & Erkut, 2005). And profit margin depends on the effective and efficient use of all these elements (Doğru, 2011). For this reason,

theories and scholarly views focusing on the management models of the banks are considered important in the literature.

**Theoretical approach and current literature**

Klein (1971) argue that the interest rates applicable to deposits of the banks depend on the efficiency in their efficiency in loaning and the parameters of the deposit source functions. In an environment of risk and uncertainty, the banks have to act like a rational investor; the traditional portfolio theory fails to explain the banks attempts to create actives. In an alternative approach, Baltensperger (1980) analyzes the portfolio management problems, optimal asset selection models and responsibility management models to explain banking models. The approach discusses Klein's theory and focuses on the anti-risk models. Naturally, a model seeking to explain a banking theory should inevitably involve a discussion on the characteristic features of the obligations, the production activities of the banks and the risks that the banks would face.

In their study, Rashid and Jaaben (2016), using CAMELS' ratios (Capital Adequacy, Asset Quality, Menagement, Earnings, Liqudity, Sensitivity to Risk), analyze the banking performance of the conventional and Islamic banks in Pakistan in three categories (bank-specific, financial and macroeconomic) by calculating the Financial Performance Index (FPI). They conclude by using the panel regression analysis for a period of 2006-2012 that operating efficiency, reserves and overheads are effective in explaining the performance of the conventional banks, and operating efficiency, deposits and market concentrations for the performance of the Islamic banks.

Samad (2004), on the other hand, compares the performances of the Islamic and conventional banks in Bahrain for a period of 1991-2001 in terms of profitability, liquidity risk and credit risk by using the Sudent t-test. In terms of profitability and liquidity, there is no significant difference between Islamic and conventional banks; but the study finds that there is visible difference in terms of credit performance between the two types.

Bader, Mohamad, and Hassan (2008) compare 43 Islamic and 37 conventional banks in 21 countries for a period of 1990-2005 in terms of cost, revenue and profit efficiency by reliance on data envelopment analysis. The study which reviews the seniority, size and regions of the banks concludes that there is no significant difference between the Islamic and conventional banks.

Iqbal (2001), in a study that compares 12 conventional and 12 Islamic banks in 12 countries for a period of 1990-1998 by relying on a trend analysis in reference to the variables of total equity, total deposits, total investment, total assets, total revenue and to the ratios of capital/asset ratio, liquidity ratio, deployment ratio, cost/income ratio, ROA (Return of asset) ROE (Return of equity). The study concludes that Islamic banks have performed much better for the period of 1998-2001.

Samad and Hassan (1999) analyze the inter-temporal performance of Bank Islam Malaysia for a period of 1984-1997 by using T-test and F-test and Profitability Ratios, Liquidity Ratios, Risk and Solvency Ratios, and conclude that BIMB is more liquid and less riskier than 8 conventional banks. Jaffar and Manarvi (2011) analyze 5 Islamic and 5 conventional banks for a period of 2005-2009 in terms of the CAMEL (Capital Adequacy, Asset Quality, Management Quality, Earning Ability and Liquidity) components. They conclude that Islamic banks perform better in terms of capital adequacy and liquidity whereas conventional banks do better in terms of management quality and earning ability. The study also notes that there is no significant difference in terms of asset quality.

Al-Tamimi (2010) analyzes the determinants of the performance of the 22 conventional and 5 Islamic banks in the United Arab Emirates (UAE) for a period of 1996-2008 by using a regression analysis that involves ROA and ROE as dependent variables. As independent variables, the study uses GDP per capita, bank size, financial development indicator, liquidity, market concentration, cost and number of branches. The study concludes that liquidity and concentration plays an influential role in determining the performance of the conventional banks whereas number of branches and cost are more visible determinants in the performance of Islamic banks.

Hanif, Tariq, Tahir, and Momeneen (2012) study the internal and external factors affecting the performance of 22 conventional and 5 Islamic banks in Pakistan in the period of 2005-2009. The internal factors are profitability, liquidity, credit risk and solvency whereas they rely on consumer satisfaction. The findings of the study suggest that customers prefer Islamic banks mostly because they operate on sharia rules. Customers of the conventional banks, on the other hand, prefer these banks because of the opportunities. Credit risk and solvency are dominant factors for Islamic banks whereas profitability and liquidity are dominant for conventional banks.

Beck, Demirgünç-Kunt, and Merrouche (2013) compare the performance of 422 conventional and 88 Islamic banks in terms of business orientation, efficiency, asset quality and stability for 22 countries in the period of 1995-2009. In addition, they analyze how 166 conventional and 41 Islamic banks are affected by the global financial crisis in 2008. They do not find any difference in terms of business model between the two systems as well as in terms of business orientation, risk-taking and stability, but conclude that Islamic banks serve as shields towards 2008 crisis thanks to higher capitalization and better asset quality.

Fayed (2013) analyzes 3 Islamic and 6 conventional banks in Egypt for the period of 2008-2010 by relying on some financial ratios. The findings reveal that conventional banks perform better than Islamic banks in terms of profitability, liquidity, credit risk and solvency. Siraj and Pillai (2012) find in their study where they analyze 6 Islamic and 6 conventional banks in the GCC for the period of 2005-2010 by reliance on ANOVA test that conventional banks perform better in terms of profitability whereas Islamic banks are better in terms of operating profit and that Islamic banks are affected less by the crises. Youssef and Samir (2015) compare 2 Islamic and 3 conventional banks in Egypt for a period of 2010-2013 in terms of their performance, taking ROA and ROE dependent variables. Islamic banks perform better in terms of asset quality whereas they perform poorer in terms of capital adequacy and management quality. Ariss (2010) analyzes the competitiveness of Islamic and conventional bank in global markets in 13 countries for the period of 2000-2006 and focus on the profit differences. The study finds

that Islamic banks reserve larger amount of assets to financial activities and that they perform poorer in terms of competitiveness.

## Scope of the research

The performance determination of the banks is a fairly important criterion for both the economic actors and the banking system as well. For this reason, the goal of the study is to create an index based on the frequently repeated performance criteria in the literature to measure the performance of the conventional and Islamic banks and to analyze which variables affect the intra-banking performance of these banks for Turkey. In addition, the study will further offer insights for a possible comparison of the determinants of the performances of the Islamic and conventional banks in Turkey.

The focus of this study is the analysis of the performance of the Islamic and conventional banks in Turkey by reliance on a panel data model where performance index (PI) serves as dependent variable and overhead ratio, banksize, deposit ratio, reserves, market concentration, real effective exchange rate and real interest rate are independent variables. The diverse internal and external criteria affecting the performance of the banks (financial and local economic macro indicators) make it hard to develop effective solutions in times of recession. For this reason, identification of domestic and external factors affecting bank performance is very important for establishment of a strong banking structure.

## Data and Methodology

This study analyzes nine conventional banks[1] and three Islamic banks[2] quoted in the stock exchange by using monthly data for the period of 2010-2015. The variables used in the study have been obtained by the standardization of a number of components taken as a benchmark of banking performance. The

[1] Conventional Banks: Akbank, Finansbank, Şekerbank, Halkbank, Yapı Kredi, Garanti Bankası, Denizbank, İş Bankası, Vakıf Bank

[2] Participation Banks: Albaraka Türk, Kuveyt Türk, Türkiye Finans

benchmarks and components of the performance are given in details in Table 1 (Rashid & Jaaben, 2016; Teker, Teker, & Kent, 2011). The data has been compiled from the Turkish Banking Association (TBB), Turkish Union of Participation Banks (TKBB), the Banking Regulation and Supervision Agency (BDDK) and the International Financial Statistic CD ROM (IFS) and then included in the model.

**Table 1: Performance Index (PI) Criteria and Components**

| Performance Characteristics | Weight ($\alpha$) | Performance Factors | Weight (W) |
|---|---|---|---|
| Management Efficiency | 15% | Profit Per Branch<br>Profit Per Employee<br>Noninterest Income/Noninterest Expenditure | 20%<br>40%<br>40% |
| Profitability | 30% | Net Income/Equity<br>Net Income/Asset<br>Net Interest Income/Loans+Securities | 50%<br>30%<br>20% |
| Liquidity | 15% | Liquidity Indicators (Cash+Cash Equivalent+Deposits in Banks+Avaliable for Sale and Trading Receivables from Money Markets) / (Demand Deposits+1 Month Deposit+Payables to Money Markets) | 100% |
| Capital Adequacy | 15% | Capital Adequacy Ratio<br>Capital Ratio | 80%<br>20% |
| Asset Quality | 15% | Nonperforming Loans / Loans | 100% |
| Growth | 10% | Growth of Deposits<br>Growth of Loans | %50<br>%50 |

**Source:** Teker et al. (2011)
**Market Value of Stocks /Equity variable has not been calculated (except for AlbarakaTürk) for the Islamic banks in the analysis because their bonds are not processed at the stock exchange; the general weighing has been obtained by evaluation of the components through significant results on the banking performance.*
*** Items on interest revenues and expenditures are taken as the profit share items in the bank sheets for the Islamic banks in the calculation of the performance index.*

Table 1 presents the Performance Index (PI) to determine the performances of the Islamic and conventional banks included in the analysis. Performance factors have first been standardized as follows in this process:

$$Z_{ijt}=(\beta_{ijt}-\mu_{jt})/\sigma_{jt}$$

In this equation, $\mu_{jt}$ and $\sigma_{jt}$ refer to the average of the j factor and standard error in t time, and the j factor value of the i bank in t time respectively. The

standardization has a normal distribution that has o average and 1 standard deviation. The reason we perform standardization is to run a correct calculation by combining the variables in different scales under one scale (Rashid & Jaaben, 2016; Teker et al., 2011). Then, the standardized data has been calculated as follows:

Management Efficiency : $ME_{it}=W_{1it}Z_{1it}+W_{2it}Z_{2it}+W_{3it}Z_{3it}$
Profitability : $PR_{it}=W_{1it}Z_{1it}+W_{2it}Z_{2it}+W_{3it}Z_{3it}$
Liquidity : $LQ_{it}=W_{1it}Z_{1it}$
Capital Adequacy : $CA_{it}=W_{1it}Z_{1it}+W_{2it}Z_{2it}$
Asset Quality : $AQ_{it}=W_{1it}Z_{1it}$
Growth : $GR_{it}=W_{1it}Z_{1it}+W_{2it}Z_{2it}$

Here, $Z_{it}$ is the standardized version of the parameters of the PI for the bank i at t time.'t' $W_{it}$ refers to the weighs determined before at t time for factor i. After these, the PI index of every bank has been calculated as follows:

$$PI_i=\alpha_{j1}ME_{it}+\alpha_{j2}PR_{it}+\alpha_{j3}LQ_{it}+\alpha_{j4}CA_{it}+\alpha_{j5}AQ_{it}+\alpha_{j5}GR_{it}$$

Here, $\alpha_j$ refers to the predetermined weighs for all banks, and $ME_{it}$, $PR_{it}$, $LQ_{it}$, $CA_{it}$, $AQ_{it}$, $GR_{it}$ to the performance characteristics of the bank i at t time. The PI index for every bank in the period of 2010-2015 has been modeled as follows in form of a dependent variable in the model that involve macroeconomic variables for both the Islamic and conventional banks:

$$PI_{it}=\alpha+\beta_1 OR_{it}+B_2 BS_{it}+\beta_3 DR_{it}+\beta_4 lnRS_{it}+\beta_5 MC_{it}\beta_6 RER_{it}+\beta_7 RIR_{it}+\varepsilon_{it}$$

Here, $PI_{it}$ denotes the PI for the banks in the analysis, α refers to fixed parameter, $\beta_1$, $\beta_2$, $\beta_3$, $\beta_4$, $\beta_5$, $\beta_6$, $\beta_7$ to slope parameter, $OR_{it}$ to Overhead Ratio, $BS_{it}$ to Banksize, $DR_{it}$ to Deposit Ratio, $lnRS_{it}$ to reserves taken its logarithms (lnReserves), $MC_{it}$ to Market Concentration, $RER_{it}$ to Real Effective Exchange Rate, $RIR_{it}$ to Real Interest Rate, $\varepsilon_{it}$ to error term.

The variables used to measure the bank performance in the analysis include gross domestic product (GDP) referring to economic growth and consumer price index (CPI) referring to the inflation; other independent variables are left out the model.

Overhead ratio: This is the ratio showing the expenses relevant to the banking activities. It is calculated OR=non-interest expenses/total assets in the model (Demirgüç-Kunt & Huizinga, 2000; Rashid & Jaaben, 2016).

Banksize: This refers to the total bank assets. Because banksize=ln(totl bank asset) refer to large numbers, natural logarithm is taken (Dietrich & Wanzenried, 2014; Rashid & Jaaben, 2016).

Deposit ratio: Refers to bank deposits, expected to influence the bank performance significantly. Calculated as deposit ratio=deposit/equity (Rashid & Jaaben, 2016).

Reserves: refers to funds banks reserve for collateral damages. Particularly less developed and developing nations hold larger amount of reserves; but this leads to low profitability (Rashid & Jaaben, 2016).

Market concentration: refers to concentration in banking sector. k–bank concentration index is frequently used in the literature to calculate this ratio. k refers to the largest banks in the sector; by reliance on this index, it is possible to measure the concentration of total actives, total loans and total deposits (Coşkun et al., 2012). This study deals with the 4 banks with largest amount of total actives to measure an index in this study. It is calculated as $CR_k = \sum_{i=1}^{k} S_i$, $0<CR_k<1$, $s_1 \geq \ldots \geq \ldots \geq s_n$.

Real effective exchange rate: Refers to the weighed average value of Turkish lira, based on basket of foreign currencies most frequently used in Turkey's foreign trade. The ultimate value is obtained through the purification of this value from the price movements. It is assumed to affect banking performance in developing and less developed nations.

Real interest rate: It is obtained through $RIR=\left[\frac{1+i}{1+r}\right]-1$ (Fisher equation). In this equation, i refers to nominal interest rate and r to the annual inflation rate. It is expected to negatively affect the bank performance in developing and less developed nations.

Panel data analysis method has been used in the study in order to evaluate multiple data for a given period of time. A dataset balanced panel has been created because we are able to access to all data on the variables. To run a panel data analysis, we first need to decide on which model to choose. To do this, F test is used to test whether there is a unit impact in the model (Baltagi, 2001). By using this test, $H_0$:$\mu_i$=0 where the impacts of all units are equal to zero. In addition, LM and LR tests are also run to test the classical model against the fixed and random effect models. It appears that the classical model is appropriate, based on the F, LM and LR test results.

After the model test, autocorrelation test should be run because autocorrelation means deviation from basic assumptions. Whether there is autocorrelation in the model is tested by Wooldridge test (Tatoğlu, 2012). According to the Wooldridge test results, there is inter-unit autocorrelation in the regression model set up for both conventional and Islamic banks. One of the main assumptions in the panel data analysis is to test the changing variance (heteroskedasticity), tested in the classical model by White test. There is no heteroskedasticity in both regression models.

Because there is autocorrelation in both regression models, the results obtained from the AR(1) correlation error correction model that are specific to the units and inter-unit correlation of the Prais-Winsten predictor are shown in Table 1 and Table 2.

**Analysis results**

Table 2 shows that Banksize, Reserves, Real Effective Exchange Rate, Real Interest Rate variables are statistically significant. It is observed that real effective

exchange rate is most influential on the bank performance. In addition, real interest rate negatively affects reserves performance whereas real effective exchange rate has a positive impact. It also appears that overhead ratio, market concentration and deposit ratio has no impact upon the performance of the conventional banks.

It could be argued that lack of a positive impact by market concentration upon performance could be associated with the fact that the first four banks included in the measurement of the index are banks included in the analysis. ın addition, lack of any impact by the overhead ration upon bank performance means that the bank operation expense revenue ratio is low. A one-unit increase in the real effective exchange rate leads to 8 pct of the increase in the bank performance; this indicates that currency pressure in banking sector in Turkey is extremely high.

**Table 2: Conventional Bank Panel Data Results (PI Dependent Variable)**

| Group of Variables | Variables | Test Result | P>\|z\| |
|---|---|---|---|
| Bank Variables | Overheads Ratio | 5.29 | 0.313 |
| | Banksize | 1.07* | 0.003 |
| | Deposit Ratio | -0.22 | 0.242 |
| | Reserves | -0.80* | 0.000 |
| Financial Indicators | Market Concentration | -0.27 | 0.449 |
| Macro Indicators | Real Effective Exchange Rate | 8.07* | 0.000 |
| | Real Interest Rate | -1.45** | 0.018 |
| Constant | (α) | -18.93* | 0.000 |
| **Other tests on Panel Regression model** | | | |
| Number of observations | 54 | | |
| Number of units | 9 | | |
| $R^2$ | 51.10 | | |
| F (μ i =0) | F (8,38)=1.50 | Prob>F=0.1912 | |
| LR test (Random effects ML Regression) | Chibar2(01)=0.00 | Prob>Chibar2=1.000 | |
| Breusch and Pagan LM test $H_0$:$\sigma_\mu^2$=0 | Chibar2(01)=0.28 | Prob>Chibar2=0.2868 | |
| White test | $X^2$ (31)=30.27 | Prob> $X^2$=0.5036 | |
| Wooldridge Test | F(1,8)=6.728 | Prob>F=0.0319 | |
| Wald test | $X^2$ (7)=151.77 | Prob> $X^2$=0.000 | |
| rhos | 55.99 58.29 | 27.52 -31.51 | |

**Note:** *indicates at the %1 level, **indicates significant at the %5 level, ***indicates significant at the %10 refer to levels of significance.

Table 3 indicates that Bank Size, Deposit Ratio, Reserves, Market Concentration, Real Effective Exchange Rate, Real Interest Rate are statistically significant. In addition, market concentration and real effective exchange rate are highly influential over the performance. However, overheads ratio has no influence and impact upon the performance of the banks. The findings confirm that market concentration has no effect upon conventional bank performance whereas it has a positive impact for the IF banks. In addition, real effective exchange rate has strong negative impact upon both conventional and IF banks as well.

**Table 3: Islamic Banking Panel Data Results (PI Dependent Variable)**

| Group of Variables | Variables | Test Result | P>\|z\| |
|---|---|---|---|
| Bank Variables | Overheads Ratio | 2.19 | 0.758 |
| | Banksize | 4.97* | 0.000 |
| | Deposit Ratio | 1.50*** | 0.093 |
| | Reserves | -3.50* | 0.000 |
| Financial Indicators | Market Concentration | 39.11* | 0.000 |
| Macro Indicators | Real Effective Exchange Rate | -16.79* | 0.000 |
| | Real Interest Rate | -4.39* | 0.000 |
| Constant | ($\alpha$) | -2.73 | 0.676 |
| **Other tests on Panel Regression model** | | | |
| Number of observations | 18 | | |
| Number of units | 3 | | |
| $R^2$ | 82.06 | | |
| F ($\mu$ i =0) | F (2,8)=2.47 | Prob>F=0.1457 | |
| LR test (Random effects ML Regression) | Chibar2(01)=0.00 | Prob>Chibar2=1.000 | |
| Breusch and Pagan LM test $H_0$:$\sigma_\mu^2$=0 | Chibar2(01)=0.00 | Prob>Chibar2=1.000 | |
| White Test | $X^2$ (17)=18.00 | Prob> $X^2$=0.3888 | |
| Wooldridge Test | F (1,2)=0.154 | Prob>F=0.7323 | |
| Wald test | $X^2$ (7)=153.98 | Prob> $X^2$=0.000 | |
| Rhos | -35.17 50.38 | 38.09 | |

***Note:*** ** indicates at the %1 level, ** indicates significant at the %5 level, ***indicates significant at the %10 refers to levels of significance.*

## Conclusion

There are a number of studies on the banking performance in the literature. This study which investigates the performances of nine conventional and three Islamic banks for a period of 2010-2015 concludes that Market concentration, real

effective exchange rate performance have determinative impact for Islamic banks; real effective exchange rate is effective in the conventional banks. The study further notes that overheads ration has no significant impact upon both types of banks.

This shows that either the activity expenses of the banking sector in Turkey are relatively small or the banks enjoy a high level of profitability. Another striking point to underline is that real effective exchange rate has a positive impact upon conventional bank performance whereas it has a negative impact in the Islamic banking. This can be attributed to the size of the deposits held in the banks. The performance of the Islamic banks is poorer when compared to the nine conventional banks for the period of 2010-2015. For this reason, the IF system needs to improve managing efficiency and profitability by offering derivative products to capital and money markets.

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