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RESEARCH ARTICLE

Does It Matter How to Fund?: A Research on Turkish Deposit Banks

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Abstract
The Aim of this paper is to examine the possible relationship between liability structure and bank performance. In this context, panel data regression method is used to analyze relationship between bank performance and liability structure of banks. The main data source in this study is The Banks Association of Turkey's banking statistics between 2005-2018. In the analysis, liability preferences of Turkish banks are used as independent variables and CAMELS performance scores of banks are used as dependent variable. Additionally, variables that are admitted in literature as bank performance determinants are taken into consideration in bank performance model as control variables. According to the results, the banks' performance is affected by several liability structure variables. Use of loans-especially long term loans- and to have high saving deposits/total deposits positively affect bank performance; while extensive use of non-deposit liabilities, third alternative liability sources, long-term deposits, and foreign currency loansnegatively affect bank performance. As with other liability structure variables, high capital adequacy ratio and leverage also have negative effect on bank performance. Moreover, as control variables GDP per capita, inflation rate, interest rate, bank size, bank efficiency, bank liquidity, bank risk and bank market share have a statistically significant effect on bank performance.

Keywords

Banks' Liability Structure, Fund Preference, Turkish Deposit Banks, Bank Performance, CAMELS Rating System

Introduction

Banks have a wide range of fund options thanks to the increase in diversity of financial instruments and the depth and volume of financial markets. They manage their liabilities in this wide range of fund options and differentiate fund sources according to their fund needs.

Since each fund source has its own pearls and pitfalls; banks' preference in terms of fund sources may have an effect on their performance and this possible relationship should be tested in a scientific perspective. However, studies related to bank performance determinants are not interested in the liability management's effect on bank performance.

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Banks by definition are exposed to high cash flow & investment risk, and cost of liabilities. Therefore, they are obliged to manage asset and liabilities more carefully than any other firm in any sector (Kusy & Ziemba, 1983:1). Banks can prepare for future uncertainities, manage interest, exchange, liquidity and credit risk better (Dash and Pathak,2009:1), perform more efficiently and understand better their overall position in terms of obligations using of asset and liability management (Romanyuk,2010:1). Also, global financial crises in the last decade showed us the vulnerability of countries' financial systems. Today, risks are more contagious in different countries' financial environment. The asset and liability management plays a crucial role in managing these risks thanks to its role in allocation of funds for a given risk structure (Tektaş et al.,2005:135). Until 1960s, asset and liability management was made up of the asset management because banks regard liabilities as exogenous factors contributing to the limitation of asset management. However, today financial system changed radically and liability management is a part of a competition between banks for low cost and strategic financing (Kosmidou and Zopounidis, 2004a:1-2). Therefore, banks need to manage liabilities quite effective to be successful in today's competitive environment. This situation brings the need of question the effect of bank liability structure on bank performance.

Banks' performance is quite influential on general macroeconomic condition of countries (Sevim and Eyüboğlu,2012:212; Karaçor et. al,2017:48) because, it affects business growth, wealth and capital accumulation (Taşkın,2011:289). Since today's banking sector is more competitive and the financial sector is quite influential on general economic condition of countries, banks need to review their performance regularly (Ecer, 2013:172). The main characteristics of survivors in competitive business environment is measuring performance periodically and implementing proactive solutions according to measurement results (Dinçer and Görener, 2011:110). In this perspective, the determinants of bank performance should be known by banks to improve their performance in competitive banking environment. Otherwise, performance review without improvement may cause to fall behind of sector standards and setback in economic condition. Therefore, as a possible bank performance determinant, banks' liability structure should be evaluated carefully like other possible bank performance determinants.

The Aim of this paper is to answer the need for research on relationship between bank liability structure and bank performance. Within this framework, in the first part, bank liabilities are summarized and different fund options that banks can use are presented. In the second part, as a bank performance measure CAMELS scoring system is explained. The third part consists of literature review on bank performance. The fourth part includes analysis on relationship between bank performance and bank liability structure in scope of Turkish deposit banks. Lastly, in the conclusion part, research results are discussed.

Bank Liabilities

Bank liabilities are composed of deposits, non-deposit liabilities and other liabilities. Deposits are the main fund source for banks and they constitute notable percentage of bank liabilities. Non-deposit liabilities are sort of liabilities that compensate the deficiencies of deposits. Non-deposit liabilities can be seen as the second alternative fund sources for banks. Lastly, other liabilities are all of the liabilities that can not be classified as deposits and non-deposit liabilities. These type of liabilities constitute very low ratio of deposit bank liabilities and other liabilities are the third alternative fund sources for banks.

Deposit can be defined as accepted money to be paid when it is demanded or on the maturity date (Turkish Banking Law, 2005: Article 3). Banks use different kinds of deposits according to customer and bank needs. Firstly deposits can be categorized into three types according to the term structure. *Demand deposits* can be withdrawn by customer at any time without bank's permission (Karapınar,2013:39). On the other hand, *time deposits* are accepted deposits that can not be withdrawn before maturity without losing interest income (Yalvaç, 2008:540). As a hybrid type deposit, *notice deposits* are accepted deposits that can be withdrawn only by noticing bank before withdrawal. Secondly, deposits can be categorized into four groups according to the depositor type. *Saving deposits* are type of deposits that belong to a natural person and not to be used for commercial purpose (Güney, 2009:74). *Commercial deposits* are type of deposits that belong to commercial entities or natural person deposits that is used for commercial purpose (Battal, 2004:107). *Government deposits* are kind of deposits that belong to government entities. *Interbank deposits* are banks' deposits that are kept for interbank transaction purposes (Güney,2009:76). Thirdly, deposits can be categorized into *local currency deposits* and *foreign currency deposits* in terms of currency type (Vurucu &Arı,2014:297).

Non-deposit liabilities are composed of *loans borrowed, money market payables, securities issued and investment funds*. Banks need loans for funding and they generally use syndicated loans. Syndicated loans are type of loans that have huge volume and more than one bank come together to give this loan because the risk is quite high as a result of amount of money borrowed (Hurn, 1990:2). In Turkey, deposit banks use loans for long-term fund needs because, average deposit term is 3 months in Turkey. Also, banks use loans for foreign exchange fund needs. In Turkey, about %90 of the loans borrowed are composed of foreign currency loans. Banks can also use money market for funding. They use *interbank exchange market, settlement and custody bank market, repurchasing agreements and central bank money market* in terms of money market options (Çelik, 2018:13-18). Since banks are legal entities, they can issue securities and can use them for their fund needs. Banks can issue *bonds* for long term fund needs (Vurucu & Arı, 2014:300-310) and can issue *commercial bill*s for short term fund needs. Banks can also issue asset backed securities. *Asset backed securities* can be

defined as financial instruments that are sold after the pooling of different type of receivables. These receivables are turned into cash before maturity by banks and investors that buy asset backed securities can collect receivables at maturity (Ceylan & Korkmaz, 2014:453). Also banks can use asset backed securities by issuing debt instrument that has collateral of banks' receivables. In this type of asset backed securities, banks continue to report receivables that are collateral for debt instrument on the assets side and the debt instrument in the liability side. In Turkey, deposit banks issued very little amount of securities as late as 2010. After 2010, they concentrated more on securities (The Banks Association of Turkey Database, 2005-2018). Lastly, banks also use a different kind of investment funds according to bank and customer requirement.

As a third alternative fund source for banks, other liabilities are composed of *derivative liabilities, provisions, deferred tax liabilities, subordinated debt instruments, and unclassifiable liabilities*.

Figure.1 shows the distribution of the deposit bank liabilities between 2005 and 2018 in Turkey. According to the figure, the main fund source for Turkish deposit banks is deposits. However, in the analysis period, especially after 2010 the share of deposits slightly decreased and share of the non-deposit liabilities slightly increased. This trend can be explained by short deposit term structure in Turkey. Banks prefer the non-deposit liabilities because of the term advantage. Equity's share is constant because of the capital adequacy ratio regulations. Lastly, other liabilities' share is constant in the analysis period.

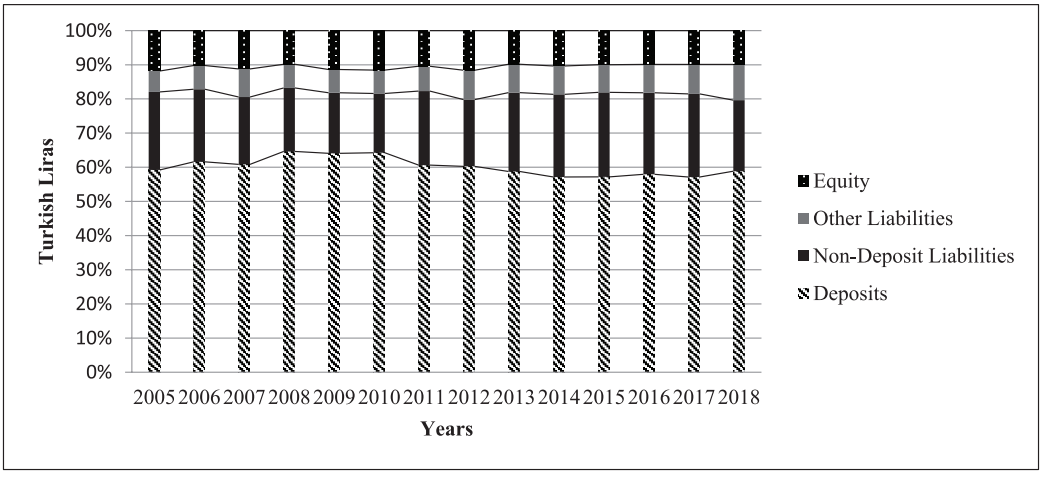

Figure 1. Distribution of Deposit Bank Liabilities in Turkey

Source: The Banks Association of Turkey Database, 2005-2018

Camels As a Bank Performance Measure

In the literature, different methods and indicators like return on equity (ROE), return on assets (ROA), net interest margin (NIM), efficiency (technical efficiency, scale efficiency etc.), data envelopment analysis (DEA) and grey relation analysis (GRA) are used for bank performance measurement (Mishkin,2004:228; Çelik, 2018:37-45). CAMELS method differentiates from other methods in bank performance measurement with its multi-dimensional structure. This method uses five different dimensions in bank performance measurement (Kaya, 2001:2-6).

As a result of need for standard bank performance evaluation system by regulators like Federal Reserve Bank (FED), Federal Deposit Insurance Corporation (FDIC) and Office of the Comptroller of the Currency (OCC), UFIRS – Uniform Financial Institutions Rating System began to be used in 1979 in United States of America (USA). Later, this rating system became popular with the abbreviation of CAMEL that is formed by first letters of capital adequacy (C), asset quality (A), management quality (M), earnings (E) and liquidity (L). In this system, bank auditors give score on scale of 1-5 to banks in terms of each component of the CAMEL. While 1 is the best score in this scale; 5 is the worse. After 1997, sensitivity to market risk component (S) is added and this method's abbreviation became CAMELS (Feldman & Schmidt, 1999; Lopez, 1999).

In this paper, CAMELS system is preferred because of its multidimensional advantage in bank performance measurement. Another reason to prefer CAMELS performance score as bank performance measure is deficiency of ROA, ROE and NIM in explaining banking failures. ROA, ROE and NIM are profit-oriented ratios in explaining bank performance. However, a bank with high profit ratios may fail because of different reasons. For example, İmar Bankası maintained to be quite profitable in pre-crisis period of 1999-2000 while the banking sector had negative profit ratios in terms of ROA and ROE because of negative economic conditions (The Banks Association of Turkey Database,2000). However, İmar Bankası failed in 2001 economic crisis. In the literature, different determinants like surplus/loan, bond/asset, reserve/deposit, deposit/asset ratios (Wheelock, 1992); managerial inefficiency (Wheelock and Wilson, 1995), technical inefficiency (Berg et. al,1992), and CAMELS components (Cole and White, 2012) are used to forecast bank failures. CAMELS can catch different factors that cause low bank performance thanks to measuring bank performance in terms of five components. Hence, CAMELS is a good method to judge safety and soundness of the commercial banks (Cole and White, 2012:5).

In CAMELS system, scores are obtained through simple calculations (Tükenmez, et. al,2010):

- Firstly, for each ratio (A) that is used in C, A, M, E, L, and S components, reference ratio is calculated by averaging ratio of all banks in the measurement.

- Secondly, for each bank, index value is calculated by formula of $\frac{100 * Bank's\ Ratio}{Reference\ Ratio}$
- Thirdly, deviation values are obtained:
- If the relationship sign (B) is positive then: Index Value - 100
- If the relationship sign (B) is negative then: 100 – Index Value
- Fourthly, weighted values are obtained through multiplying deviation values with ratio weight (C) formula.
- Fifthly, weighted values are added up to obtain component values in terms of C, A, M, E, L, and S.
- Lastly, CAMELS index score is obtained through formula of $\sum_{i=1}^{6} Component\ Value_i * Component\ Weight\ (D)_i$ (while 1: Capital Adequacy, 2: Asset Quality, 3: Management Quality, 4: Earnings, 5: Liquidity and 6:Sensitivity to Market Risk).

The ratios, ratio weights, relationship signs and component weights that are used in this paper are demonstrated below (*Table.1*):

Table1
Ratios Used in CAMELS Score Calculation

Component	Component Weight (D)	Ratios (A)	Ratio Weight (C)	Relationship Sign (B)
C - Capital Adequacy	*0.2*	*Capital Adequacy Ratio*	*0.5*	+
		Shareholders' Equity / Assets	*0.3*	+
		(Shareholders' Equity-Fixed Assets)/Assets	*0.2*	+
A - Asset Quality	*0.15*	*Non-Performing Loans/Loans*	*0.4*	-
		Fixed Assets/Assets	*0.3*	-
		Total Loans &Receivables/Assets	*0.3*	+
M-Management Quality	*0.15*	*Non-Performing Loans/Loans*	*0.4*	-
		Operating Margin/Assets	*0.3*	+
		Net Profit Per Branch	*0.3*	+
E - Earnings	*0.15*	*Net Profit / Assets*	*0.3*	+
		Net Profit/Shareholders' Equity	*0.3*	+
		Earnings Before Taxes/Assets	*0.2*	+
		Net Profit / Paid Capital	*0.2*	+
L - Liquidity	*0.2*	*Liquid Assets/Assets*	*0.35*	+
		Liquid Assets/Short-Term Liabilities	*0.35*	+
		Foreign Currency Assets/Foreign Currency Liabilities	*0.3*	+
S - Sensitivity to Market Risk	*0.15*	*Foreign Currency Assets/Foreign Currency Liabilities*	*0.35*	-
		Net Interest Margin Before Special Provisions/Assets	*0.35*	-
		Foreign Exchange Position/Shareholders' Equity	*0.3*	-

Source: Kandemir & Demirel Arıcı, 2013:71-72

Literature

Literature on bank performance determinants can be summarized in two categories of studies. In first category of studies, macroeconomic determinants' effect on bank performance is analysed, while in the second category of studies, bank-specific variables' effect on bank performance is analysed. This paper's contribution to the literature is to perform an analysis on the effect of liability structure on bank performance with a more detailed point of view relative to other studies. Literature on bank performance determinants is presented below at **Table.2**.

Table 2
Literature on Bank Performance Determinants

Author	Method & Scope	Findings
Hunter & Srinivasan (1990)	*Probit Model -Newly Chartered US Banks*	*Inefficiency By The Ratio Of Wage And Salary Expenses To Total Assets(-), Riskiness By Loan Losses (-)*
Molyneux & Thornton (1992)	*Panel Data Analysis-European Countries*	*Inefficiency By The Ratio Of Wage And Salary Expenses To Total Assets(+)*
Swamy et al. (1995),	*Panel Data Analysis- US commercial Banks*	*Unemployment Rate (-), Real-Estate Loans/Assets (-)*
Naceur & Goaided (2001)	*Panel Data Analysis-Tunisia*	*Labour Productivity(+)*
Grigorian & Manole (2002)	*Logit Analysis-Transition Economies Of Eastern Europe And Former Soviet Union Area*	*Strict Capital Adequacy Regulations (+),Tighter Foreign Exchange Policy(-), Private Ownership(+), Medium Size(+)*
Guru et. al (2002)	*Panel Data Analysis-Malaysia*	*Inflation Rate(+), Interest Rates(+), Inefficiency By The Ratio Of Total Expenses To Assets(-), Loans-Assets Ratio(-)*
Hassan & Bashir (2003)	*Panel Data Analysis-21 Countries' Islamic Banks*	*GDP Growth Rate(+), GDP Per Capita(+), Taxation(+), Loans-Assets Ratio(-), Small Size(+)*
Staikouras & Wood (2004)	*Panel Data (OLS And Fixed Effect)-EU*	*GDP Growth Rate(-), Interest Rates(-), Loans-Assets Ratio(-), Riskiness By Loan Loss Provisions/Total Loans Ratio (-), Market Share(+)*
Barros et al. (2007)	*Mixed Logit Analysis -EU*	*Deregulation(+), Loans-Assets Ratio(+), Small Size(+)*
Adams & Mehran (2008)	*Panel Data (OLS) Analysis -USA*	*Board Size(-)*
Athanasoglou et al. (2008)	*Panel Data (GMM) Analysis -Greece*	*Inflation Rate(+), Market Concentration By Herfihndal -Hirschman Index (-), Inefficiency By The Ratio Of Total Expenses To Assets(-), Expected Credit Risk(-)*
Heffernan & Fu (2008)	*Panel Data (GMM) Analysis -China*	*GDP Growth Rate(+), Unemployment Rate(-), Inefficiency By The Ratio Of Total Costs To Income(-), Foreign Ownership(+), Riskiness By Loan Loss Provisions/Total Loans Ratio(+)*
Ata (2009)	*Panel Data Analysis (OLS And Fixed Effect)-Turkey*	*Loans-Deposits Ratio(+), Small Size(+), Riskiness By Loan Losses(-)*
Vong & Chan (2009)	*Panel Data (GLS) Analysis -Macao*	*Inflation Rate(+), Riskiness By Loan Losses(-)*
Sufian & Habibullah (2010)	*Panel Data Analysis -Bangladesh*	*Inflation Rate(-)*

Author	Method & Scope	Findings
Alper & Anbar (2011)	*Panel Data Analysis -Turkey*	*Interest Rate(+), income diversification by non interest income to total assets(+), large size(+), loans-assets ratio(-), riskiness by loan losses(-)*
Sastrosuwito & Suzuki (2011)	*Panel Data Analysis -Indonesia*	*Market Concentration By Herfihndal -Hirschman Index (+),Inefficiency By The Ratio Of Operating Expenses To Operating Income(-), Loans-Assets Ratio(-)*
Sufian (2011)	*Panel Data (Fixed And Random Effect Models) Analysis –South Korea*	*Crisis Dummy(-), Inflation(-), Market Concentration By Largest 3 Banks' Assets/Total Assets(+), Income Diversification By Non Interest Income To Total Assets(+), Liquidity By Loans/Assets(+), Expected Credit Risk(-)*
Taşkın (2011)	*Panel Data Analysis -Turkey*	*Industrial Production Index(+), Inefficiency By The Ratio Of Wage And Salary Expenses To Income(-), Loans-Assets Ratio(-), Riskiness By Loan Losses(-), Foregin Ownership(+), Small Size(+)*
Gülhan & Uzunlar (2012)	*Panel Data (Fixed) Analysis -Turkey*	*Inflation Rate(+), inefficiency by the ratio of wage and salary expenses to total assets(+), liquidity by liquid assets/assets(+), market share(+), large size(+), riskiness by loan losses(-)*
Kutan et. al (2012)	*Panel Data Analysis (OLS And GMM)-Dollarized Countries*	*Inflation Rate(+)*
Francis (2013)	*Panel Data (Fixed, Random Effect, FGLS Models) Sub-Saharan Countries*	*Inflation Rate(-), Inefficiency By The Ratio Of Expenses To Income(-), Liquidity By Net Loans/Assets(-)*
Lee & Kim (2013)	*Panel Data (Fixed Model) Analysis – South Korea*	*Foreign Ownership(+),Government Ownership(-)*
Nasreddine et al. (2013)	*Cognitive Mapping Technique -Tunisia*	*Private Ownership(+), Large Size(+), Riskiness By Loan Losses(-)*
Bertin et. al (2014)	*Panel Data (GMM) Analysis –South America Countries' Banks*	*GDP Growth Rate(+), Inflation Rate(+), Market Concentration By Largest 3 Banks' Assets/Total Assets(+), Inefficiency By The Ratio Of Operating Expenses To Assets(+), Income Diversification By Non Interest Income To Total Assets(+), Large Size(+), Liquidity By Liquid Assets/Assets(-), Expected Credit Risk(-)*
Lelissa (2014)	*Panel Data Analysis -Ethiopia*	*Inflation Rate(+), Riskiness By Loan Loss Provisions/ Total Loans Ratio(-)*
Osuagwu (2015)	*Panel Data Analysis -Nigeria*	*Nigerian Naira And US Dollar Rate(+), Reserve Requirement(-), Market Concentration By Herfihndal-Hirschman Index(-) , Inefficiency By The Ratio Of Operating Expenses To Assets(+), Income Diversification By Non Interest Income To Operating Profit(+), Loans-Assets Ratio(-), Riskiness By Loan Losses(-)*
Owusu-Antwi et. al (2015)	*Panel Data (GMM) Analysis -Ghana*	*Inefficiency By The Ratio Of Costs To Income(+), Liquidity By Liquid Assets/Assets(+), Large Size(+)*
Reis et. al (2016)	*Panel Data (Fixed) Analysis -Turkey*	*GDP Growth Rate(-),Loans-Assets Ratio(-)*
Sevim & Eyüboğlu (2016)	*Panel Data Analysis -Turkey*	*Loans-Assets Ratio(-)*
Yalçınkaya et. al (2016)	*Panel Data Analysis -Turkey*	*Volatility Of Turkish Lira To %50US Dollar-%50 Euro Rate(-), Political Instability(-), Interest Rates(-), loans-assets ratio(+), large size(+)*
Çelik (2018a)	*CAMELS Analysis -Turkey*	*Size(-)*

EU: *European Union;* ***FGLS:*** *Feasible Generalized Least Squares;* ***GDP:*** *Gross Domestic Product;* ***GLS:*** *Generalized Least Squares;* ***GMM:*** *Generalized Method of Moments;* ***OLS:*** *Ordinary Least Squares;* ***USA:*** *United States of America;* ***(+)****: Positive relationship;* ***(-)****: Negative relationship*

The studies that analyse the bank performance and liability structure relationship in the literature have less detailed point of view relative to this paper. These studies analyse the capital, deposits, leverage, liability deviation and other liabilities' effect on bank performance.

Capital

Demirguc-Kunt & Huizinga (1999), used panel data analysis (OLS, Within and Between Estimates) in scope of 38 countries' banks and revealed the positive relationship between CAR and to attract more deposits. Naceur & Goaided (2001) in their panel data analysis on Tunisian banks showed the positive relationship between CAR and ROA. Guru et. al (2002) in their panel data analysis in scope of Malaysian banks, found out the negative relationship between CAR and ROA/ROE. Athanasoglou et al. (2008) used the panel data (GMM) analysis in scope of Greek banks and presented the positive relationship between CAR and ROA/ROE. Heffernan & Fu (2008), in their panel data (GMM) analysis in scope of Chinese Banks demonstrated the negative relationship between CAR and ROE/NIM. Ata (2009), in his panel data analysis (OLS and fixed effect) on Turkish banks exhibited the negative relationship between CAR and ROA. Koranteng (2012), in his regression analysis on Ghana banks found positive relationship between equity/assets ratio and ROE. Francis (2013) in his panel data analysis (fixed, random effect and FGLS) on 42 sub-Saharan countries' banks revealed the positive relationship between CAR and ROA. Yalçınkaya et. al (2016) used the panel data analysis in Turkish deposit banks and demonstrated the positive relationship between CAR and ROA.

Deposits

Studies in the literature related to deposits effect on bank performance show the positive relationship of deposits-assets ratio and bank performance. Naceur & Goaided (2001), in their panel data analysis on Tunisian banks showed the positive relationship between deposits-assets ratio and ROA. Kosmidou et. al (2004b), in their statistical cost accounting (SCA) model analysis on UK banks, revealed the negative relationship between demand deposits, time & saving deposits and net income. Koranteng (2012), in his regression analysis on Ghana banks presented positive relationship between deposits/assets ratio and ROA,ROE. Belete (2013), in his pooled OLS regression analysis on Ethiopian banks exhibited the negative relationship between saving and fixed deposits and ROA. Francis (2013), in his panel data analysis (fixed, random effect and FGLS) on 42 sub-Saharan countries' banks found the positive relationship between deposits-assets ratio and ROA. Bertin et al.(2014), used the panel data (GMM) analysis in scope of Argentina, Brazil, Chile, Colombia, México, Paraguay, Peru, and Venezuela commercial banks and showed the positive relationship between deposits-assets ratio and ROA/NIM. Zhang (2017), in his regression analysis on Chinese banks presented the positive relationship between deposit share in market and ROA. Wagdi et.al

(2019) in their panel data analysis (WLS) on Egyptian banks revealed the negative relationship between investments/deposits ratio and ROA, ROE. Owusu & Alhassan (2020), in their statistical cost accounting (SCA) model analysis on Ghana banks demonstrated the negative relationship between demand deposits, saving deposits, deposits from banks and net income/ net interest income.

Leverage

Hassan & Bashir (2003), presented the positive relationship between liabilities/assets ratio and bank performance that measured by ROA, ROE and NIM. While, Reis et. al (2016) in their panel data (fixed effect model) analysis in Turkish deposit banks showed negative relationship between liabilities/assets ratio and NIM.

Liability Deviation

Özyıldırım & Özdinçer (2009), in their panel data analysis (fixed effect and GMM) on Turkish deposit banks revealed negative relationship between deviation from average liability allocation and ROA. They used third party funds, equity and customer deposits' average share in liabilities.

Other Liabilities

Kosmidou et. al (2004b), in their statistical cost accounting (SCA) model analysis on UK banks, showed the negative relationship between short term funding, other funds (subordinated debt, hybrid capital and long term debt) and net income. Belete (2013), in his pooloed OLS regression analysis on Ethiopian banks found out the negative relationship between other liabilities (other banks deposits, provision for taxation, state dividend payables, long term loans) and ROA. Owusu & Alhassan(2020), in their statistical cost accounting (SCA) model analysis on Ghana banks revealed the negative relationship between total long term funding, other short term funding and net income/net interest income.

Research on Turkish Deposit Banks

This research aims to investigate the possible relationship between bank performance and bank liability structure.

Scope of the research is limited to Turkish deposit banks. Turkish deposit banks are exposed to structural policy changes after 2001 local economic crisis. These structural policy changes affect the capital and liability preferences of Turkish deposit banks. Especially demand to non-deposit fund sources, long-term loans and alternative fund sources are increased after 2012 and banks began to issue wide variety of instruments for funding. (Çelik, 2018b: 56-71). Therefore, Turkish deposit bank sector is a good scope to view bank liability structure

changes that happened in a short time. This characteristic of Turkish deposit banks makes it appetizing scope for the research.

Constraints

Results of researches in social sciences have to be interpreted by taking constraints of the research into consideration. This research also has some constraints and they have to be considered carefully in use of results. The main constraints of the research can be summarized as follow:

- The scope of the research is limited with Turkish deposit banks. Therefore, generalization of the results can be misleading.
- Research's method is panel regression that only takes linear relationship between variables into consideration. However, in social sciences, relationship between variables can be in various ways like non-linear or monotonic etc.
- It is assumed that performance measure of banks is CAMELS score, but the fact remains that different variables that are not considered in CAMELS score calculation may also affect banks' performance.
- Research uses 10 deposit banks in Turkey that constitute roughly %85-%90 of the Turkish deposit bank sector in terms of asset size, loans, deposits, number of branches and number of employees.
- It is assumed that banks have similar opportunity in funding decisions. However, like banking sector, in some sectors big size firms have better opportunities in reaching sources because of economies of scale.
- Research is based on the data between 2005 and 2018. Therefore, results should be interpreted according to last 14 years' conditions.

Population and Sample

Population of the research is all deposit banks that operate in Turkey between 2005-2018. Handling with all deposit banks between these years is quite difficult because in each period different banks enter into the sector and some other banks quit the sector. Taking all banks' data into consideration brings the problem of unbalanced data. Therefore, 10 deposit banks (*Table.3)* that have the highest asset size according to 2018 ranking are sampled with assumption of that these banks reflect the general tendency in Turkish deposit banking sector. These banks constitute about %85-%90 of the sector in terms of asset size, loans, deposits, number of branches and number of employees (*Figure.2*).

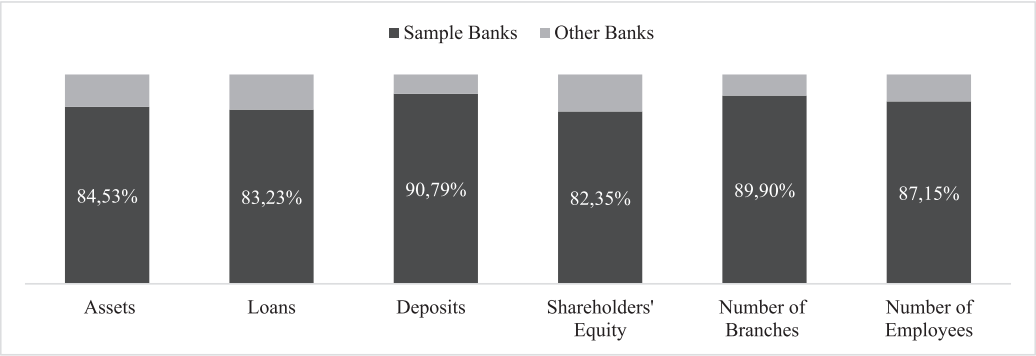

Figure 2. Share of Sample Banks in the Sector
Note: Figure is composed through the data of The Banks Association of Turkey

Table 3
Sample Banks

1	*Türkiye Cumhuriyeti Ziraat Bankası A.Ş.*	*6*	*Türkiye Vakıflar Bankası T.A.O.*
2	*Türkiye İş Bankası A.Ş.*	*7*	*Akbank T.A.Ş.*
3	*Türkiye Halk Bankası A.Ş.*	*8*	*QNB Finansbank A.Ş.*
4	*Türkiye Garanti Bankası A.Ş.*	*9*	*Denizbank A.Ş.*
5	*Yapı ve Kredi Bankası A.Ş.*	*10*	*Türk Ekonomi Bankası A.Ş.*

Model and Variables

Bank performance is the model's dependent variable and the banks' CAMELS score is regarded as banks' only performance indicator. Research model endeavors to explain bank performance (dependent variable) through three type of independent variables. First type of independent variables is macro variables that are gathered by literature review on bank performance determinants. Second type of independent variables is bank specific variables that are also gathered by literature review on bank performance determinants. The first two type of variables are used in the model as control variables. Third type of variables is composed of bank liability structure variables. These variables are policy variables in the model. The data that is used in the model is gathered from The Banks Association of Turkey's database, Turkey Statistical Institute (TUIK) and Central Bank of Turkey's (TCMB) database. The Banks Association of Turkey's database is used for bank-specific variables and liability structure variables and TUIK and TCMB database is used to gather macroeconomic variables. Data covers 10 deposit banks' information between 2005-2018 years and Turkey's macroeconomic variables between these years. Research model can be summarized as below:

$$CAMELS_{it} = \alpha_{it} + \sum_{i=1}^{10}\sum_{t=2005}^{2018} \beta_{it}\, Macro\ Variable_{it} + \sum_{i=1}^{10}\sum_{t=2005}^{2018} \beta_{it}\, Bank\ Specific\ Variable_{it} + \sum_{i=1}^{10}\sum_{t=2005}^{2018} \beta_{it}\, Liability\ Structure\ Variable_{it} + \varepsilon_{it} \quad (1)$$

Macro variables are used in the model because of the possible effect of macro changes on finance sector entities. Macro variables in the model are as follows (*Table.4)*:

Table 4
Macro Variables in the Model

Macro Variables	Symbol	Explanation	Excpected Relationship
Crisis Dummy	*dumCRISIS*	*It is used in the model to take 2009 financial crisis effect into consideration. It is 1 if year is 2008 or 2009 and otherwise it is 0.*	*(-)*
GDP Per Capita Change Ratio	*GDP*	*GDP per capita's yearly % change*	*(+)*
Inflation Rate (Consumer Prices)	*INF*	*Yearly Consumer Price Index % change that is announced by Turkish Statistical Institute (TUIK)*	*(-)*
Unemployment Rate	*UNEMP*	*Yearly Unemployment Rate that is announced by Turkish Statistical Institute (TUIK)*	*(-)*
TCMB O/N Lending Rate	*INTEREST*	*Current Central Bank of Turkey's Overnight Lending Rate by each year's 31th December*	*(-)*

Expected effect of crisis dummy is negative because crisis periods cause decrease in trust to financial sector and this situation affects banks in both of the asset and liability side negatively. Expectation between GDP per capita and performance is positive because increase in disposable income leads an increase in investment and savings. Expected relationship sign for inflation is negative because inflation affects disposable income and expected risk negative by decreasing predictability in economic environment. In the same way, unemployment rate's expected effect is negative because increase in unemployment rate means decrease in economic activity and less investments. Expected relationship between performance and interest rate is negative because rise in interest rate means rise in bank costs in funding and decrease in investments and loan needs.

Variables that are related to banks' specific characteristics also have effect on bank's performance. Therefore, through literature review bank specific variables are also determined to use in the model. These variables are as follows (*Table.5*):

Table 5
Bank Specific Variables in the Model

Bank Specific Variables	Symbol	Explanation	Expected Relationship
Size	*SIZE*	*Asset size*	*(+)*
Efficiency	*EFFC*	*Operating Income / Assets Ratio*	*(+)*
Liquidity	*LIQ*	*Bank's Liquid Assets / Short Term Liabilities Ratio*	*(+)*
Riskiness	*RISK*	*Non-Performing Loan Ratio*	*(-)*
Effectiveness	*EFFCTIVE*	*Loans/Assets Ratio*	*(+)*
Market Share	*SHARE*	*Market Share in the Loan Market*	*(+)*

Expected sign of the size is positive because banks operate in an oligopolistic market and this means that bigger size brings different advantages that can not be reached by small sized market entrants. Efficiency's expected sign is positive because being efficient decrease

costs and increase income. Expectation on the sign of relationship between liquidity and bank performance is is positive because banks have to stay liquid because of the banking sector's characteristics. Banks have to make their payment exactly right time; otherwise they face to risk of bankruptcy. Hence, a decrease in liquidity should affect bank performance in a negative way and vice versa. Expectation regard to the sign of relationship between riskiness and banka performance is negative because credit risk measure is used for riskiness in the model and increase in credit risk means deterioration in asset quality and sustainable income. Herewith, the negative relationship between riskiness and bank performance is sensible. The positive relationship between effectiveness and bank performance is expectable because the ratio to measure effectiveness in the model is asset quality ratio and increase in asset quality brings less fluctuating and higher income. Also, expectation regard to relationship sign for market share and bank performance positive, because higher market share results in higher profit, higher customer info, link and higher recognition in the market. These are all good ways to increase performance.

Policy variables in the model are composed of banks' liability structure related ratios. These variables as follows (*Table.6*):

Table 6
Liability Structure Variables in the Model

Liability Structure Variables	Symbol	Explanation	Expected Relationship
Capital	*CAP*	*Capital Adequacy Ratio*	*(+)*
Dependence to Deposits	*DEP*	*Deposits/Liabilities Ratio*	*(+/-)*
Dependence to Non-Deposit Liabilities	*NONDEP*	*Non-Deposit Liabilities/ Liabilities Ratio*	*(+/-)*
Dependence to Loans Borrowed	*LOANS*	*Loans Borrowed / Liabilities Ratio*	*(+/-)*
Dependence to Third Alternative Liabilities	*OTHER*	*Other Liabilities / Liabilities Ratio*	*(+/-)*
Deposit Term Structure	*LTDEP*	*Long Term Time Deposits/Deposits Ratio (In Turkey average deposit term is 3 months. Deposits that have longer term than 3 months are assumed long term deposits)*	*(+)*
Depositor Structure	*DEMAND*	*Demand Deposits /Deposits Ratio*	*(-)*
	SAV	*Saving Deposits/Deposits Ratio*	*(+)*
	GOV	*Government Deposits/ Deposits Ratio*	*(+)*
Deposit Size Structure	*BOT*	*Bottom Level Deposits/ Deposits Ratio (Bottom level deposits are assumed as deposits that are subject to deposit insurance)*	*(+)*
Deposit Currency Structure	*FORGN*	*Foreign Exchange Deposits/ Deposits Ratio*	*(+)*
Dependence to Securities Issued	*SEC*	*Securities Issued / Non-Deposit Liabilities Ratio*	*(+/-)*
Leverage	*LEV*	*Liabilities/Assets Ratio*	*(-)*
Loan Term Structure	*LTLOAN*	*Long Term Loans / Loans Borrowed Ratio*	*(+)*
Loan Currency Structure	*FORGLOAN*	*Foreign Exchange Loans / Loans Borrowed Ratio*	*(+)*

Expected sign of the capital adequacy ratio is positive because the higher level of capital for each risk measure (market, credit and operational) makes the bank safer and less vulnerable to risks. There is no expected sign for dependence to deposits, dependence to non-deposit liabilities, dependence to third alternative liabilities, dependence to loans borrowed, and dependence on securities issued because each of these fund options has its own pearls and pitfalls and their usage value changes according to the bank needs and characteristics. Positive relationship between long-term deposits/long term loans and bank performance is expected because these funds give advantage of using them for a longer term profitable investments. For the same reason, demand deposits' expected sign is negative because they are not long term fund sources and can be withdrawn any time. Expected sign for foreign deposits-loans is positive because Turkey is a country that has chronic current deficits for years because of the structural deficiencies and financial system needs foreign currency usually. Hence, foreign currency funds are advantageous for banks. The expected sign for saving deposits and bottom level deposits is positive because these deposits constitute huge amount in the total but they are little deposits separately. Therefore, in a short time too much amount of withdrawal in a mass can not be expected for these deposits. For this reason, they are quite permanent funds for banks. In the same way, government deposits' expected sign is also positive because they are also semi-permanent funds for banks since they can not be withdrawn in the short term because of agreements between government agencies and banks. Lastly, leverage's expected sign is negative because too much leverage cause more vulnerable financial condition against risks.

Method

"*A panel of data, also known as longitudinal data, has observations on individual micro-units who are followed over time*" (Hill et al., 2011:8). For example, ten different families' monthly food budget information across ten years is a panel data. By increase in available panel type data, many researchers begin to use panel data because panel data includes more variability and can help to handle issues that time series and cross sectional data can not explain alone (Kennedy, 2008:282).

In this paper, regression analysis is used on panel data that includes 10 banks' information across 14 years. Regression analysis is a type of analysis that purposes to find the effect of changes in one variable (independent variable) on another variable's (dependent variable) change (Sevüktekin, 2013:231-232).

Since panel data includes both units and times, panel data models may have individual (unit) effect, time effect or both. These effects are taken into consideration through fixed effect and random effect models in panel data regression (Park, 2011:1). In deciding on which model to use in panel regression analysis, unobserved heterogeneity is an important term.

Unobserved heterogeneity is failure of explaining changes in dependent variable with present variables because excluding some variables (Tatoglu, 2016:7).

If the unobserved heterogeneity problem can be dealt with specific intercepts (individual effect) then fixed effect model can be used. If unobserved heterogeneity problem can be dealt with disturbance term then random effect model is applied. With a statistical perspective, if F-test can be rejected fixed effect model is applicable; while if LM test can be rejected random effect model can be used. If both tests (F and LM) can be rejected then Hausman test is used in model decision process. If Hausman Test's H_0 hypothesis can be rejected then fixed effect model is used; otherwise random effect model is used (Park, 2011:16-17).

After deciding on model to use in panel regression; assumption tests should be performed. According to assumption test results, appropriate estimator is selected. Model should be tested against heteroscedasticity, autocorrelation and cross-sectional correlation. If model can not meet assumptions of homoscedasticity, no-correlation and no-cross-sectional correlation then robust estimators are used like Driscoll & Kraay (1998), Beck-Katz (1995) etc.

Findings

In the *Table.7* below, CAMELS scores of the banks between 2005-2018 years are presented. Median is preferred to reflect general condition of the banks because of the reason that calculation method of the CAMELS causes zero average in each year and this situation does not allow to comparison of yearly changes in CAMELS score. In the analysis period government and private banks performed better than foreign banks. 2007,2008, 2013 and 2015 are well performed years for the analyzed banks while 2005, 2010,2011 and 2018 are relatively less successful years.

As a result of the tests that are performed for model and estimator selection, fixed effect model is preferred and estimations are generated through Driscoll-Kraay estimator that is robust against heteroscedasticity, autocorrelation and cross-sectional correlation. Results are presented in the *Table.8* below.

According to the results, at least one variable in the model to explain CAMELS score is statistically meaningful ($F(26,9)=1899.18$ and $p>F=0.0000$). Model can explain %86.78 of the changes in the CAMELS score (within $R^2=0.8678$).

In terms of macro variables, % change in GDP per capita, inflation rate and interest rate have statistically significant effect on bank performance. Parallel to the expectation, rise in interest rate affect bank performance negatively. However, contrary to expectations, rise in GDP per capita and decrease in inflation results in decrease in bank performance. The reason behind this result may be related to reforms of 2001 in finance sector. After crisis period, the main two problems of Turkey were government budget deficits because of public enterprises and financial sector vulnerability. Therefore, bank reforms aimed soundness for banks against negative economic fluctuations. Unexpected GDP per capita growth/inflation rate and bank performance relationship may be result of the soundness of banks in negative business cycles.

Table 7
CAMELS Scores of Banks

	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Median
Ziraat Bankası	*7.52*	*19.53*	*26.88*	*28.79*	*27.28*	*18.56*	*11.54*	*11.71*	*23.50*	*29.15*	*22.90*	*37.17*	*38.17*	*-138.54*	*23.20*
Akbank	*14.20*	*20.71*	*21.92*	*19.13*	*19.05*	*14.78*	*20.59*	*14.36*	*22.38*	*19.40*	*12.74*	*24.78*	*24.82*	*-82.05*	*19.26*
Garanti Bankası	*18.09*	*14.46*	*9.51*	*10.30*	*9.62*	*12.57*	*14.46*	*23.54*	*20.72*	*19.38*	*16.93*	*20.20*	*-3.45*	*-100.11*	*14.46*
İş Bankası	*-3.45*	*1.70*	*5.53*	*4.60*	*9.28*	*4.97*	*4.22*	*2.26*	*3.07*	*4.13*	*11.80*	*4.74*	*-1.37*	*-40.60*	*4.18*
Halk Bank	*-8.07*	*4.24*	*1.49*	*8.70*	*3.93*	*16.05*	*15.38*	*10.29*	*4.52*	*-1.76*	*-7.65*	*-2.48*	*-15.70*	*-115.98*	*2.71*
Vakıf Bank	*0.23*	*-2.03*	*-1.60*	*0.40*	*-4.44*	*-3.00*	*-5.91*	*-4.98*	*-10.12*	*1.44*	*0.59*	*5.94*	*6.82*	*-45.52*	*-1.82*
Türk Ekonomi Bankası	*4.20*	*-7.73*	*-10.80*	*-3.61*	*-10.89*	*-9.02*	*-13.98*	*-21.26*	*-8.84*	*-13.83*	*3.58*	*-18.35*	*-15.95*	*-94.72*	*-10.84*
Yapı ve Kredi Bankası	*-4.67*	*-15.62*	*-14.97*	*-13.05*	*-7.32*	*0.38*	*-8.27*	*-13.89*	*-9.56*	*-20.93*	*-15.89*	*-41.58*	*-48.83*	*856.05*	*-13.47*
Denizbank	*-17.89*	*-13.86*	*-13.62*	*-23.64*	*-22.98*	*-29.71*	*-12.20*	*-5.76*	*-28.75*	*-15.64*	*-17.49*	*-17.47*	*3.27*	*-100.24*	*-17.48*
QNB Finansbank	*-10.17*	*-21.40*	*-24.34*	*-31.63*	*-23.53*	*-25.58*	*-25.83*	*-16.27*	*-16.92*	*-21.35*	*-27.52*	*-12.95*	*12.23*	*-138.29*	*-22.46*
Median	*-1.61*	*-0.17*	*-0.06*	*2.50*	*-0.26*	*2.68*	*-0.84*	*-1.36*	*-2.89*	*-0.16*	*2.09*	*1.13*	*0.95*	*-97.42*	*0.44*

Table 8
Regression Results with Driscoll-Kraay Estimator

	CAMELS (Dep. Variable)		***CAMELS (Dep. Variable)***
Constant	*1154.136*** (3.42)*	***Liability Structure Variables***	
Macroeconomic Variables		*CAP*	*-1.965026*** (-3.40)*
dumCRISIS	*-32.07218 (-1.58)*	*DEP*	*-0.5182075 (-0.22)*
GDP	*-1.409204* (-2.07)*	*NONDEP*	*-3.652707* (-1.94)*
INF	*4.489466** (2.92)*	*LOANS*	*0.7090021* (1.85)*
UNEMP	*-1.215025 (-0.23)*	*OTHER*	*-3.884178* (-2.08)*
INTEREST	*-1.38501* (-1.99)*	*LTDEP*	*-1.950843* (-2.10)*
Bank Specific Variables		*DEMAND*	*0.5202497 (0.42)*
SIZE	*-0.0002235* (-2.05)*	*SAV*	*2.772054*** (4.03)*
EFFC	*-56.30842*** (-9.55)*	*GOV*	*-1.660241 (-0.95)*
LIQ	*0.277552*** (4.23)*	*BOT*	*0.7864697 (0.95)*
RISK	*-9.833123*** (-5.83)*	*FORGN*	*1.070702 (1.22)*
EFFCTIVE	*0.3684484 (0.59)*	*SEC*	*-0.4260985 (-0.81)*
SHARE	*4.698355*** (3.40)*	*LEV*	*-10.72471*** (-4.57)*
		LTLOAN	*0.5415833** (2.33)*
		FORGLOAN	*-0.9788127** (-2.49)*
Tests & Data Information			
***# of observations**: 140*		**Mod. Bhargava et al. Durbin-Watson** = 1.7203677	
***F (26,9)** : 1899.18 (Prob>F:0.0021)*		***Baltagi-Wu LBI** = 1.969851*	
***LM Test**: Prob>=chibar2 = 0.031*		***Pesaran's Test of Cross Sectional Independence** Prob = 0.0013*	
***Hausman Test**: Prob>chi2 = 0.0040*		*-Values in parentheses are t-statistics.*	
***Modified Wald Test**: Prob>chi2 =0.0000*		*-***, **, and * indicate significance at 1, 5, and 10%levels*	

As bank-specific variables, size, efficiency, liquidity, riskiness and market share have statistically significant effect on bank performance. The results in terms of riskiness, liquidity and market share are parallel to the expectations. According to the results, there is a negative relationship between riskiness and bank performance. Liquidity and market share's relationships with bank performance are in positive way. However, the results in terms of size and efficiency are contrary to expectations. There is a negative relationship between size and bank performance. Although this result is unexpected, it can be explained by that banks are service firms and shrinking may be good way to serve better because of small size companies' advan-

tage in flexibility and response speed to change in business environment. There is a negative relationship between efficiency and bank performance. This result is also quite unexpected and it may be explained by that in service industry serving the best may be more important than serving the better in terms of utility/cost.

As liability structure variables, capital, dependence to non-deposit liabilities, dependence on loans, dependence on third alternative fund sources, deposit term structure, depositor structure, leverage, loan term structure and loan currency structure have statistically significant effect on bank performance. Contrary to expectation relationship between capital adequacy and performance is negative. Banks are obliged to obey capital adequacy ratios that are determined by regulators. Departing from regulators' minimum limit may mean taking less risk than required. This may be the reason for negative relationship between capital and bank performance. There is a negative relationship between dependence to non-deposit liabilities/third alternative liabilities and bank performance. This result can be explained by that deposits are always primary fund source for banks and less deposit dependent liability structure may result in higher costs and less customer contact although different fund sources give more flexibility to banks. There is a negative relationship between leverage and bank performance as expected. Relationship between dependence to loans and banks performance is in positive way. Loans are fund sources that offer longer term than any other fund source. This characteristic of loans makes them attractive source for banks especially in Turkey, because average deposit term in Turkey is 3 months. Therefore, use of loans -especially for longer term fund needs- is right fund choice for banks. The positive relationship between long-term loans and bank performance also supports this idea. While use of long term loans has positive effect on bank performance; use of long term deposits has negative effect on bank performance contrary to expectation. The reason behind this result may be that use of long term loans rather than long term deposits for longer term fund needs gives quite longer term despite its little higher cost. This relative advantage of loans may be reason of negative relationship between long term deposits and bank performance. According to the results, there is a positive relationship between bank performance and saving deposits as expected. Lastly, contrary to expectation, there is a negative relationship between foreign currency loans and bank performance. This result is related to end of quantitative easing in the world and foreign trade deficit of Turkey. Turkish Lira and other developing country currencies lose value by the end of quantitative easing period. Also, Lira lose value because of Turkey's foreign trade deficits. Therefore, heavy use of foreign loans may result in increase in costs because of value loss in Lira.

Conclusions

Banks have wide variety of funding opportunities and they choose how to fund by comparing advantages and disadvantages of each. This paper, with Turkish deposit bank scope, endeavors to answer question of that "Does how to fund has any effect on bank performan-

ce?". According to the results that are reached in this paper, liability structure affects bank performance.

According to the research on Turkish deposit banks, parallel to the situation in the very beginning of the banking, deposits are primary fund source for banks and too much departure from deposit dependent liability structure results in decrease in performance. However, this does not mean that banks should not use any different fund options. By considering the research results, different fund options like loans can affect bank performance in positive way because weakness of deposit in terms of term structure can be compensated with use of loans. Especially long-term use of loans is a quite important for better bank performance.

By taking the research results into consideration, saving deposits are important fund sources for banks thanks to their semi-permanent structure. Additionally, heavy use of foreign currency loans may cause increase in costs when local currency lose value. Therefore, use of foreign currency loans should be in accordance with exchange risk management.

According to the research results, although banking is a high leverage sector, excessive use of leverage does not bring better performance for banks. Also, in the same way too much departure from capital adequacy regulations and being excessively prudent in terms of capital brings underperformance.

Major policy recommendations as a result of the findings in this paper can be summarized below:

- Banks have to allocate liabilities very carefully because liability structure affects bank performance.
- Deposits are always primary fund sources for banks. Therefore, banks should avoid too much departure from deposit dependent liability structure.
- Use of loans is a good policy for banks to answer long term fund needs. Banks should prefer long term loans rather than long term deposits for long term fund needs.
- Decision to use of foreign currency loans should be made very carefully and banks should hedge themselves against value loss of local currency in use of foreign currency loans.
- Economic governance should be attentive to interest rates because higher interest rates affect bank performance negatively because of decrease in real sector investments.
- Excessive use of leverage should be controlled and reviewed very carefully by both regulators and bank management.

- Too much departure from capital adequacy minimum limit means taking less risk than required. Therefore, staying close to the limit should be encouraged.
- Solvency level of bank assets in terms of their liability repayment should be controlled and reviewed very carefully by both regulators and bank management.
- Problem loans should be managed and reviewed very carefully by banks.

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