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TURKISH – GERMAN UNIVERSITY

INSTITUTE OF SOCIAL SCIENCE

DEPARTMENT OF INTERNATIONAL FINANCE

DETERMINANTS OF TIME AND DEMAND DEPOSITS IN THE TURKISH BANKING SECTOR

MASTER'S THESIS

Oğuz ESKİN

ADVISOR

Asst. Prof. Dr. Çiydem ÇATAK

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In this study, the effects of bank-specific and macroeconomic factors on time and demand deposits, which are an important issue for the banking sector, are analyzed by econometric methods with taking the Turkish banking sector as an example. I would like to express my infinite gratitude to my thesis advisor, Asst. Prof. Dr. Çiydem ÇATAK, who has always been there to help and guide me, and whose support, suggestions, and motivation have been invaluable to me. I would like to extend my thanks to Prof. Dr. Elif Nuroğlu, who has always been supportive and helpful, and to whom I am truly grateful. I also want to express my gratitude to my family for their unwavering support, both financially and emotionally, throughout my master's journey and thesis work. Additionally, I'd like to thank my colleagues at work for their patience and support, my friend Bünyamin Fuat Yıldız for his ideas, and my friend Ahmet Taha Sivrioğlu for his presence. I dedicate this work to my father Hasan ESKİN, who passed away in 2020.

Oğuz ESKİN

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ÖZET

TÜRK BANKACILIK SEKTÖRÜNDE VADELİ VE VADESİZ MEVDUATLARI ETKİLEYEN FAKTÖRLER

Türk bankacılık sektöründe yer alan 10 Türk bankasının verilerini kullanarak vadeli ve vadesiz mevduatlarını merkez bankası faiz oranı, enflasyon oranı, para arzı, sermaye yeterlilik ve özsermaye getirisi gibi makroekonomik ve bankacılık sektörü verileri ile etkileyen faktörleri incelenmesi amaçlanmıştır. Vadeli ve vadesiz mevduatları etkileyen faktörleri incelemek üzere iki model kurulmuştur. Bu modelleri değerlendirmek için üç aşamalı bir ekonometrik analiz kullanılmıştır. Değişkenler öncelikle Levin Lin Chu, Im Pesaran Shin, Fisher ADF ve Fisher PP birim kök testleri kullanılarak birim kök analizi yapılmıştır ve bulgulara göre, seviyede durağan olmayan değişkenler birinci farkı alındığında durağan hale gelmektedir. İkinci aşama, değişkenler arasında uzun vadeli bir ilişkinin olup olmadığını tespit etmeyi amaçlamaktadır. Pedroni ve Kao Panel Eşbütünleşme testleri kullanılarak değişkenler arasında uzun vadeli bir ilişkinin kanıtı bulunmuştur. Çalışmanın son aşaması, geliştirilen modele göre değişkenler arasındaki uzun vadeli katsayıyı FMOLS ve DOLS yaklaşımlarıyla tahmin edilmiştir. Merkez bankası faizinin mevduatlar üzerinde olumlu etkisi tespit edilmiştir. Enflasyon; FMOLS'de vadeli mevduatlara olumlu bir ilişki gösterirken, DOLS için istatistiksel olarak anlamsız bir sonuç ortaya koymuştur. Vadesiz mevduatlar üzerinde ise modellere göre; FMOLS, pozitif bir etki gösterirken, DOLS istatistiksel olarak anlamsız bir negatif ilişki gösterir. Para arzı pozitif bir etki gösterirken, sermaye yeterlilik oranı negatif yönlü ve anlamlı olarak mevduatlarla etki eder; özsermaye getirisi vadeli mevduatları olumsuz yönde etkilerken, DOLS, özsermaye getirisi vadesiz mevduatlar arasında anlamlı ve olumlu yönde ilişki olduğunu göstermektedir.

Anahtar Kelimeler: mevduatlar, makroekonomik ve banka-spesifik faktörler, FMOLS, DOLS

ABSTRACT

DETERMINANTS OF TIME AND DEMAND DEPOSITS IN THE TURKISH BANKING SECTOR

The major goal of this research is to investigate the relationship for time and demand deposits in the context of 10 Turkish banks while taking important factors like the interest rate of the central bank, inflation rate, money supply rate, capital adequacy rate, and return on equity into account. Two models are presented in the study to examine the effects of time deposits and demand deposits. A three-stage econometric technique was used to assess these models. The variables were initially examined using a variety of unit root tests, including Levin Lin Chu, Im Pesaran Shin, Fisher ADF, and Fisher PP. The series displays a unit root at the level but becomes stationary when differed once, according to the findings of all four unit root tests. The second stage involves looking at whether there is a long-term relationship between the factors. Pedroni and Kao panel cointegration tests are used in this investigation. Both cointegration tests found evidence of a long-term relationship between the variables. The third and last stage of the study involved estimating the long-term coefficient between variables in the developed model using the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) approaches. The study shows that the central bank interest is positively impacting both deposit types; inflation's impact varies, showing a positive link to time deposits in FMOLS and an insignificant DOLS result, while affecting demand deposits diversely per models: FMOLS indicates positive significance, while DOLS suggests a nonsignificant negative relation; money supply affecting positively; equity adequacy ratio inversely and significantly associates with deposits, return on equity negatively affects time deposits in both models, but DOLS shows a significant positive link between return on equity and demand deposits.

Key Words: deposits, macroeconomic and bank-specific factors, FMOLS, DOLS

LIST OF ABBREVIATIONS

ADF : Augmented Dickey-Fuller

ARDL : Autoregressive Distributed Lag

ARCH : Autoregressive Conditional Heteroskedasticity

BAT : The Banks Association of Turkey

BRSA : Banking Regulation and Supervision Agency

CBRT : Central Bank of Republic of Turkey

DOLS : Dynamic Ordinary Least Square

ECM : Error Correction Model

FMOLS : Fully Modified Ordinary Least Square

GDP : Gross Domestic Product

GLS : Generalized Least Square

NPL : Non-performing Loans

PP : Phillips-Perron

SME : Small Medium Enterprise

TURKSTAT : Turkish Statistical Institute

VECM : Vector Error Correction Model

1. INTRODUCTION

The presence of a wealthy, modern, and effective financial system within a country holds significant importance in facilitating its economic expansion and advancement. This system also has a favorable influence on economic development. The banking industry, through its crucial role, fosters economic growth. Playing a crucial role in the economy, banks facilitate capital formation, foster business expansion, and contribute to overall economic prosperity.

Within the existing economic framework, banks assume the crucial function of intermediation, whereby they collect funds from individuals with surplus income, commonly referred to as savers, and subsequently allocate these funds to both private and public investors, who are entities that are open to investment opportunities. Banks can typically extend loans and credit when they accumulate sufficient deposits, which serve as their primary revenue stream in the market. Therefore, deposits play a crucial role as a primary funding source for banking operations, serving as the principal means by which commercial banks fulfill their funding requirements within the banking system.

In a bank-based financial system, banks also have a significant influence. By distributing monetary resources to the economy, the banking system fulfills its role as an essential component of the financial intermediation industry. They are important commercial lenders, and businesses rely heavily on bank loans for debt financing. Banks are also the main depositors in this system. The presence of a robust banking sector contributes to the maintenance of financial stability, thereby enhancing the economy's ability to withstand and recover from macroeconomic disturbances. Changes in the macroeconomic conditions exert an influence on both the efficacy and financial resilience of the banking system. Hence, individuals responsible for upholding monetary and financial stability ought to possess a comprehensive understanding of the influence exerted by macroeconomic variables on the banking industry.

In Turkey, much like in the rest of the world, the banking industry presents an array of possibilities and risks. The financial sector serves vital functions such as facilitating real economy spending, accumulating savings, and mitigating risks in growing income economies. Before the 1980s, the banking sector in Turkey played a less prominent role in the economy. However, it has since evolved into a highly integral component of the economy. Both globally and within Turkey, the significance of the banking sector continues to escalate, supported by a high volume of transactions. Undoubtedly, the most pivotal element of Turkey's financial system is the banking sector.

The ratio between the total value of bank assets and the GDP showed minimal changes after 2017 and exhibited a slight decline over time (Appendix A). Nevertheless, the Covid-19 pandemic led to a noticeable surge in the assets held by financial institutions. These figures underscore the interconnectedness of the national economy and the banking sector with global events. Upon analyzing inflation and exchange rate patterns within the Turkish economy over the past few years and taking into account the impact of global factors such as trade disputes, economic conflicts, and the Covid-19 pandemic, it can be argued that the Turkish banking sector faced minimal repercussions from these adverse conditions. In this context, there was an observable increase in the ratio between the size of the banking sector's balance sheet and the GDP, rising from 1.04 in 2019 to 1.21 in 2020, and further to 1.28 in 2021. Notably, the Turkish banking sector exhibits a striking characteristic where its assets exceed the value of the nation's GDP by a margin exceeding 100%. The finance industry in Turkey is primarily composed of banks, accounting for 82% as of September 2021 (Appendix B).

The banking sector encompassed a total of 57 operating banks in 2021 (Appendix C). Among these, 35 entities were classified as deposit banks, while the remaining 16 were categorized as development and investment banks. Within the total number of deposit banks, three were state-owned, and the remaining eight were private banks. Additionally, there were a total of six participation banks. The count of foreign banks, where non-residents possess a majority stake of 51 percent or more in terms of capital, totaled 21. Among the banks engaged in development and investment, three were state-owned, nine were privately owned, and four were foreign institutions.

Table 1.1. Concentration in Banking Sector (Percentage)

Five Largest Banks	**2020**	**2021**
Assets	60%	58%
Deposits	66%	65%
Loans	60%	58%
Ten Largest Banks	**2020**	**2021**
Assets	87%	87%
Deposits	90%	90%
Loans	88%	88%

Source: BAT (December 2021)

In terms of total assets, the initial five largest banks accounted for 58% of the market share (Table 1.1). The combined proportion of deposits held by the top five banks experienced a one-point decline, while their proportion of loans decreased by 2 points. The first ten banks collectively held 88% of the total bank assets. Of all savings, 90% were allocated to the top ten banks, whereas only 88% of all loans were channeled to these ten banks.

Among the initial set of five banks, three were state-owned, one was privately owned, and one had foreign origins. Within the first ten banks, there were three banks under state ownership, three privately owned banks, three banks with foreign origins, and one bank primarily dedicated to development and investment purposes.

Table 1.2. Asset Size

ASSETS	**Total (billion TL)**	**Changes (%)**
CASH AND CASH EQUIVALENTS	1,229	113,6
REQUIRED RESERVES	702	118,6
LOANS	4,901	37,0
NON-PERFORMING LOANS	160	4,9
SECURITIES	1,477	44,4
OTHER ASSETS	904	48,0
Total Assets	9,213	50,9
LIABILITIES	**Total (billion TL)**	**Changes (%)**
DEPOSITS	5,303	53,5
BANKS	1,048	59,4
REPO TRANSACTIONS	587	129,9
SECURITIES ISSUED	310	38,4
EQUITIES	711	18,6
OTHER LIABILITIES	1,254	37,1
Total Liabilities	9,213	50,9

Source: BRSA (2021)

The Turkish Banking Sector experienced a significant increase in its total asset size, showing a remarkable surge of 50.9% in 2021 (Table 1.2). While this surge may seem highly favorable at first glance, representing a 50.9% growth from the previous year, it's crucial to consider how the appreciation in the exchange rate impacts the assets within these figures for a conclusive interpretation. Considering the exchange rate's appreciation rate during the corresponding period, it's reasonable to deduce that stagnation is also applicable in this case.

The distribution of total assets within the banking sector was observed across various categories of banks. The largest portion of total assets, accounting for 85%, was attributed to deposit banks, while participation banks contributed 8% of the overall assets, and development and investment banks held a 7% share (Appendix D).

Overall, the assets of the banking sector were distributed among ownership groups as follows: state banks held 43%, private banks held 31%, and foreign-origin banks held 26% of the assets. The proportion of public banks within the Turkish banking sector is less than 50% (Appendix E).

As of December 2021, loans constituted the largest share of Turkish banks' total assets, accounting for 52%, while the securities portfolio's share was lower, standing at only 16% (Appendix F). Furthermore, 58% of the total resources of banks were comprised of deposit resources. Banks also enhanced resource diversity through activities such as issuing securities and borrowing from repos or interbank markets (Appendix G).

From 2011 onward, loans and deposits in the banking sector have shown consistent growth. Total deposits of the banking sector increased by 53% compared to the previous year, reaching 4.901 million TL in 2021. Concurrently, loans increased by 37% to 5.303 million TL (Appendix H). The loan-to-deposit ratio, which had been increasing until 2017, sharply declined since 2018 due to exchange rate depreciation. By the end of 2021, with the exchange rate increase, the loan-to-deposit ratio stood at 0.92, remaining below 1.

The distribution of loans in December 2021 revealed that 58% of the total were commercial and corporate loans, while loans extended to small and medium-sized enterprises constituted 22% of the overall loan portfolio. Additionally, consumer loans, including credit cards and similar financial instruments, represented a 20% share (Appendix I).

There was an upward trend in foreign currency deposits within Turkey's banking sector, signifying a significant increase in deposits denominated in foreign currencies (Appendix J). Between 2017 and 2021, a substantial shift occurred in the composition of deposits. During this period, the percentage of deposits and participation funds denominated in Turkish lira decreased from 56% to 35%, while the proportion of deposits kept in foreign currency notably grew from 44% in 2017 to 65% by 2021.

In December 2021, Non-Performing Loans (NPLs) in the Turkish banking sector totaled 160 billion TL (Appendix K). The NPL ratio exhibited fluctuations around three until 2017 but surged to 3.88 in 2018 and further to 5.37 in 2019 due to the economic slowdown. The NPL ratio subsequently decreased to 4.09 in 2020 and further to 3.16 in 2021 with the onset of the Covid-19 pandemic, credit expansion, legal regulations on credit delay times, and exchange rate fluctuations. The combination of increasing non-performing loans and a high percentage of consumer and SME loans could potentially pose future problems.

Different bank cohorts in the Turkish banking sector experienced fluctuations in return on equity in December 2021 (Appendix L). Public banks demonstrated relatively lower return on equity, while domestic private and foreign bank groups displayed comparatively higher figures. Throughout December 2021, the Turkish banking industry saw a substantial increase in return on equity compared to the previous year.

In December 2021, the Turkish banking sector displayed noticeable variations in return on assets compared to the same month in the previous year. Specifically, the group of public banks experienced a decline in return on assets, while both the domestic private and foreign bank groups witnessed improvements (Appendix M). Overall, the Turkish banking industry exhibited an enhanced performance in generating returns on assets as of December 2021.

By December 2021, the Turkish banking industry achieved an impressive capital adequacy ratio of 18.34% (Appendix N). Remarkably, the industry managed to maintain high levels of capital adequacy despite pandemic-related difficulties. This achievement, surpassing anticipated and legal limitations, underscores the stability of the sector's financial structure. Consequently, the Turkish Banking Sector's overall financial structure can be described as notably favorable.

Using various econometric methods, this thesis seeks to examine the determinants influencing time and demand deposits in Turkish deposit banks. For this purpose, many academic studies were examined. Eriemo (2014), Yakubu & Abokor (2020), Unvan & Yakubu (2020), Charles (2022), Pitoňáková (2016), Azolibe (2019), Yadav & Kishore (2017), Larbi-Siaw & Lawer (2015), Banke & Yitayaw, M. (2022), Abiodun et al. (2021), Boadi & Larteyf (2015), and Alper (2018) researched many macroeconomic factors and bank-specific variables affecting bank deposits and obtained different results. However, it has been observed that there is no detailed study on time and demand deposits in terms of the banking sector in Turkey. This thesis aims to understand and determine the factors affecting time and demand deposits in Turkish deposit banks by examining the studies in this literature and using the data supporting them.

The introductory section of the study focuses on analyzing the composition of the Turkish banking sector. The second section of the study reviews the literatures. The third section of the study outlines the methodological background. The fourth section utilizes panel data analysis to examine the impact of macroeconomic and bank-specific factors on time and demand deposits in 10 Turkish deposit banks between 2011-Q1 and 2021-Q4. In the final section, the model results are discussed and leads to the conclusion and suggestions.

2. LITERATUR REVIEW

There is a wide variety of research published in the academic literature that investigates the elements that influence deposits of varying sizes. When all of the research is taken into consideration, it is apparent that while comparable findings were acquired and the same factors were used as a foundation, conflicting results were also produced because of the variances in data or examination periods. This is observed when the studies are analyzed in their entirety. The following is a discussion of just some of the numerous studies that have been carried out in this field.

Bank deposit growth in Turkey researched by Yakubu and Abakor (2020) by analyzing between 2000-Q1 and 2016-Q4. The researchers employed the ARDL methodology to investigate the determinants impacting short- and long-term results, considering both bank-specific and macroeconomic variables. In Turkey, deposit growth exhibited positive relationships with the expansion of branches and the expand in broad money supply for short term, factors such as bank stability, bank efficiency, and inflation did not have statistically significant effects; however, in the long term, deposit growth demonstrated significant and positive associations with the consistency of the banking sector and the broad money supply (Yakubu & Abokor, 2020).

Ferrouhi (2017) conducted a regression analysis covering between 2003 and 2014 to investigate the factors influencing bank deposits, using deposit in Moroccan banks as the dependent variable and considering various bank-specific and macroeconomic variables. The variables pertaining to banks in this study encompassed their size, external funding to total liabilities ratio, internal funding, and equity to total assets ratio. In this study, it was observed that large banks tend to attract a greater volume of deposits compared to their smaller counterparts. Furthermore, it was noted that the provision of bank financing has a positive influence on the behavior of depositors. The analysis focused on several macroeconomic variables, including the GDP growth rate, inflation rate, unemployment rate, foreign direct investment, and simulated financial crisis. It is noteworthy that the impact of deposit rates exhibited a paradoxical pattern, whereby an increase in rates corresponded to a decrease in deposits, while periods of escalating unemployment rates coincided with an increase in deposits. The study provided that the significance of bank size and bank financing are effect on deposits. Additionally, it uncovered unforeseen relationships between deposit rates, unemployment rates, and deposit growth (Ferrouhi, 2017).

Ünvan & Yakubu (2020) investigated the impact of characteristics of bank spesific factors on deposits between 2008 and 2017 in Ghana. The research took data from 11 banks into account and examined how various independent factors affected the amount of bank deposits. Bank size, bank profitability, capital adequacy ratio, liquidity level, monetary policy rate, and inflation were all investigated as independent factors. The results showed that bank deposits had a bad association with bank profitability, liquidity, and inflation. The amount of deposits was considerably and positively effected by size of bank. On the other hand, it was discovered that the monetary policy rate and capital adequacy ratio had no effect on deposits. Overall, the research brought attention to the role that bank size has in attracting deposits as well as the detrimental effects that variables like bank profitability, liquidity, and inflation have on bank deposits in the Ghanaian banking industry (Ünvan & Yakubu, 2020).

Morina and Osmani (2019) conducted a comprehensive study of the economies in the Western Balkan region. Their specific research area centered around analyzing how various macroeconomic factors influenced the deposits within the banking sector. The research utilized econometric models to examine the relationship betweendeposit level, and independent variables including deposit interest rate, marginal rates, GDP, inflation, and broad money. Deposits were effected by the deposit interest rate, the marginal rate, GDP growth, and the money supply. (Morina & Osmani, 2019).

Charles (2022) made a research of bank-specific factors, macroeconomic indices, and bank deposit growth in Rwanda between 2005-Q1 and 2019-Q4 to analyze the link between bank and GDP, deposit interest rate, bank branches, consumer price index, and government expenditure. This study estimated these factors' long-term and short-term associations. The analysis found a statistically significant and positive link between GDP and bank deposits that lasted over time. Rwanda's considerable link between government expenditure and bank deposits influenced the outcome. The studies also showed bank deposits effected by a deposit interest rates positively. However, the long-run model showed a negative link between deposit growth and inflation's consumer price index. The empirical research also showed that branch expansion does not affect bank deposit accumulation over time. The analysis found a positive relationship between GDP and government expenditure in the short term. Bank deposits were also affected by government expenditure and GDP. However, bank branches and deposit interest rate had effect on bank deposits, they did not reach statistical significance. However, the consumer price index did not affect in the predicted direction and was not statistically significant. GDP, government expenditure, and deposit interest rates had an impact on Rwanda's bank deposit growth, in short term and long-term. Branch numbers and the consumer price index have no immediate effect on bank deposits (Charles, 2022).

In a research carried out by Pitonakova (2016), the objective was to identify the determinants on household bank deposits in Slovakia. The research utilized the income and saving theory and employed the ARDL framework for analysis. The research employed household bank deposits as the independent variable, while the explanatory variables encompassed the interest rate on household deposits, household disposable income, inflation, the dependency ratio, and the growth of household disposable income. The dataset utilized for analysis encompassed the temporal span ranging from 1998-Q2 to 2015-Q1. The research revealed a positive relation between and elderly dependency ratio and deposits, suggesting a beneficial effect on short and long term. Rising in inflation has had a beneficial impact on bank deposits, indicating a prolonged period of precautionary saving behavior among households. Furthermore, there was a notable rise in gross disposable income, which consequently prompted households to augment their financial assets by means of bank deposits. Moreover, the research revealed that a rise in actual interest rates prompted households to allocate their financial assets towards bank accounts, leading to a subsequent increase in deposits. The assessment of the impact of explanatory variables on household bank deposits was facilitated by the elasticity of the variables (Pitonakova, 2016).

Azolibe (2019) carried out to explore the intricate relationships among the factors within the banking sector of Nigeria. The research utilized the multiple ordinary least squares methodology, wherein customer deposits were considered the dependent variable and a variety of macroeconomic and bank-specific factors were regarded as independent variables. The study examined several macroeconomic factors, including lending rate, government expenditure, the inflation rate, GDP, unemployment rate, and exchange rate. Furthermore, the study took into account the deposit interest rate, the expansion of the branch network, and the level of bank liquidity as bank specific determinants. The temporal data utilized for the analysis spanned from 1985 to 2018. The findings have provided valuable insights into the relationship between these variables and the mobilization of deposits. Significantly, a statistically significant inverse relationship was observed between the deposit interest rate and consumer prices, which had a notable effect on deposit levels. Additionally, it was observed that fluctuations in the unemployment rate, loan-to-deposit ratio, and exchange rate had a slight negative effect on the mobilization of deposits. Conversely, variations in the lending rate and government expenditure demonstrated a modest yet favorable impact on the accumulation of deposits. Moreover, it was observed that both the GDP and bank branches have a favorable influence deposit mobilization (Azolibe, 2019).

Eriemo (2014) researched the determinants effecting on bank deposits in Nigeria. For data analysis, researchers utilized both the autoregressive conditional heteroskedasticity (ARCH) method and the error correction model (ECM). Utilized between 1980 and 2010. Bank deposits analysed by interest rate, bank branches, bank investment and consumer price index. Study found that bank branches has a positive and significant relationship effect on bank deposits. This finding implies that bank branches impact on the ability to attract deposits. Furthermore, the research revealed that deposit interest rates and lagged consumer price index exerted an impact on bank deposits in Nigeria (Eriemo, 2014).

Alper (2018) conducted a study to examine the factors effecting domestic savings in Turkey. Research employed the dates between 1979 and 2017 and employed the Kapetanios-Shin-Snell cointegration test and the FMOLS method for estimation. The independent variables encompassed were the deposit interest rate, government final consumption expenditure, GDP growth rate, urbanization rate, and inflation rate expressed as a proportion of GDP. The previously mentioned factors employed to research the long run association. Findigs indicate a positive relationship between the deposit interest rate, GDP, and domestic savings. This implies that there is a positive relationship between GDP, deposit interest rates, and domestic savings, whereby an increase in GDP and deposit interest rates increase in domestic savings. On the contrary, it was observed that domestic savings were negatively affected by government final consumption expenditure and inflation. To clarify, an inverse relationship between government expenditure and inflation rates, and the consequent impact is a decrease in domestic savings (Alper, 2018).

In a study conducted by Çetin (2014), researcher examine the financial factors that effecting participatory bank deposits in Turkey. The study examined Turkish participatory bank deposits as the dependent variable, while as independent variables are London gold prices, 3-month Libor rates, customer price indexes. The dataset encompassed monthly data spanning from December 2005 to November 2013. Results indicated that there are no significance impact of London gold prices, 3-month Libor rates, customer price indexes on Turkish participatory banks deposits. The study revealed a persistent relationship between stationary variables and a one-way association between Turkish participatory bank deposits and stationary 3-month Libor rates (Çetin, 2014).

In their research, Yadav and Kishore (2017) investigated the macroeconomic factors that influence bank deposits in India. They employed the VECM as analytical framework and research was centered on comprehending the impact of different variables on bank deposits within the nation. The variables employed in the analysis encompassed repo rate, inflation, Treasury bill rate, industrial production, money supply, and stock market index. The investigation employed monthly data encompassing the timeframe spanning from January 2011 to December 2015. Results indicated a relationship between money supply and the quantity of deposits positively, suggesting that an augmentation in money supply resulted in an increase in bank deposits. Nevertheless, it is worth noting that both inflation and the Treasury bill rate exerted a detrimental influence on deposits. Also found that a negative relationship between increased Treasury bill rates, inflation, and diminished bank deposits (Yadav & Kishore, 2017).

Siaw and Lawer (2015) conducted an extensive study examining the determinants influencing bank deposits encompassing macroeconomic and financial variables in Ghana. The research employed time series data covering the period from 2000 to 2013, which included financial data bank spesific and macroeconomic variables. The variable of interest in the study was operationalized as the aggregate amount of deposit balances held at financial institutions. The study conducted by the researchers focused on analyzing the effects of macroeconomic indicators, such as, the All Share Index, the monetary policy rate, the consumer price index, and money supply. Furthermore, the investigation examined the deposit interest rate as a financial independent variable. Results indicated that there was a positive relationship between deposit interest rates and monetary policy rates, although this relationship was not found to be statistically significant in terms of its impact on bank deposits. This finding indicates that alterations in these variables did not exert a statistically significant influence on deposit levels. In a similar vein, the All Share Index exhibited a statistically insignificant inverse relationship with bank deposits, suggesting that variations in the stock market index did not have a substantial impact on deposit balances. Nevertheless, it was determined that the consumer price index had a statistically significant adverse impact on bank deposits. This suggests a negative relation between higher inflation and bank deposits. Moreover, it is noteworthy that money supply exerted substantial adverse effect on deposits, thereby suggesting that inflation played a role in shaping deposit levels throughout the analyzed timeframe (Siaw & Lawer, 2015).

Banke & Yivataw (2022) used a fixed effect model to analyze deposit mobilization in Ethiopian banks from 2011 to 2020. Profitability, liquidity, capital adequacy, inflation, GDP, and deposit mobilization are bank-specific dependent factors. Macroeconomics depends on population, political stability, and growth. The model shows that Ethiopian commercial banks' deposit mobilization is negatively and statistically significantly affected by the loan-to-deposit ratio, liquidity, capital adequacy, economic development, inflation, population growth, and political stability. Ethiopian Commercial Banks mobilize deposits statistically more when they are profitable (Banke & Yitayaw, 2022).

Abidoun et al. (2021) examined macroeconomic and banking sector-specific determinants on domestic currency deposits in Nigeria between 2000 and 2018 using the auto-regressive distributed lag approach. They used domestic currency deposits, with the total domestic currency deposits held by banks as the dependent variable, to explain the factors that affect deposits. They also used two macroeconomic variables that are unique to banks, such as private sector credit and bank size, as well as three macroeconomic variables, including the savings interest rate, the GDP, and inflation. Results for the macroeconomic factors indicate that Nigerian domestic currency deposits are not significantly adversely impacted by the monetary policy rate or the savings interest rate. Additionally, Nigerian local currency deposits are significantly negatively impacted by the inflation rate. Domestic currency deposits are significantly influenced favorably by the GDP. Regarding the characteristics related to banks, domestic currency deposits are significantly positively impacted by private sector lending, but the impact of bank size is minimal. Furthermore, macroeconomic factors, bank-specific factors, and local currency deposits in Nigeria all have a long-term relationship (Abiodun et al., 2021).

Bikker and Gerritsen (2018) studied the macroeconomic, bank-specific, and account-specific factors that affect Dutch savings and time deposit interest rates using monthly data from January 2003 to September 2014. In the time deposit model, they considered various independent variables, including macroeconomic factors (interest rate, volatility, inflation, market rate, economic growth, and volatility index), bank-specific factors (total assets, creditworthiness, liquidity surplus, foreign bank presence, deposit funding, cost-to-asset ratio), and account-specific factors (minimum balance, frequency of payments, ascending rates, and maturity). The basic savings account model included two additional variables (withdrawal fees and bonus rates) and substituted liquidity mismatch using Fixed Effect, an Error Correction Model (ECM) and feasible Generalized Least Squares (GLS). Results define that macroeconomic factors significantly influenced interest rates, with the market rate, market rate volatility, inflation rate, and volatility positively affecting rates, while market concentration and economic growth had a negative impact on rates (Bikker & Gerritsen, 2018).

Boadi et al. (2015) researched Ghana to explore the influence of interest rate liberalization on bank deposits. They used quarterly data from 1991 to 2012, adjusting for seasonality. The independent variables included long-term deposits, real saving deposit rates, real treasury bill rates, changes in the exchange rate, GDP, and a dummy variable for the liberalization period. Employing the ordinary least squares model, the study found a significant negative relationship between real savings rates and bank deposits in Ghana. Additionally, the actual treasury bill rate and GDP had robust impacts on bank deposits. Additionally, the study showed statistically negative significant relationship between exchange rate depreciation and its effect on bank deposits. Lastly, the findings confirmed that the liberalization process was associated with bank deposits (Boadi et al., 2015).

Pradhan and Paneru (2017) looked at the macroeconomic variables affecting bank deposits in Nepal's commercial banks in their research. The deposit notion was explained using a multiple linear regression model using data from 18 commercial banks from the years 2008 to 2013. Fixed deposit and savings deposits whew dependent variables, while the explanatory factors were return on assets, inflation, branch count, and GDP growth rate. The results showed that the number of branches, delayed log fixed deposits, and the observed trend in fixed deposits all exhibited substantial and positive correlations. However, factors including GDP, inflation, return on assets, and lagged logs of GDP, inflation, and return on assets had a statistically significant and negative impact on fixed deposits. The study discovered that the quantity of branches and lagged log saving deposits had a statistically significant beneficial affect on saving deposits. Nevertheless, while lacking statistical significance, the delayed increase in the GDP had a favorable impact on saving deposits. Similar to this, Pradhan and Paneru (2017) found that factors including GDP, inflation, lagged GDP growth rate, inflation, return on assets, return on assets, and trend had a statistically insignificant and negative effect on saving deposits (Pradhan & Paneru, 2017).

Morina and Osmani (2019) examined the macroeconomic variables effecting on deposits in Western Balkan nations. The quantity of deposits is the dependent variable, and and the growth of broad money, marginal interest rates, the interest rates on deposits, inflation, GDP are the independent variables. With the Arelano Bond Test, random effect, fixed effect, Hausman Taylor regression, and linear regression methods, the six western Balkan nations included in the study's data range of 2005–2017 are examined. Although inflation is not a significant predictor of deposit level, all models reveal a substantial positive relationship between interest rate, marginal interest rate, GDP, and the development of broad money (Morina & Osmani, 2019).

Using an ordinary least squares model, Mashamba et al. (2014) researched the banks' deposit interest rates and deposit mobilization relationship between 2000 and 2006 in Zimbabwe. To explain deposit change, they employed total commercial bank deposits as dependend variable with inflation rates, deposit interest rates, GDP, interest rate margins, and financial deepening as M2/GDP ratios as independent variables. In Zimbabwe, interest rate margins and inflation have a significant negative impact on deposits and financial deepening, whereas the GDP effects positively (Mashamba et al., 2014).

Nishat & Bilgrami (1989) examined the factors determining commercial bank demand and time deposits in Pakistan and compared the post- and pre-nationalization periods for the period from 1959–1960 to 1985–1986. They defined partly demand deposits and time deposits separately as dependent variables and Gross national income, national income from the agricultural sector, national income from the non-agricultural sector, interest rates on deposits, government bond and securities yields, industrial securities yields, investment index on real estate, defense certificate yield, national saving scheme yield, previous year deposits, total bank credits, number of bank branches, and nationalization dummies for the pre- and post-period are independent variables. Result shows income level has a positive impact on demand deposit growth in pre- and post-nationalization periods, and yield on industrial securities has a negative and significant effect on demand deposits. For bank credit, There is an insignificant relationship with demand deposits. For time deposits, there is a significant and positive relationship with non-agricultural income, the yield on time deposits, and bank credit; on the other hand, there is a negative significant relationship with investment in real estate for both the pre- and post-nationalization periods in Pakistan (Nishat & Bilgrami, 1989).

Using an ordinary least squares model, Turhani and Hoda (2016) investigated the effects of macroeconomic and specialized banking factors on deposit behavior in the Albanian banking system between January 2005 and December 2014. According to the model, deposit levels are negatively impacted by the capitalization rate, interest rates, the amount of cash held outside of banks, and the rate of inflation. The macroeconomic crises, exchange rate, unemployment rate, and liquidity level all have a substantial positive impact on Albania's deposit level (Turhani & Hoda, 2018).

3. METHODOLOGY

3.1. Dataset

Within this segment of the research, panel data analysis is employed to examine the interplay among variables as central bank interest rate, inflation rate, money supply rate, return on equity, capital adequacy ratio, and deposits based on banks' quarterly financial reports.

In this study, the dataset for 10 banks shown in Table 3.1 was obtained by combining the macro data with the key determinants on a bank-by-bank basis for the quarterly periods of 2011-2021 and the quarterly data of the banks was analyzed. Selected ten banks represent banking sector's 86% of assets, 84% of credits, 92% of deposits, and 83% of equities so that sampling size of the banks show majority of banking sector.

Table 3.1. Banks in Dataset

Name of Banks	Asset Size*	Credits*	Deposits*	Equity*	Licence Date
ZIRAATBANK	1.370.890	778.404	948.687	97.100	1863
VAKIFBANK	1.007.214	592.010	590.943	51.953	1954
IŞBANK	926.569	514.209	595.628	86.839	1924
HALKBANK	901.217	539.588	625.904	43.500	1938
GARANTI	757.802	424.855	513.240	78.903	1946
YAPI KREDI BANK	736.770	406.267	401.095	63.484	1944
AKBANK	708.911	353.372	413.261	75.955	1948
QNB FINANSBANK	371.369	212.744	226.923	22.144	1987
DENIZBANK	308.719	189.321	186.841	28.857	1997
TEB	194.057	107.823	131.839	13.618	1927
10 BANKS	7.283.518	4.118.592	4.634.362	562.353	
TOTAL	8.489.361	4.882.783	5.011.889	677.636	
Ratio (%)	86	84	92	83	

Source: BAT ***** denotes million TL.

3.2. Research Variables and Model Specification

Variables as defined independed in this study are time and demand deposits, while the independent factors consist of the central bank interest rate, inflation rate, money supply rate, capital adequacy ratio, and return on equity.

Time deposits and demand deposits are different types of accounts in banks where depositors can keep their money. Demand deposits are deposit accounts that do not have a fixed maturity period and customers can always withdraw. Demand deposits are generally used for daily financial transactions and are preferred to provide liquidity. Time deposits refer to deposit accounts that are kept in the bank for a certain maturity period and whose withdrawal is restricted during this period. Time deposits are generally used to provide a certain return. When opening the account, the maturity period of the time deposit and the amount of interest to be obtained are determined. At maturity, the deposit can be recovered along with the interest earned along with the principal. Both types of deposits are affected by factors such as macroeconomic conditions, and bank specific dynamics. Banks adjust their balance sheets by considering these factors. To determine these factors, the factors affecting time and demand deposits will be determined as dependent variables in two different models.

Choosing the central bank interest rate as the independent variable from the list of major macro variables is aimed at explaining how and in which direction the interest rate changes determined by the central bank as a policy rate will affect the banks demand and time deposits in the long run.

As another policy tool, the size of the money supply in the economy, which is controlled by central banks, is followed by monetary expansion during economic stagnation, and economic vitality is created. However, in the case of excessive monetary expansion, inflation is created. The fact that the size of the money supply is so important has made it necessary to examine the effect of changes in this size on the deposits of the banks.

The reason for choosing the inflation rate is that individuals and institutions can make changes in their spending and investment preferences when there is a rapid increase in prices, and the effect of this change on the deposits, which is the most important resource of the banks, needs to be examined.

Banks can expand lending by collecting deposits and bolstering these deposits with equity. Bank-owned equity can be supported by external borrowing and deposits, introducing a leverage dynamic. Through borrowing upon equity, banks heighten transaction capacity, yet heightening borrowing raises risk due to mounting interest payments and repayments. The rationale behind the equity in a bank's assets as a capital adequacy ratio and its impact on deposits will be examined.

The return on equity shows how the equity owned by the bank is used. If the bank makes high profits by using its equity efficiently, the return on equity increases. However, an important point to be aware of is risk. Banks must strike a balance between protecting depositors' money and making a profit at the same time. Attempting to earn high profits by taking high risks may run the risk of undermining the trust of depositors. Collecting sufficient deposits is important to ensure the liquidity of the bank. At the same time, it can increase customers' confidence in the bank. A reliable bank can attract more depositors. Due to these factors, the effect of the bank's return on equity on deposits will be examined. In Table 3.2., The variables' definitions are provided:

Table 3.2. Variable Descriptions, Predicted Relationships, and Signs

Variable	Symbol	Measurement	Source	Expected Sign
Demand Deposit	dd	Billion TL	Bank's report	
Time Deposit	td	Billion TL	Bank's report	
Central Bank Interest Rate	ir	Percentage	CBRT	+
Inflation Rate	inf	Percentage	Turkstat	+ / -
Money Supply / GDP	ms	Percentage	CBRT/Turkstat	+
Capital Adequacy	ca	Percentage	Bank's report	-
Return on Equity	roe	Percentage	Bank's report	-

Source: Author's original formulation based on theoretical and practical research

3.2.1. Dependent Variables:

Time Deposit: A time deposit is a type of deposit that has a set maturity or duration and receives interest at that time. Time deposit maturities can start from one day and be extended with longer maturities. Time deposits typically gain interest that is fixed for the duration of the term and payable at maturity; but, some types for deposits, especially long-term deposits, may have periodic interest payments made over the term. In general, the interest rate on time deposits tends to increase with longer maturities and larger deposit amounts. (Kagan, 2020).

Demand Deposit: Demand deposits have no recall or maturity requirements, can be withdrawn in full or in part at any time by the account holder without the bank's approval, and interest accrues at the end of the year or when the account is closed. Demand deposits are among the most liquid assets since they may be taken from the bank at any moment (Team, 2020).

3.2.2. Independent Variables:

Inflation Rate: According to the Turkish Statistical Institute (TURKSTAT), inflation refers to the persistent devaluation of currency caused by a sustained and progressive increase in the overall price level. Consequently, consumers experience a decline in their ability to purchase goods and services. As per the provided definition, inflation encompasses not only the escalation of prices for specific goods or services, but also the sustained elevation of the general price level. In an economy, there exists a phenomenon where certain goods experience price increases while others undergo price decreases. The trend of average prices holds significant importance. Price indices are used to measure the changes in average prices over time (TURKSTAT, 2023).

Numerous studies have explored the influence of inflation on the growth of bank deposits, conducting in-depth analyses of both empirical and theoretical research. Based on investigations conducted by Alper (2018), Azolibe (2019), Banke and Yivataw (2022), Charles (2022), Mashamba et al. (2014), Siaw and Lawer (2015), and Eriemo (2014), it is evident that inflation has a detrimental and statistically significant effect on the expansion of bank deposits. Similarly, prior research carried out by Morina and Osmani (2019), Ferrouhi (2017), Paneru and Pradhan et al. (2017) has examined the relationship between inflation and bank deposits, revealing a negative association; however, it is worth noting that the observed effect was not statistically significant. In contrast, the findings of Yakubu and Unvan (2020) and Pitonakova (2016) indicate that inflation exerts a statstically significant and positive impact on the savings rate. According to the aforementioned empirical and theoretical evidence, a hypothesis stated in the following formulation:

H1: Inflation rate has a significant impact on Turkish banks' deposits.

Central Bank Policy Interest Rate: Central banks possess significant authority in regulating the money supply and short-term interest rates through the implementation of official interest rates. As a result, they play a pivotal role in determining the interest rates that are applicable to short-term loans extended to banks. This function serves the purpose of ensuring the adequate availability of liquidity for banks and encouraging borrowing to attract surplus liquidity. The primary goal of central banks is to exert influence over the aggregate level of economic activity and price levels by means of setting interest rates. Therefore, the aforementioned interest rate is commonly known as the policy rate. The interest rate utilized by the Central Bank as a policy instrument refers to the rate of interest employed in one-week repurchase agreements (CBRT, 2023).

Based on the findings of Yakubu and Unvan (2020) and Siaw and Lawer (2015), it was observed that the central bank policy rate had a positive yet statistically insignificant effect on bank deposits. Review the following hypothesis has been developed in order to has mentioned before:

H2: Central bank policy interest rate has a significant impact on Turkish banks' deposits.

Money Supply Rate: The M2/GDP ratio represents the relationship between a nation's money supply, specifically M2, and its GDP. M2 refers to a monetary aggregate that encompasses currency in circulation, demand deposits (commonly known as checking accounts), and time deposits (which include savings accounts and certificates of deposit). Conversely, GDP represents the worth of products and services produced inside a nation within a certain time (Worldbank, 2023).

The M2/GDP ratio serves as a metric for assessing the liquidity or financial depth of an economy. Typically, an elevated M2/GDP ratio signifies a greater magnitude of money supply in relation to the size of the economy, thereby indicating a heightened level of financial intermediation and liquidity. On the contrary, a reduced ratio indicates a diminished monetary supply relative to the magnitude of the economy.

The research conducted by Yakubu and Abokor (2020), Yadav and Kishore (2015), and Morina and Osmani (2019) establishes that the rate of money supply is a positively and significantly influential factor in determining deposit growth. In contrast, Siaw and Lawer (2015) demonstrate that the money supply exerts a notable adverse effect on deposit levels. This research formulates the following hypothesis for money supply, drawing upon the aforementioned literature:

H3: Central bank policy interest rate has a significant impact on Turkish banks' deposits.

Capital Adequacy Ratio: The equity to asset ratio is a critical metric used to assess the capital adequacy of a company by measuring the proportion of its equity relative to total assets. This financial indicator holds significant importance for both business owners and investors as they evaluate a bank's financial well-being. Calculated by dividing a bank's total equity by its total assets, the resulting percentage represents the portion of the bank's assets financed by equity. This ratio provides valuable insights into a bank's financial health. A business model with a substantial equity to asset ratio indicates enhanced financial stability and reduced reliance on debt financing. Consequently, the organization demonstrates increased resilience to economic disruptions and the capacity to recover from adverse situations. On the contrary, a lower equity to asset ratio signals a higher dependence on debt financing and a comparatively weaker financial position. This situation elevates the bank's vulnerability to financial shocks and heightens the risk of default (Kantrovich, 2011)

In the study conducted by Yakubu and Unvan (2020), the capital adequacy ratio had a negative effect on bank deposits, although the effect was statistically insignificant. Building upon these previous findings, this research aims to explore the impact of equity adequacy on deposits.

H4: Capital Adequacy rate has a significant impact on Turkish banks' deposits.

Return on Equity Rate: The computation of the return on equity rate involves dividing a company's net income by its shareholders' equity, serving as a key financial performance metric (Fernando, 2023). Widely acknowledged as a measure of profitability, the return on equity reflects the efficiency of generating returns on net assets. This metric is obtained by deducting a company's debt from its assets, resulting in the calculation of shareholders' equity.

Regarded as a vital indicator, the return on equity serves as a gauge of a company's profitability and its ability to generate profits efficiently. A higher return on equity is indicative of effective management in generating income and growth through equity financing. This research seeks to investigate the effect on return on equity on deposits.

H5: Return on equity rate has a significant impact on Turkish banks' deposits.

The study employs the natural logarithms of all variables for modeling purposes. The usage of panel data methods in the estimation of the econometric model is built into equations (3.1) and (3.2) for this objective.

Model 1: Time deposit, central bank interest rate, inflation rate, money supply rate, capital adequacy rate, and return on equity relationship.

$$ltd_{it} = \beta_{0it} + \beta_{1it} lir_{1it} + \beta_{2it} linf_{2it} + \beta_{3t} lms_{3it} + \beta_{4it} lca_{4it} + \beta_{5it} lroe_{5it} + u_{it} \quad (3.1)$$

Model 2: Demand deposit, central bank interest rate, inflation rate, money supply rate, capital adequacy rate, and return on equity relationship.

$$ldd_{it} = \beta_{0it} + \beta_{1it} lir_{1it} + \beta_{2it} linf_{2it} + \beta_{3t} lms_{3it} + \beta_{4it} lca_{4it} + \beta_{5it} lroe_{5it} + u_{it} \quad (3.2)$$

Model 1 ltd_{it} represents the logarithm time deposits of i bank in the period t. Model 2 ldd_{it} refers to the demand deposits of i bank in the period t with logarithm taken. lir_{it}, $linf_{it}$, lms_{it}, lca_{it} and $lroe_{it}$ in Model 1 and Model 2, respectively, are the central bank interest rate with logarithms of i bank in t period, inflation rate with logarithms, logarithm of money supply ratio, logarithm of capital adequacy ratio and logarithm of return on equity ratio, β_{0it} is the constant term, and u_{it} denote error term of the model.

In the study, ten fundamental hypotheses were developed to test the significance of the independent variables in relation to the validity of the above two models. The following hypotheses are for model 1 and model 2 stated, respectively:

Model 1 Hypotheses:

H_0^1: The central bank interest rate has a significant impact on time deposits.

H_0^2: The inflation rate has a significant impact on time deposits.

H_0^3: The monetary supply rate has a significant impact on time deposits.

H_0^4: The capital adequacy rate has a significant impact on time deposits.

H_0^5: The return on equity rate has a significant impact on time deposits.

Model 2 Hypotheses:

H_0^1: The central bank interest rate has a significant impact on demand deposits.

H_0^2: The inflation rate has a significant impact on demand deposits.

H_0^3: The monetary supply rate has a significant impact on demand deposits.

H_0^4: The capital adequacy rate has a significant impact on demand deposits.

H_0^5: The return on equity rate has a significant impact on demand deposits.

Pedroni (1996, 2000, 2004) Pedroni Panel cointegration test and Kao (1999) Kao Panel cointegration test were used in the study to determine the existence of long-term co-integrated relationships between time and demand deposits and independent variables. The Panel Fully Corrected Least Squares Method (FMOLS) and The Panel Fully Modified Dynamic Least Square (DOLS) will be used to estimate long-term coefficients. The variables will be subjected to stationarity analysis utilizing the Levin Lin Chu, Im Pesaran Shin, Fisher ADF, and Fisher PP unit root tests in order to prevent the problem of false regression and reliably detect long-term correlations between variables. The Eviews 10 program will be used to carry out the aforementioned analyses.

3.3. Unit Root Tests

3.3.1. Levin, Lin and Chu Panel Unit Root Test

Levin, Lin, Chu (2002) employ the Augmented Dickey-Fuller unit root test specification, a commonly used technique in time series analysis, to conduct unit root tests. They present a three-step approach for executing their test. Initially, they estimate equation (3.3) using the Levin Lin Chu unit root test:

$$\Delta y_{it} = \rho_i y_{it-1} + \Sigma_{L=1}^{pi} \theta_{iL} \Delta y_{it-L} + a_{mi} d_{mt} + u_{it} \ (m = 1,2,\dots) \qquad (3.3)$$

The lag order, denoted as ρ_i, is allowed to vary among individuals. Following (3.3)'s determination of the autoregression order ρ_i, we do two supplementary regressions to provide orthogonalized residuals: Saving the residuals $\hat{e}_{it}$ and $\hat{v}_{it-1}$ from the regressions of Δy_{it} and y_{it-1} against Δy_{it-L} (L=1, …, ρ_i) and the relevant deterministic variables, d_{mt}.

$$\hat{e}_{it} = \Delta y_{it} - \sum_{L=1}^{P_i} \hat{\pi}_{iL} \Delta y_{it-L} - \hat{a}_{mi} d_{mt} \qquad (3.4)$$

$$\hat{v}_{it-1} = y_{it-1} - \sum_{L=1}^{P_i} \hat{\pi}_{iL} \Delta y_{it-L} - \hat{a}_{mi} d_{mt} \qquad (3.5)$$

Also normalize $\hat{e}_{it}$ and $\hat{v}_{it-1}$ by the regression standard error from Equation (3.6) to account for individual variation.

$$\tilde{e}_{it} = \frac{\hat{e}_{it}}{\hat{\sigma}_{\varepsilon i}}, \tilde{v}_{it-1} = \frac{\hat{v}_{it-1}}{\hat{\sigma}_{\varepsilon i}} \qquad (3.6)$$

It is feasible to compute the ratio between the standard deviations of the short-run and long-run periods. Assuming a unit root in the null hypothesis, the estimation of the long-run variance of (3.7) can be performed.

$$\hat{\sigma}_{yi}^2 = \frac{1}{T-1}\sum_{t=2}^{T} \Delta y_{it}^2 + 2\sum_{L=1}^{\bar{K}} w_{\bar{K}L}\left[\frac{1}{T-1}\sum_{t=2+L}^{T} \Delta y_{it}\,\Delta y_{i,t-1}\right] \tag{3.7}$$

Lastly, we get ρ by this equation (3.8):

$$\tilde{e}_{it} = \rho\tilde{v}_{i,t-1} + \tilde{\varepsilon}_{it} \tag{3.8}$$

The hypotheses established for the Levin Lin Chu unit root test are as follows:

$H_0: \rho_i = \rho = 0$ (Each series has a unit root, it is not stationary).

$H_1: \rho_i = \rho \neq 0$ (Each series has no unit root, it is stationary).

In the Levin Lin Chu unit root test, the t statistics are compared to the critical values by examining the t-statistic of the coefficient ρ. If the H_0 hypothesis is refuted, it is determined that the series is stationary (Levin et al., 2002).

3.3.2. Im, Pesaran, Shin Unit Root Test

Im Pesaran Shin panel's unit root test complies with the Augmented Dickey Fuller (ADF) unit root test standard. Im Pesaran Shin's (2003) study's panel unit root test statistic was calculated by doing the ADF test on each cross-sectional unit and figuring out its arithmetic mean. The following model has to be established in order to implement the Im Pesaran Shin panel unit root test.

$$\Delta y_{it} = \rho_i y_{it-1} + \Sigma_{L=1}^{pi}\theta_{iL}\Delta y_{it-L} + a_{mi}d_{mt} + u_{it}\ (m = 1,2,\ldots) \tag{3.9}$$

When doing the Im Pesaran Shin panel unit root test, each cross-section that makes up the panel is represented by the model given in equation (3.9). The relevant information is then combined to provide an average Augmented Dickey-Fuller (ADF) test statistic.

The resulting ADF test statistic is shown (3.10):

$$\bar{t} = \frac{1}{N}\sum_{i=1}^{N} t_{\rho i} \tag{3.10}$$

Im Pesaran Shin examined the null hypothesis, which states that "each section in the panel contains a unit root, ρi=0," and tested it against the alternative hypothesis, suggesting that "some sections in the panel contain a unit root, ρi<0." during the panel unit root test. The model uses the following to set up the null and alternate hypotheses (Baltagi, 2021):

$H_0 : \rho_i = 0$ (Each series has a unit root).

$H_1 : \begin{cases} \rho_i < 0 \; for \; i = 1,2, \dots, N_1 \\ \rho_i = 0 \; for \; i = N_1 + 1, \dots, N \end{cases}$ (Some section series has a unit root).

3.3.3. Fisher ADF and Fisher PP Tests For Unit Root

The unit root tests for the Fisher Augmented Dickey-Fuller (ADF) and Fisher Phillips-Perron (PP) are conducted on all cross-section units, similar to the Im Pesaran Shin unit root test. These tests were proposed by Maddala and Wu (1999) and Choi (2001), respectively. The p-values derived from the individual sections are utilized in the construction of the Fisher-type panel unit root test statistics. The Fisher Augmented Dickey-Fuller (ADF) and Fisher Phillips-Perron (PP) unit root tests are employed by formulating the subsequent model (3.11):

$$\Delta y_{it} = \rho_i y_{it-1} + \Sigma_{L=1}^{pi} \theta_{iL} \Delta y_{it-L} + a_{mi} d_{mt} + u_{it} \; (m = 1,2,3) \tag{3.11}$$

The Fisher ADF and Fisher PP unit root tests evaluate the null hypothesis that all units possess unit root time series, in contrast to the alternative hypothesis that suggests a mixture of stationary and non-stationary time series among the units. The test statistics employed in the Fisher augmented Dickey-Fuller (ADF) (3.12), and Fisher Phillips-Perron (PP) (3.13) unit root tests are provided below, respectively (Choi, 2001, Baltagi, 2021):

$$P = -2\sum_{i=1}^{N} lnp_i \tag{3.12}$$

$$P = \frac{1}{2\sqrt{N}} \sum_{i=1}^{N} (-2lnp_i - 2) \tag{3.13}$$

3.4. Cointegration Tests

3.4.1. Pedroni Cointegration Tests

Pedroni (1996, 2000, 2004) devised statistical tests to measure the null hypothesis that "there exists no cointegrated relationship among the variables within the panel." There are four tests in this set that comprise panel test statistics, while the remaining three tests are composed of group test statistics. The test statistics within the initial category (panel) are derived by conducting individual cointegration tests for each section and subsequently calculating the average of the resulting statistics. The test statistics in the second category (group) are obtained by utilizing the asymptotic distributions of the mean, numerator, and denominator terms. The test statistics belonging to the initial category are labeled as between-dimension cointegration test statistics, whereas the test statistics in the subsequent category are known as within-dimension cointegration test statistics.

The general form of Pedroni regression can be expressed as (3.14):

$$Y_{i,t} = a_i + \delta_t + \sum_{m=1}^{M} \beta_{mi} X_{mi,t} + u_{it} \tag{3.14}$$

Accordingly, the between-dimension cointegration test statistics in the first group are as follows:

1 - The panel v-statistic:

$$N^2 N^{\frac{3}{2}} Z_{\hat{v}NT} = \frac{T^2 N^{\frac{3}{2}}}{\Sigma_{i=1}^{N} \Sigma_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{u}_{it}^{2}} \tag{3.15}$$

2 - The panel ρ-statistic:

$$T\sqrt{N} Z_{\hat{\rho}NT} = \frac{T\sqrt{N} \left(\Sigma_{i=1}^{N} \Sigma_{t=i}^{T} \hat{L}_{11i}^{-2} \left(\hat{u}_{it-1}^{2} \Delta \hat{u}_{it}^{2} - \hat{\lambda}_i \right) \right)}{\Sigma_{i=1}^{N} \Sigma_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{u}_{it}^{2}} \tag{3.16}$$

3 - The panel t-statistic (non-parametric):

$$Z_{tNT} = \sqrt{\tilde{\sigma}_{NT}^{2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{u}_{it-1}^{2}} \left[\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \left(\hat{u}_{it-1}^{2} \Delta \hat{u}_{it}^{2} - \hat{\lambda}_{i} \right) \right] \quad (3.17)$$

4 - The panel t-statistic (parametric):

$$Z_{tNT} = \sqrt{\tilde{\sigma}_{NT}^{*2} \sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{u}_{it-1}^{*2}} \left[\sum_{i=1}^{N} \sum_{t=1}^{T} \hat{L}_{11i}^{-2} \left(\hat{u}_{it-1}^{*2} \Delta \hat{u}_{it}^{*2} - \hat{\lambda}_{i} \right) \right] \quad (3.18)$$

The cointegration test statistics in the second group are as follows:

5 - The group ρ-statistic (parametric):

$$T\sqrt{N}\tilde{Z}_{\hat{\rho}NT} = T\sqrt{N} \frac{\left(\Sigma_{t=1}^{T} \left(\hat{u}_{it-1}^{2} \Delta \hat{u}_{it}^{2} - \hat{\lambda}_{i} \right) \right)}{\Sigma_{i=1}^{N} (\Sigma_{t=1}^{T} \hat{u}_{it}^{2})} \quad (3.19)$$

6 - The group t-statistic (non-parametric):

$$\sqrt{N}\tilde{Z}_{tNT-1} = \sqrt{N} \sum_{i=1}^{N} \left(\sqrt{\sigma_{i}^{2} \sum_{t=1}^{T} \hat{u}_{it-1}^{2}} \right) \sum_{t=1}^{T} \left(\hat{u}_{it-1}^{2} \Delta \hat{u}_{it}^{2} - \hat{\lambda}_{i} \right) \quad (3.20)$$

7 - The group t-statistic (parametric):

$$\sqrt{N} z_{tNT-1}^{*} = \sqrt{N} \sum_{i=1}^{N} \left(\sqrt{\tilde{s}_{i}^{*2} \sum_{t=1}^{T} \hat{u}_{it-1}^{*2}} \right) \sum_{t=1}^{T} (\hat{u}_{it-1}^{*2} \Delta \hat{u}_{it}^{*2}) \quad (3.21)$$

The null hypothesis "There is no cointegration for all cross-sections" is assessed by contrasting it with the critical values of Pedroni (1999) based on the test statistics obtained previously (Pedroni, 1999).

3.4.2. Kao Cointegration Test

Kao (1999) proposed a panel cointegration test that utilizes residuals and is derived from the Dickey-Fuller and Augmented Dickey-Fuller test methodologies. The fundamental framework is established in accordance with equation (3.22).

$$Y_{it} = a_i + \beta X_{it\,+}\, u_{it} \tag{3.22}$$

The equation can be tested to the residual-based cointegration test (3.23):

$$\hat{u}_{it} = e\hat{u}_{it-1} + \nu_{it} \tag{3.23}$$

$\hat{u}_{it}$ is the estimated resudials from equation(21). The estimation of ρ by ordinary least squares and its corresponding test statistics are as in equation (3.24) and (3.25), respectively:

$$\hat{\rho} = \frac{\Sigma_{i=1}^{N} \Sigma_{t=2}^{T} \hat{e}_{it} + \hat{e}_{it-1}}{\Sigma_{i=1}^{N} \Sigma_{t=2}^{T} \hat{e}_{it}} \tag{3.24}$$

$$t_{\rho} = \frac{(\hat{\rho} - 1)\sqrt{\Sigma_{i=1}^{N} \Sigma_{t=2}^{T} \hat{e}_{it-1}^{2}}}{s_e} \tag{3.25}$$

Kao (1999) proposes four test statistics that "there is no cointegration between the variables, ρ=1" for null hypothesis. Besides, the residuals regression in equation (3.26) below is estimated for Kao (1999) ADF test. The ADF test statistic for the null hypothesis "There is no cointegration between the variables, ρ=1" is as in equation (3.27) (Kao, 1999, Baltagi, 2021):

$$\hat{e}_{it} = \rho\hat{e}_{it-1} + \sum_{j=1}^{p} \vartheta_j \Delta\hat{e}_{it-j} + v_{itp} \tag{3.26}$$

$$ADF = \frac{t_{ADF} + \frac{\sqrt{6N}\hat{\sigma}_v}{2\hat{\sigma}_{0v}}}{\sqrt{\frac{\hat{\sigma}_{0v}^2}{2\hat{\sigma}_v^2} + \frac{3\hat{\sigma}_v^2}{10\hat{\sigma}_{0v}^2}}} \tag{3.27}$$

3.5. FMOLS AND DOLS Models

3.5.1. Panel FMOLS

Pedroni (2000) formulated the Pooled Panel FMOLS regression as shown in equation (3.28):

$$\begin{gathered} y_{it} = a_i + \beta x_{it} + \mu_{it} \\ x_{it} = x_{it-1} + \varepsilon_i \end{gathered} \tag{3.28}$$

Here $\xi = (\mu_{it}, \varepsilon_{it})'$ represents the vector error process which is stationary. Thus, if the dependent variable y_{it} is integrated of the first order $I(1)$, y_{it} is the dependent and x_{it} independent variables cointegrated with the cointegrating vector β for each unit forming the panel. The coefficient a_i expresses the fixed effects of the units in the cointegrating relationship, where the vector β is the cointegrating vector that needs to be estimated and is calculated as in equation (3.29) (Pedroni, 2000):

$$\hat{\beta}_{NT}^* - \beta = \left(\sum_{i=1}^{N} \hat{L}_{22i}^{-2} \sum_{t=1}^{T} (x_{it} - \overline{x}_i)^2\right)^{-1} \sum_{i=1}^{N} \hat{L}_{11i}^{-1} \hat{L}_{22i}^{-1} \left(\sum_{t=1}^{T} (x_{it} - \overline{x}_i) \mu_{it}^* - T\hat{\gamma}_i\right) \tag{3.29}$$

In order to obtain Panel FMOLS test statistics, FMOLS test statistics are obtained for each cross-sectional unit and the arithmetic average of these test statistics is compared with the t-statistics values. How the t-statistics values are calculated is given in equation (3.30):

$$t_{\hat{B}_{NT}} = \left(\hat{\beta}^{*}_{NT} - \beta\right)\left(\sum_{i=1}^{N} \hat{L}^{-2}_{22i} \sum_{t=1}^{T} (x_{it} - \overline{x}_{i})^{2}\right)^{-1/2} \tag{3.30}$$

3.5.2. Panel DOLS

In estimating the long-term coefficients, the pooled panel DOLS approach, fixes the issue of autocorrelation between the internality and error terms between the variables and yields reliable and eliminates the endogeneity. The internal feedback is controlled in the Panel DOLS method by adding the leading and lagging values of the independent variable differences to the model (Kao & Chiang, 2000). Equation (3.31) establishes the DOLS model as follows:

$$y^{*}_{it}{=}\alpha_{i} + x^{*}_{it}{}'\beta + \sum_{j=-qi}^{qi} c_{ij} \Delta\, x^{*}_{it+j} + \dot{v}^{*}_{it} \tag{3.31}$$

The t-statistics for the coefficient obtained are as follows in equation (3.32):

$$t_{\hat{\beta}^{*}_{PD}} = N^{-1/2} \sum_{i=1}^{N} t_{\hat{\beta}^{*}_{D,i}} \tag{3.32}$$

4. DATA ANALYSIS AND REVIEW

This section aims to showcase the study's results and discussing their implications. The chapter was partitioned into four distinct sections. The initial section of the study provides descriptive analysis. Next section of presents the unit root tests used to assess stationarity. The third section examines long-term relationships with the application of cointegration tests. The fourth section of the report presents the findings of the FMOLS and DOLS methods for estimating the long-run coefficients.

4.1. Descriptive Statistics

In this study, the dependent variables are time deposits and demand deposits. The explanatory factors that were taken into consideration encompassed the central bank interest rate, inflation rate, money supply rate, capital adequacy rate, and return on equity rate.

Table 4.1. Descriptive Statistics of Variables

	TD	DD	IR	INF	MS	CA	ROE
Mean	117,114	38,811	11.47	11.41	53.44	10.57	5.69
Median	92,411	22,434	9.03	9.23	51.66	10.64	5.48
Maximum	607,998	340,688	25.50	36.08	69.83	15.09	13.35
Minimum	13,911	2,186	5.11	3.99	45.49	4.83	0.52
Std. Dev.	89,254	45,47	5.50	5.75	6.29	1.78	2.13
Observations	440	440	440	440	440	440	440

Source: EViews10 output

Table 4.1 shows that from 2011-Q1 to 2021-Q4, the average value of time deposits is 117,114 billion TL. Time deposits varied from 13,991 billion TL to 607,998 billion TL, as well. Time deposits at the bank had a standard deviation of 89,254 billion TL. The findings of this data analysis indicate that there was minimal fluctuation in the terms offered by banks for time deposits over the entire period of the observation. The standard deviation of time deposits exhibited a lower magnitude compared to the mean, suggesting a persistent pattern.

In contrast, significant fluctuations were observed in demand deposits throughout the observational period. The demand deposits ranged from a minimum of 2,186 billion TL to a maximum of 340,688 billion TL, with a standard deviation of 45.47 billion TL.

In relation to the macroeconomic variables, it is observed that the central bank interest rate displayed an average value of 11.47%, with fluctuations ranging from 5.11% to 25.00% over the course of the observation period. The central bank interest rate exhibited a standard deviation of 5.50%.

The observed inflation rate exhibited an average value of 11.41%, with fluctuations spanning from 3.99% to 36.08% over the designated period of analysis. The observed standard deviation of the inflation rate was 5.75%.

The average money supply rate during the observational period was 53.44%, with a range of values between 45.49% and 69.83%. The observed standard deviation of the money supply rate was determined to be 6.29%.

Regarding the measure of capital adequacy rate, the mean value was recorded at 10.57%, exhibiting a range of fluctuations spanning from 4.83% to 15.09% over the course of the observation period. The observed standard deviation of the capital adequacy rate was 1.78%.

The return on equity rate exhibited an average value of 5.69% over the course of the observational period, with fluctuations ranging from 0.52% to 13.35%. The return on equity exhibited an observed standard deviation of 2.13%.

Number of observation is 440 and it includes 44 quarter period for each variable.

4.2. Panel Unit Root Test Results

To accurately reflect the long-term relationship and avoid being mistaken with the spurious regression issue, stationarity level of the variables must be established. The unit root analysis of the variables at level values and first differences was investigated using the Levin, Lin, Chu unit root test, which assumes that the coefficient is common for all sections, and the Im, Pesaran, Shin, Fisher ADF, and Fisher PP unit root tests, which assume that the coefficient is different for all sections. Tests for unit roots were run using constant, trend, and constant terms. Lag lengths were computed for unit root tests using the modified Akaike information criteria. With the help of the Eviews 10 package software, unit root tests were run. The spectral estimator and bandwidth in the Levin Lin Chu, Fisher PP unit root tests were created using the Bartlett and Newey-West methods, respectively.

Table 4.2. Unit Root Test With Level (I(0))

I(0)	**With Constant**							
	Im, Pesaran, Shin		**Fisher ADF**		**Fisher PP**		**Levin, Lin, Chu**	
	Statistic	**Probability**	**Statistic**	**Probability**	**Statistic**	**Probability**	**Statistic**	**Probability**
ldd_{it}	12.1877	1.0000	0.06593	1.0000	0.01911	1.0000	8.83969	1.0000
ltd_{it}	7.1164	1.0000	7.03092	0.9966	7.20274	0.9960	3.82658	0.9999
lir_{it}	0.9041	0.8170	7.59313	0.9942	21.6577	0.3594	3.56067	0.9998
$linf_{it}$	0.6863	0.7537	10.0469	0.9673	11.92	0.9188	2.66869	0.9962
lms_{it}	6.2177	1.0000	0.62234	1.0000	0.30125	1.0000	5.16709	1.0000
lca_{it}	2.8296	0.9977	11.3402	0.9369	21.9039	0.3457	5.08868	1.0000
$lroe_{it}$	0.1598	0.5635	14.4328	0.8079	141.803***	0.0000	5.60917	1.0000
I(0)	**With Constant and Trend**							
	Im, Pesaran, Shin		**Fisher ADF**		**Fisher PP**		**Levin, Lin, Chu**	
	Statistic	**Probability**	**Statistic**	**Probability**	**Statistic**	**Probability**	**Statistic**	**Probability**
ldd_{it}	8.2362	1.0000	1.30395	1.0000	1.24908	1.0000	7.2082	1.0000
ltd_{it}	1.1109	0.8667	16.6987	0.6724	27.2186	0.1292	2.49165	0.9936
lir_{it}	-0.3800	0.3520	16.4097	0.6909	30.1205**	0.0679	3.6807	0.9999
$linf_{it}$	-1.65327**	0.0491	25.1409	0.1961	34.5367**	0.0227	3.99329	1.0000
lms_{it}	5.0974	1.0000	0.52419	1.0000	16.6164	0.6777	8.49329	1.0000
lca_{it}	1.0929	0.8628	16.2347	0.7020	25.3702	0.1876	3.48108	0.9998
$lroe_{it}$	2.8143	0.9976	4.99449	0.9997	138.572***	0.0000	8.23079	1.0000

Unit root test results with constant, constant and trended at level values for demand deposit (ldd_{it}), time deposit (ltd_{it}), central bank interest rate (lir_{it}), inflation rate ($linf_{it}$), money supply rate (lms_{it}), capital adequacy rate(lca_{it}), and return on equity ($lroe_{it}$) in Table 4.2. Since the probability value is larger than 0.05 and 0.01 (5% and 1%), null hypothesis is accepted. Levin Lin Chu unit root tests conclude that "common unit root exists" for all variables (ldd_{it}, ltd_{it}, lir_{it}, $linf_{it}$, lms_{it}, $lca_{it,}$ $lroe_{it}$). Accordingly, it is concluded that variables are not stationary.

Im Pesaran Shin, Fisher ADF, Fisher PP, and Levin, Lin, Chu panel unit root tests were also used to investigate if there was an individual unit root for each variable in Table 5.2. Since the probability values of time deposit, demand deposit, money supply rate, and capital adequacy rate variables are greater than 0.05 and 0.01, it has been determined that the variables contain unit root both in the fixed term and in the fixed and trending terms. It was observed that the central bank interest rate did not contain a unit root at the 10% probability value in the Fisher PP test in the intercept and trend terms, the return on equity in both intercept, and intercept and trend terms, and in the inflation rate at the 5% probability value in the Im Pesaran Shin and Fisher PP test. As a result, it shows that the variables for these four methods of stationarity analysis are not stationary, that is, they contain a unit root. It is important for both the cointegration analysis and the estimation of long-term coefficients whether the series are stationary or not, and if not, at what degree $I(d)$ they are stationary. In cointegration analysis, the series should be stationary at first $I(1)$ order, whereas in FMOLS and DOLS methods which long-term coefficients are estimated, all variables should be stationary at first differenced.

Table 4.3. Unit Root Test With First Differences

I(1)	**With Constant**							
	Im, Pesaran, Shin		**Fisher ADF**		**Fisher PP**		**Levin, Lin, Chu**	
	Statistic	**Probability**	**Statistic**	**Probability**	**Statistic**	**Probability**	**Statistic**	**Probability**
d(ldd_{it})	1.7175	0.9571	23.0441	0.2866	190.942***	0.0000	17.3435	1.0000
d(ltd_{it})	-12.1424***	0.0000	187.803***	0.0000	311.875***	0.0000	-11.7393***	0.0000
d(lir_{it})	-10.473***	0.0000	138.187***	0.0000	119.711***	0.0000	-11.6632***	0.0000
d($linf_{it}$)	-16.4544***	0.0000	239.169***	0.0000	239.411***	0.0000	-11.9174***	0.0000
d(lms_{it})	-14.1135***	0.0000	199.21***	0.0000	187.166***	0.0000	-12.1346***	0.0000
d(lca_{it})	-3.74933***	0.0001	72.2056***	0.0000	321.904***	0.0000	3.22817	0.9994
d($lroe_{it}$)	-16.536***	0.0000	252.402***	0.0000	410.442***	0.0000	-17.4573***	0.0000
I(1)	**With Intercept and Trend**							
	Im, Pesaran, Shin		**Fisher ADF**		**Fisher PP**		**Levin, Lin, Chu**	
	Statistic	**Probability**	**Statistic**	**Probability**	**Statistic**	**Probability**	**Statistic**	**Probability**
d(ldd_{it})	-8.12379***	0.0000	143.078***	0.0000	195.051***	0.0000	-5.07267***	0.0000
d(ltd_{it})	-18.7804***	0.0000	280.709***	0.0000	346.589***	0.0000	-18.0869***	0.0000
d(lir_{it})	-8.62127***	0.0000	101.498***	0.0000	84.6289***	0.0000	-10.7359***	0.0000
d($linf_{it}$)	-15.036***	0.0000	194.985***	0.0000	193.581***	0.0000	-10.1866***	0.0000
d(lms_{it})	-13.7241***	0.0000	174.893***	0.0000	164.831***	0.0000	-10.9878***	0.0000
d(lca_{it})	-8.77332***	0.0000	159.537***	0.0000	346.201***	0.0000	-9.10979***	0.0000
d($lroe_{it}$)	-15.4654***	0.0000	225.673***	0.0000	1549.39***	0.0000	-15.9778***	0.0000

Unit root test results are for the variables with constant, constant and trended at level values for demand deposit (ldd_{it}), time deposit (ltd_{it}), central bank interest rate (lir_{it}), inflation rate ($linf_{it}$), money supply rate (lms_{it}), capital adequacy rate(lca_{it}), and return on equity ($lroe_{it}$) when the first differences are taken in Table 5.3. For time deposit (ltd_{it}), central bank interest rate (*lir_{it}*), inflation rate (*$linf_{it}$*), money supply (*lms_{it}*), and return on equity(*$lroe_{it}$*) Levin Lin Chu common unit root test probability value which tests the null hypothesis that there is a not unit root. Probablity results fot these variables are less than 0.01 in both constant and constant and trend. According to the Levin Lin Chu unit root test, when the first difference is taken, it is stationary at the 1% significance level. It was observed that the capital adequacy and demand deposit did not contain a unit root at the 1% probability value in the Levin Lin Chu test in the intercept.

For all three unit root tests, since the probability values are less than 0.01 in both constant and constant and trend models, the first difference taken variables demand deposit (*ldd_{it}*), time deposit (*ltd_{it}*), central bank interest rate (*lir_{it}*), inflation rate (*$linf_{it}$*), money supply rate (*lms_{it}*), capital adequacy rate(*lca_{it}*), and return on equity (*$lroe_{it}$*)variables are determined to be stationary at the 1% significance level. For demand deposit, Im Pesaran Shin and Fisher ADF unit root test with constant are significant at 1% probability. As the majority of the results, demand deposit variable is considered to be stationary at the first difference.

Unit root tests assume that the cross-sectional units are homogeneous and heterogeneous, the variables contain unit roots in both fixed and constant and trended models and are stationary when their first difference is taken. Thus, cointegration and long-term coefficient estimate study may proceed.

4.3. Panel Cointegration Test Results

Co-integration is an analysis that researchers do to avoid the spurious regression problem and investigates whether there are long-term relationships between variables in line with the established models. Considering the two models established in this section, which time deposit (*ltd_{it}*) and demand deposit (*ltd_{it}*) are dependent variables the central bank interest rate (*lir_{it}*), inflation rate (*$linf_{it}$*), money supply rate (*lms_{it}*), capital adequacy rate(*lca_{it}*), and return on equity (*$lroe_{it}$*) are independent variables, the existence of a long-term cointegrated relationship was investigated by Pedroni Panel cointegration test and Kao Panel cointegration test. In both cointegration tests, Schwarz information criteria is is used for lag lenght. Tables 4.4. and 4.5. are the results for both established Cointegration tests:

Table 4.4. Pedroni and Kao Cointegration Test Results for Model 1

Model 1: $ltd_{it} = \beta_0 + \beta_1 lir_{it} + \beta_2 linf_{it} + \beta_3 lms_{it} + \beta 4 lca_{it} + \beta 5 lroe_{it} + u_{it}$				
Pedroni Cointegration Test Results				
Within Dimensions	**Constant**		**Constant and Trend**	
	Test Statistics	**Probability Value**	**Test Statistics**	**Probability Value**
Panel v-Statistic	-1.8379	0.9670	17.1254***	0.0000
Panel ρ-Statistic	1.7515	0.9601	-0.0236	0.4906
Panel t-Statistic (non-parametric)	-0.0338	0.4865	-2.7267***	0.0032
Panel t-Statistic (parametric)	-0.7828	0.2169	-2.8680***	0.0021
Between Dimensions	**Constant**		**Constant and Trend**	
	Test Statistics	**Probability Value**	**Test Statistics**	**Probability Value**
Group ρ-Statistic	3.0153	0.9987	0.5765	0.7179
Group t-Statistic (non-parametric)	0.8707	0.8080	-3.0045***	0.0013
Group t-Statistic (parametric)	-0.2421	0.4043	-3.0793***	0.0010
	Kao Panel Co-integration Test Result (ConstantTerm)			
	Test Statistics		**Probability**	
ADF test statistic	-6.6205***		0.0000	

Note: The cointegration tests were performed using the Eviews 10 package program. In Pedroni Panel and Kao Panel cointegration tests, the spectrtal estimator was made according to the Bartlett method, and the bandwidth was made according to the Newey-West method. ***, ** and * denote 1%, 5% and 10% significance, respectively.

In Table 4.4., Pedroni Panel and Kao Panel cointegration test results can be seen for Model 1 for the dependent variable of time deposit (ltd_{it}) series and variables the central bank interest rate (lir_{it}), inflation rate ($linf_{it}$), money supply rate (lms_{it}), capital adequacy rate(lca_{it}), and return on equity ($lroe_{it}$) are independent variables. In the cointegration equation established for Model 1, since the group t-statistic (non-parametric) and group t-statistic(parametric) probability values for the constant and trend terms are less than 0.01, the null hypothesis of "there is no cointegrating relationship between the variables" is rejected at 1% significance level and the existence of cointegration is accepted. However, the probability values of panel v-statistics (non-parametric), panel t-statistics(non-parametric), and panel t-statistics (parametric) for constant and trend terms are less than 0.01, so the cointegrating relationship between variables regarding null hypothesis is rejected at the 1% significance level and the existence of cointegration is accepted. Other statistics show that there is no cointegration.

Additionally, as noted in Table 4.4., the Kao Panel cointegration test was used to determine whether there is a cointegrated relationship between the variables. Pedroni group t-statistics and Pedroni panel t-statistics are supported by Kao ADF t-statistics, which demonstrate cointegration between variables at the 1% level of significance. As a result, the variables in Model 1 move together over time, according to both Pedroni and Kao's cointegration approaches.

Table 4.5. Pedroni and Kao Cointegration Test Results for Model 2

Model 2: $ldd_{it} = \beta_0 + \beta_1 lir_{it} + \beta_2 linf_{it} + \beta_3 lms_{it} + \beta 4 lca_{it} + \beta 5 lroe_{it} + u_{it}$				
Pedroni Cointegration Test Result				
Within Dimensions	**Constant**		**Constant and Trend**	
	Test Statistics	**Probability Value**	**Test Statistics**	**Probability Value**
Panel v-Statistic	-0.4101	0.6591	15.8694***	0.0000
Panel ρ-Statistic	0.6502	0.7422	-0.6777	0.2490
Panel t-Statistic (non-parametric)	-2.2374**	0.0126	-3.2674***	0.0005
Panel t-Statistic (parametric)	-2.7840***	0.0027	-3.2059***	0.0007
Between Dimensions	**Constant**		**Constant and Trend**	
	Test Statistics	**Probability Value**	**Test Statistics**	**Probability Value**
Group ρ-Statistic	1.7961	0.9638	0.4851	0.6862
Group t-Statistic (non-parametric)	-2.0602**	0.0197	-2.6833***	0.0036
Group t-Statistic (parametric)	-2.6937***	0.0035	-2.6160***	0.0044
	Kao Panel Co-integration Test Result (Fixed Term)			
	Test Statistics		**Probability**	
AFD test statistic	-6.4756***		0.0000	

Note: The cointegration tests were performed using the Eviews 10 package program. In Pedroni Panel and Kao Panel cointegration tests, the spectrtal estimator was made according to the Bartlett method, and the bandwidth was made according to the Newey-West method. ***, ** and * denote 1%, 5% and 10% significance, respectively.

In Table 5.5., Pedroni Panel and Kao Panel cointegration test results can be seen for Model 2 for the dependent variable of demand deposit (ltd_{it}) series and variables the central bank interest rate (lir_{it}), inflation rate ($linf_{it}$), money supply rate (lms_{it}), capital adequacy rate(lca_{it}), and return on equity ($lroe_{it}$) are independent variables. In the cointegration equation established for Model 2, since the group t-statistic (parametric), panel t-statistic(non-parametric) probability values for the constant terms are less than 0.05, the null hypothesis of no cointegrating relationship between the variables is rejected at 5% significance level and the existence of cointegration is accepted. However, the probability values of group t-statistics (parametric), and panel t-statistics (non-parametric) for constant and group t-statistics (non- parametric), group t-statistics (parametric), panel v-statistics, panel t-statistics (non-parametric) and panel t-statistics (parametric) fot constant and trend terms are less than 0.01, so the cointegrating relationship between variables regarding null hypothesis is rejected at the 1% significance level and the existence of cointegration is accepted. Other statistics show that there is no cointegration. Additionally, as noted in Table 4.5., the Kao Panel cointegration test was used to determine whether there is a cointegrated relationship between the variables. Pedroni cointegration test results are supported by Kao ADF t-statistics, which demonstrate cointegration between variables. As a result, the variables in Model 2 move together over time, according to both Pedroni and Kao's cointegration approaches.

For both models established in this study (Model 1 and Model 2), Pedroni cointegration test results show the existence of a cointegrated relationship between the variables. In addition, this finding is supported by the Kao Panel cointegration ADF t-statistic for both models. As a result, the first two stages of econometric analysis (unit root analysis and cointegration analysis) were completed and the necessary conditions were met for the remaining long-term coefficients estimation.

4.4. Panel Long-Run Coefficient Estimation Results

It has been stated that some conditions must be met in order to move on to the long-term coefficients estimation, which is the last stage of the analysis. These conditions can be briefly summarized as follows. In the first stage: all of the variables subject to the analysis are unit rooted at level values, and if their first difference is I(1), they are stationary; In the second stage: there is a long-run cointegrated relationship between the variables. The necessary conditions listed above were provided for both models established in the first two stages of the analysis. The long-term coefficients estimation, which is the last stage of the analysis, was estimated by panel FMOLS and DOLS methods. In the coefficient estimation of both models, first of all, FMOLS and DOLS coefficients were estimated for the panel. Accordingly, the results of 4 panel regression analyzes (panel FMOLS and panel DOLS) are given below. The estimation results are given in the tables below for Model 1 and Model 2, respectively. In the FMOLS method, Schwarz information criterion is used for the lag length, for the DOLS method, the lead and lag values were taken as (-1 and 1).

Table 4.6. Long-Run Coefficients Estimation (FMOLS and DOLS) for Model 1

Model 1: $ltd_{it} = \beta_0 + \beta_1 lir_{it} + \beta_2 linf_{it} + \beta_3 lms_{it} + \beta 4 lca_{it} + \beta 5 lroe_{it} + u_{it}$				
Variables	**FMOLS**		**DOLS**	
	Coefficient	**Probability**	**Coefficient**	**Probability**
LIR	0.4213***	0.0000	0.6157***	0.0000
LINF	0.1642*	0.0559	-0.1347	0.4000
LMS	2.0855***	0.0000	2.3060***	0.0000
LCA	-0.4414***	0.0044	-0.4077**	0.0176
LROE	-0.2518***	0.0000	-0.1100	0.1928

Note: The FMOLS and DOLS methods were implemented using the Eviews 10 software package. The Bartlett kernel, specifically the Newey-West fixed bandwidth, is employed to estimate long-term covariances. The symbols ***, **, and * are used to express 1%, 5%, and 10% significance levels, respectively.

Time deposit (ltd_{it}) is dependent variable and central bank interest rate (lir_{it}), inflation rate ($linf_{it}$), money supply rate (lms_{it}), capital adequacy rate (lca_{it}), and return on equity ($lroe_{it}$) are independent variables for Model 1 (Table 4.6.). FMOLS and DOLS results are given for Model 1. Since the established model is a fully logarithmic model, the estimated β coefficients also express the elasticity of the variables.

Utilizing the panel FMOLS method, the coefficient of central bank interest rate (lir_{it}) was estimated 0.4213% at a 1% significance level. This suggests that a 1% rise in the central bank interest rate results in a concurrent 0.4213% increase in time deposits. In a similar vein, when estimating Model 1 using the panel DOLS method, the long-term coefficient of the central bank interest rate (lir_{it}) was estimated to be 0.6157% at a significance level of 1%. Although both methods estimated the elasticity coefficients differently, at the 1% significance level, a positive effect of the central bank interest rate on time deposits was estimated.

At a 10% significance level, the panel FMOLS method estimates the long-term inflation rate coefficient ($linf_{it}$) to be 0.1642%. This finding suggests that a marginal 1% increase in the inflation rate is a proportional 0.1642% increase in time deposits. In contrast, the estimation of Model 1 using the panel DOLS method yielded a long-run coefficient of -0.1347% for the inflation rate ($linf_{it}$) which was found to lack statistical significance. As a result, results observed statistically and positive relationship between the inflation rate ($linf_{it}$) and time deposits when employing the FMOLS method at a significance level of 10%. However, the DOLS method yielded a negative and statistically insignificant association between the inflation rate and time deposits.

Based on the application of the FMOLS method, the estimated long-term coefficient for the money supply rate (lms_{it}) is determined to be 2.0855% with a significance level of 1%. This finding suggests that a 1% rise in the return on equity results in a proportional increase of 2.0855% in time deposits. In a similar vein, when applying the DOLS method at a significance level of 1%, Model 1 produced an estimated long-term coefficient of the money supply rate (lms_{it}) equal to 2.3060%. Although there is a slight disparity in the estimated elasticity coefficients obtained from the two methodologies, both analyses demonstrate a positive association between the money supply rate (lms_{it}) and time deposits, 1% significant level.

According to the panel FMOLS method, the coefficient of the capital adequacy rate (lca_{it}) is estimated to be -0.4414% at a 1% significance level, indicating that a increase %1 the return on equity leads to a corresponding 0.4414% decrease in time deposits. Similarly, when Model 1 was estimated at the 5% significance level using DOLS method, the long-term coefficient of the capital adequacy rate (lca_{it}) was estimated to be -0.4077%. Despite the slight variation in the estimated elasticity coefficients between the two methods, they both consistently suggest a negative effect of the capital adequacy rate (lca_{it}) on time deposits.

Based on the application of the FMOLS method, the estimated coefficient of the return on equity rate ($lroe_{it}$) is determined to be -0.2518% with a significance level of 1%. This finding suggests that a 1% rise in the return on equity rate is associated with a corresponding decrease of -0.2518% in time deposits. In contrast, the estimation of Model 1 using the panel DOLS method yielded a long-term coefficient of -0.1100% for the return on equity rate ($lroe_{it}$), which was found to be statistically insignificant. As a result, the analysis shows that the impact of the return on equity rate ($lroe_{it}$) on time deposits was determined to be statistically and negatively significant at a 1% level when employing the FMOLS method. However, when employing the DOLS method, the impact was determined to be negative but statistically insignificant.

Table 4.7. Long-Run Coefficients Estimation (FMOLS and DOLS) for Model 2

Model 2: $ldd_{it} = \beta_0 + \beta_1 lir_{it} + \beta_2 linf_{it} + \beta_3 lms_{it} + \beta 4lca_{it} + \beta 5lroe_{it} + u_{it}$				
Variables	**FMOLS**		**DOLS**	
	Coefficient	**Probability**	**Coefficient**	**Probability**
LIR	0.3006***	0.0000	0.3859***	0.0002
LINF	0.4573***	0.0000	0.2124	0.1153
LMS	4.7863***	0.0000	5.3299***	0.0000
LCA	-0.3826***	0.0028	-0.4264***	0.0033
LROE	0.0524	0.1429	0.2211***	0.0020

Note: The FMOLS and DOLS methods were implemented using the Eviews 10 software package. The Bartlett kernel, specifically the Newey-West fixed bandwidth, is employed to estimate long-term covariances. The symbols ***, **, and * are used to express 1%, 5%, and 10% significance levels, respectively.

Demand deposit (ltd_{it}) is dependent variable central bank interest rate (lir_{it}), inflation rate ($linf_{it}$), money supply rate (lms_{it}), capital adequacy rate(lca_{it}), and return on equity ($lroe_{it}$) are independent variables for Model 2 (Table 4.7.). FMOLS and DOLS results are given on the basis of the panel for Model 2. Since the established model is a fully logarithmic model, the estimated β coefficients also express the elasticity of the variables.

The panel FMOLS method estimates the coefficient of central bank interest rate (lir_{it}) to be 0.3006% at a significance level of 1%, which means a 0.3006% increase in demand deposits is observed for every 1% increase in the central bank interest rate. Similarly, the Model 2 estimated using the panel DOLS method, a statistically 1% significance level result was obtained, with the long-term coefficient of the central bank interest rate (lir_{it}) estimated to be 0.3859%. Although both methods estimated the elasticity coefficients differently, at the 1% significance level, a positive effect of the central bank interest rate on demand deposits was estimated.

The long-term coefficient of inflation rate ($linf_{it}$), is estimated as 0.4573% at 1% significance level for FMOLS method, which means that 1% increase in the central bank interest rate creates 0.4573% increase in demand deposits. When, Model 2 was estimated at using DOLS method, the long-term coefficient of the inflation rate ($linf_{it}$) estimated as 0.2124% and insignificant. Hereby, the effect of the inflation rate ($linf_{it}$) on demand deposits was positive and statistically 1% significant. In the results obtained according to the FMOLS method, while it was found to be positive and statistically insignificant in the DOLS method.

The long-term coefficient of money supply rate (lms_{it}) is estimated as 4.7863% at 1% significance level, for FMOLS method, which means that 1% increase in the return on equity creates a 4.7863% increase in demand deposits. Similarly, when Model 2 was estimated at the 1% significance level for DOLS method, the long-term coefficient of the money supply rate (lms_{it}) was estimated as 5.3299%. Although both methods estimated the elasticity coefficients differently (but close to each other), they estimated the effect of the money supply rate on demand deposits positively at the 1% significance level.

The coefficient of capital adequacy rate (lca_{it}) is estimated as -0.3826% at 1% significance level for FMOLS method, which means that 1% increase in the return on equity creates a 0.3826% decrease in demand deposits. Similarly, when Model 2 was estimated at the 5% significance level according to the panel DOLS method, the long-term coefficient of the capital adequacy rate (lca_{it}), was estimated as -0.4264%. Although both methods estimated the elasticity coefficients differently (but close to each other), they estimated the effect of capital adequacy rate (lca_{it}), on time deposits negatively.

The long-term coefficient of return on equity rate ($lroe_{it}$), is estimated as 0.0524% but statistically insignificant according to the panel FMOLS method. Using the panel DOLS method to estimate Model 2, a statistically significant long-term coefficient of 0.2211% was found for the return on equity rate ($lroe_{it}$) at the 1% significance level. In the obtained results, the impact of the return on equity rate ($lroe_{it}$) on demand deposits was examined using both the FMOLS and DOLS methods. Interestingly, the FMOLS method revealed a positive effect that was statistically insignificant. However, the DOLS method demonstrated a statistically significant and positive relationship at the 1% significance level.

5. CONCLUSION

This research aimed to investigate the relationship between time and demand deposits within the context of 10 Turkish banks, while considering key factors such as the central bank's interest rate, inflation rate, money supply rate, capital adequacy rate, and return on equity. Additionally, the Central Bank of the Republic of Turkey (CBRT) and Turkstat official websites are where the bank-specific key ratios and macro variables are taken. Two distinct models were introduced to analyze the impacts on time deposits and demand deposits. Employing a three-stage econometric methodology, this study first subjected the variables to various unit root tests, including Levin Lin Chu, Im Pesaran Shin, Fisher ADF, and Fisher PP, revealing a unit root at the level but achieving stationarity after first differencing. In the subsequent stage, the presence of a long-term relationship among the factors was explored through Pedroni and Kao panel cointegration tests. Both of these tests provided evidence of a significant long-term relationship between the variables. The final stage encompassed the estimation of the long-term coefficients within the developed model using the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) approaches.

The central bank-determined interest rate has been identified as the primary factor that significantly and positively affects both time and demand deposits over an extended period, aligning with the expected result. Based on the average effect size observed, it can be inferred that the coefficient linked to time deposits surpasses that associated with demand deposits. This observation can be ascribed to the conduct of depositors who aim to take advantage of rising interest rates over an extended period when the central bank makes adjustments to its rates. Regardless of the prevailing interest rates, individuals seeking a stable source of income tend to opt for time deposits when the anticipated long-term returns surpass their initial projections.

The model also takes into account the inflation rate as an additional variable, which exhibits an uncertain impact on both time and demand deposits, as anticipated. As seen in both models, results indicate a strong positive relationship between inflation and time deposits. However, while the FMOLS model shows statistically significant results, the DOLS model shows statistically insignificant findings. Empirical evidence sufficiently identifies the relationship between the inflation rate and time deposits. Higher levels of inflation create increased uncertainty and erode the purchasing power of individuals, leading to a decreased propensity for savings. Consequently, depositors may refrain from increasing their holdings of time deposits, which are characterized by longer maturities, as the value of these deposits is susceptible to erosion in the face of inflationary pressures.

The inflation rate's effect on demand deposits results in different outcomes according to the FMOLS and the DOLS models. Based on the FMOLS model, the observed effect is both positive and statistically significant. Conversely, the DOLS model suggests a negative effect that has no statistical significance. One possible explanation for this discrepancy can be offered within the framework of a high inflationary setting. When confronted with persistent high inflation rates, depositors may display a tendency to prioritize the retention of their deposits in forms that are readily available and easily converted to cash, rather than opting for longer-term deposit commitments. This preference is driven by the inclination to ensure prompt accessibility to their deposits and safeguard their purchasing power in the face of inflationary pressures. As a result, depositors may increasingly prefer demand deposits in such situations.

The examination of the money supply rate's magnitude is another independent variable investigated in this study. The results demonstrate a strong and positive association between the size of the monetary base and the amounts of time and demand deposits, which is consistent with the expected relationship. This phenomenon underscores a significant relationship, whereby an increase in the monetary base within an economy has a substantial impact on the growth of time and demand deposits, it typically results in enhanced liquidity conditions and an augmented circulation of money within the economy. As a result, there is an increased flow of funds into deposit accounts, leading individuals and businesses to demonstrate a tendency to make further deposits over an extended period of time. The increased demand for deposits necessitates that banks allocate additional resources to accommodate the amplified volume of deposits.

The equity adequacy ratio is an additional independent variable under investigation. In the long-term, the equity adequacy ratio has a negatively and statistically significant with both time and demand deposits for both models, as expected. This suggests that banks with a better capital adequacy ratio may demonstrate a reduced willingness to substantially depend on deposits to finance its operations or may expend less effort to attract deposits. Additionally, this suggests that financial institutions with a higher capital adequacy ratio are more likely to attain profitability. When a financial institution upholds a substantial amount of equity, the utilization of additional equity has the potential to impede the institution's capacity to generate profits.

The variable that has been investigated with regard to how it impacts on time and demand deposits is the return on equity ratio. The statistical analysis revealed that the return on equity demonstrated a significant relationship with the FMOLS model, while it exhibited an insignificant relationship with the DOLS model in the context of time deposits. The direction of the effect was negative for both models as expected. In the long run, banks may exhibit a preference for reducing the presence of time deposits, which are associated with costs, on their balance sheets, as their profitability improves.

However, the impact of return on equity on demand deposits was determined to be statistically insignificant based on the FMOLS model. However, the DOLS model yielded significant results, indicating a positive relationship between return on equity and demand deposits in the long term. The result suggests that depositors' confidence in the banking industry's ability to refund their money will rise as banks grow more financially successful.

6. SUGGESTIONS

The research results allow for the following suggestions:

Monetary policy affects deposit behavior as seen by the large and time and demand deposits are effected by central bank interest rates favorably. The deposit preferences of individuals and organizations can be significantly influenced by fluctuations in interest rates, as evidenced by a meticulous examination of the effects of interest rate adjustments in monetary policy on deposit volumes. It is crucial to find a balance between promoting the expansion of deposits and upholding financial stability.

Given the unpredictability of inflation's effect on reserve balances, authorities should prioritize price stability and pressure management. Inflation-control policies may lessen uncertainity and increase savings.

The need of a strong capital basis for banks is shown by the negative and statistically significant association between the equity adequacy ratio and both time and demand deposits. Improving a bank's capital adequacy boosts customer faith in the institution and ensures its continued stability and profitability.

The fact that the return on equity ratio has a negative effect on time deposits suggests that financial institutions might prioritize profitability goals by working to lower the expenses associated with time deposits. Banks need to manage their profits while also taking into account any implications on deposit expansion. In order to keep depositors satisfaction and increase deposits over the long term, it is essential to strike a balance between profitability and delivering appealing deposit options.

Although the factors affecting deposits in the banking sector are important, studies on their effects on deposits are very limited. In this thesis, it has been tried to reveal how the macroeconomic and bank-specific factors for the Turkish banking sector affect the time and demand deposits. Analyzes were made on a sample of 10 Turkish deposit banks. The fact that the banks in research have a high ability to represent the sector makes it a very suitable sample group for this type of study. In addition, although there have been many studies on the subject in other countries, the absence of many studies focusing only on Turkish banks makes this thesis unique.

The limitations of a study can also serve as a motivation for future studies. Some problems were encountered during the research. Initially, some variables were selected that were not later included in the models. These variables were the return on assets and the unemployment rate. However, these variables were excluded from the model during the research because they did not exhibit a unit root.

In particular, the factors influencing deposits constitute the subject of future studies and may serve as motivation for further research. The variables influencing deposit levels in Turkey's banking industry are investigated in this research. Prospective research, on the other hand, allows for the examination of a wider range of factors, and more narrowly, the impact of banking policy or regulatory changes on deposit behavior. It is also possible to get insight into deposit dynamics and create efficient management plans by doing comparative research with other nations or areas.

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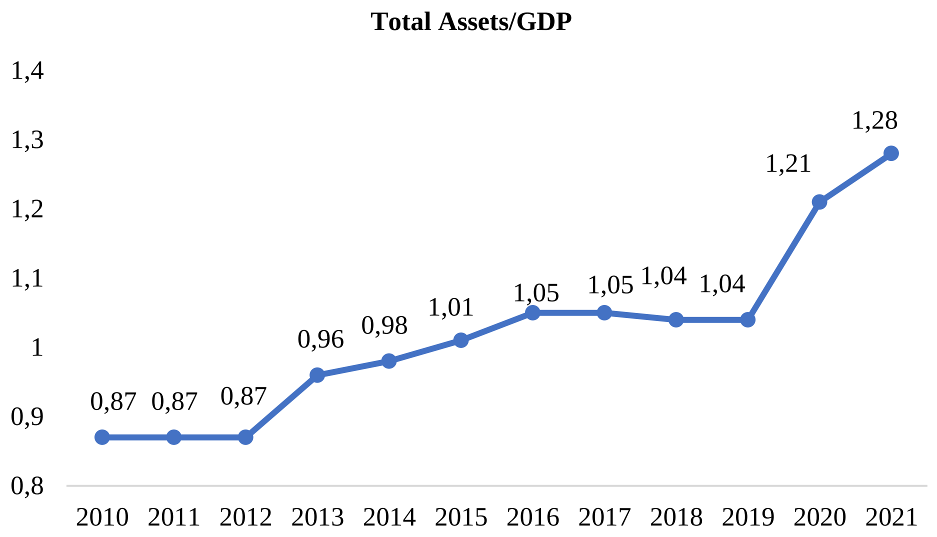
APPENDICES

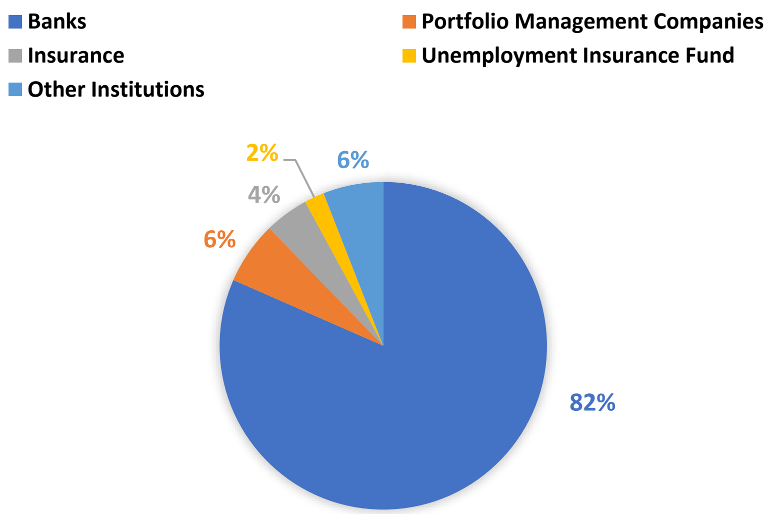
Appendix A RATIO OF ASSET SIZE TO GDP



Source: BRSA, TURKSTAT

Appendix B ASSET SIZE OF FINANCIAL INSTITUTIONS IN TURKEY

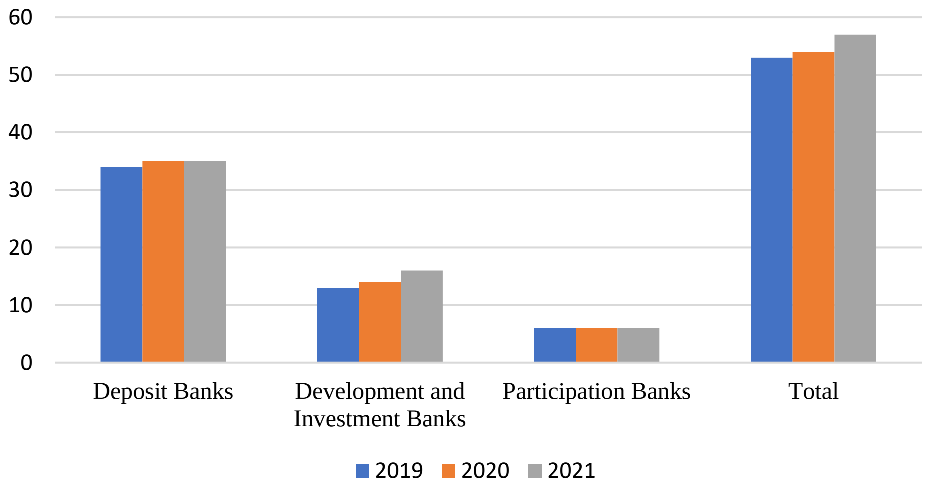
FINANCIAL SECTOR SHARE (%)



Source: BAT (2021)

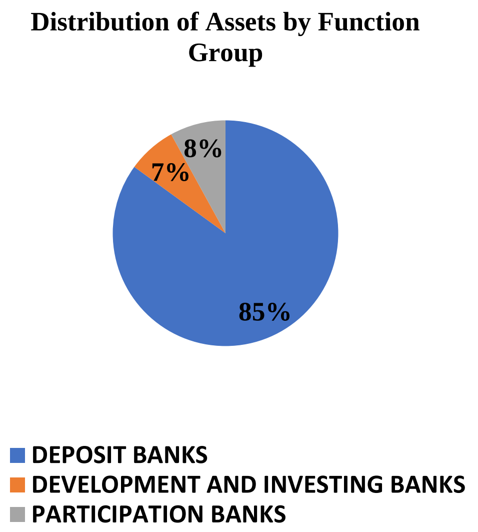
Appendix C NUMBER OF BANKS

Number of Banks



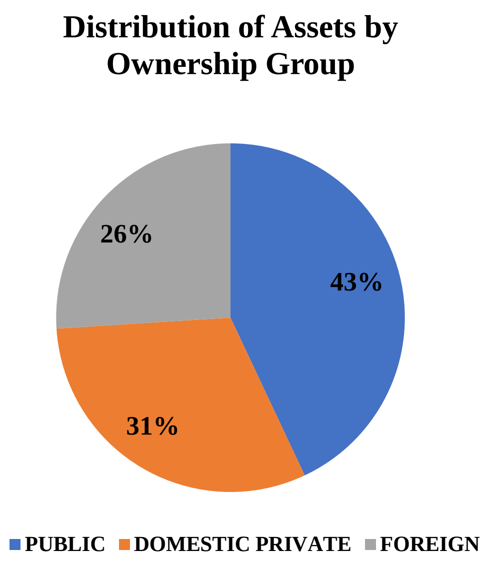
Source: BAT (December 2021)

Appendix D DISTRIBUTION OF ASSETS BY FUNCTIONING GROUP



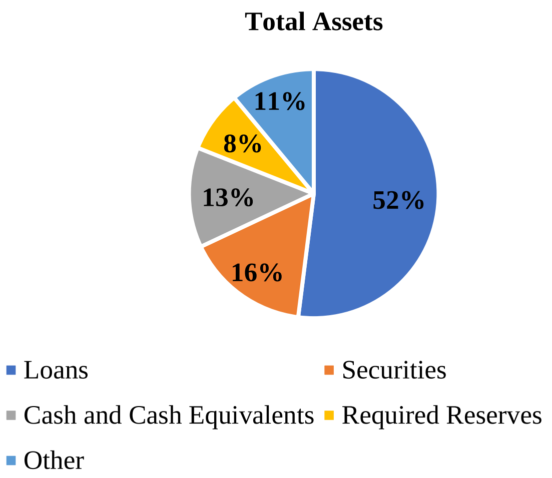
Source: BRSA (2021)

Appendix E DISTRIBUTION OF ASSETS BY OWNERSHIP GROUP



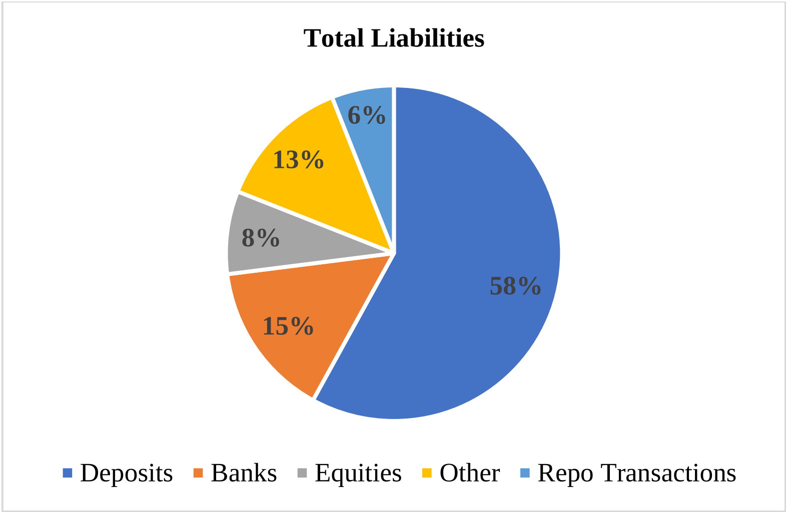
Source: BRSA (2021)

Appendix F TOTAL ASSETS



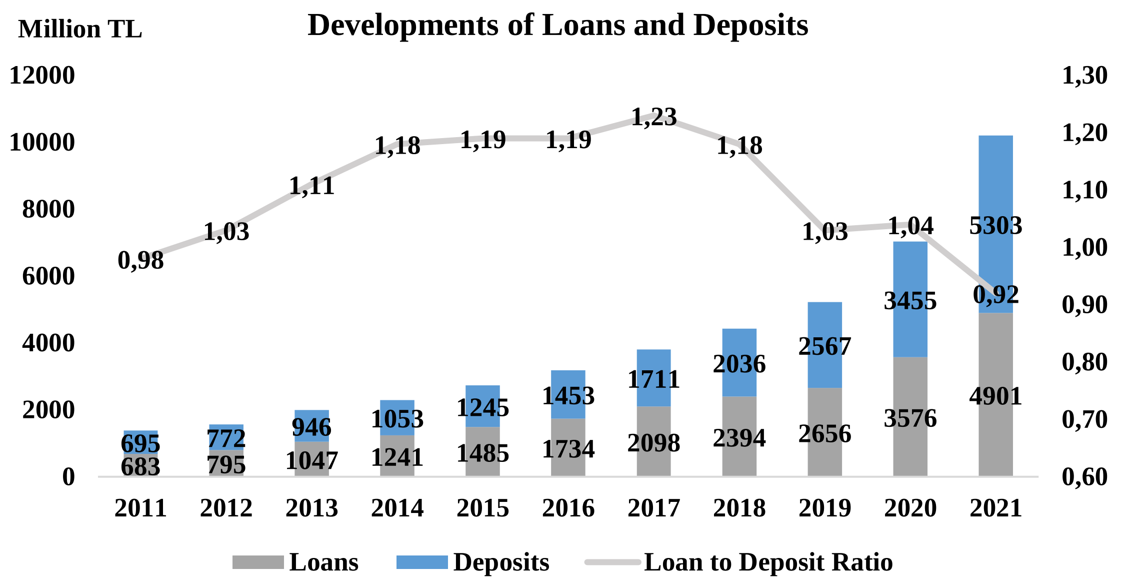
Source: BRSA (2021)

Appendix G TOTAL LIABILITIES



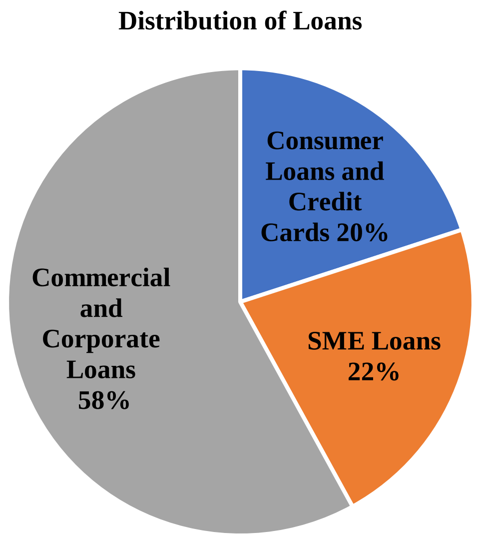
Source: BRSA (2021)

Appendix H DEVELOPMENT OF LOANS AND DEPOSITS



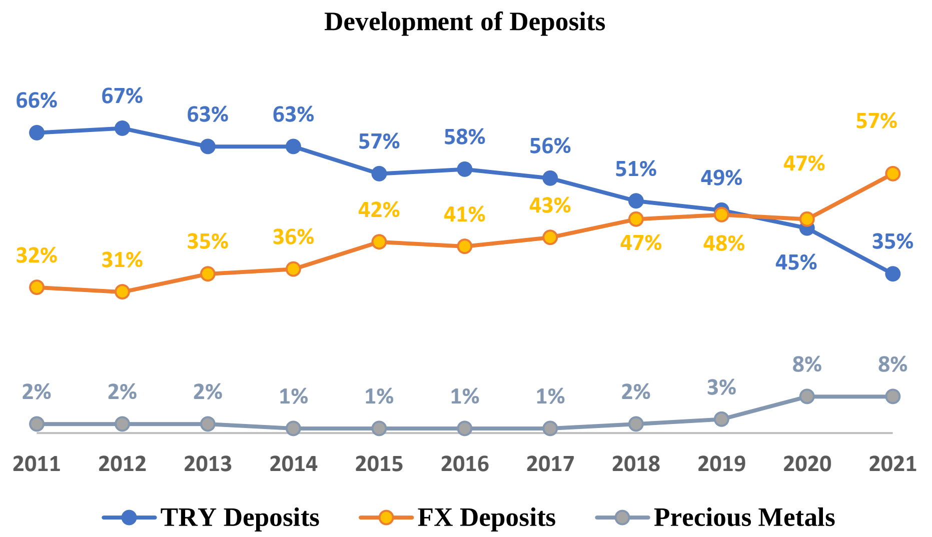
Source: BAT

Appendix I DISTRIBUTION OF LOANS



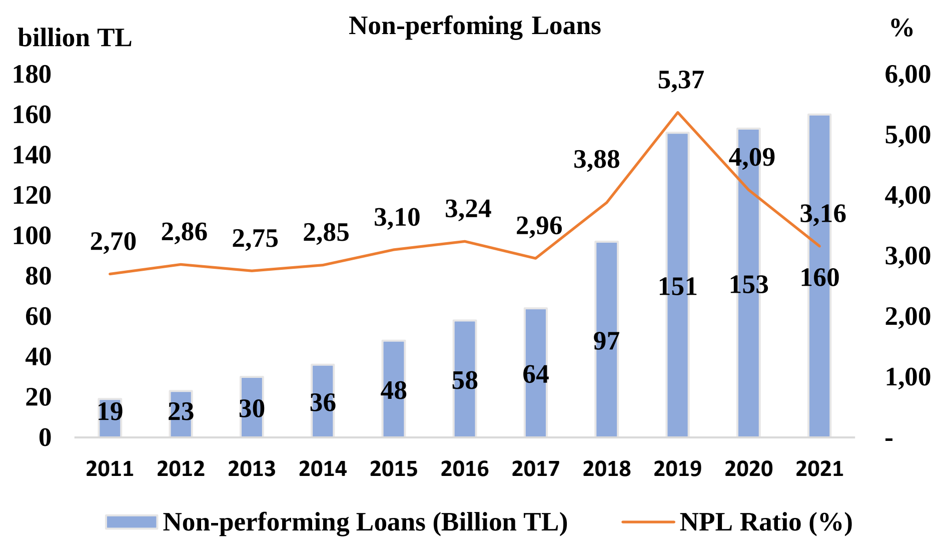
Source: BRSA (2021)

Appendix J DEVELOPMENT OF DEPOSITS



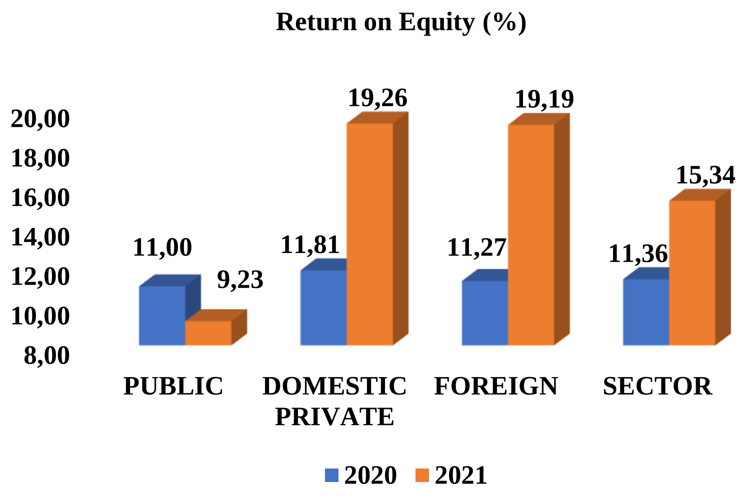
Source: BRSA

Appendix K NON-PERFORMING LOANS



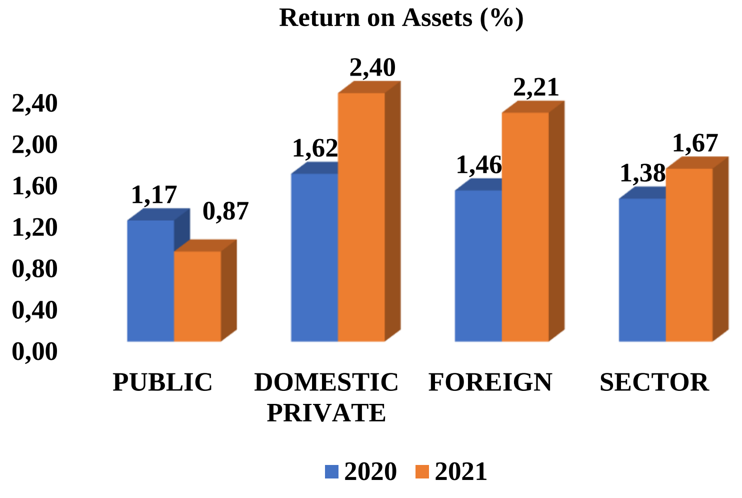
Source: BRSA

Appendix L RETURN ON EQUITY



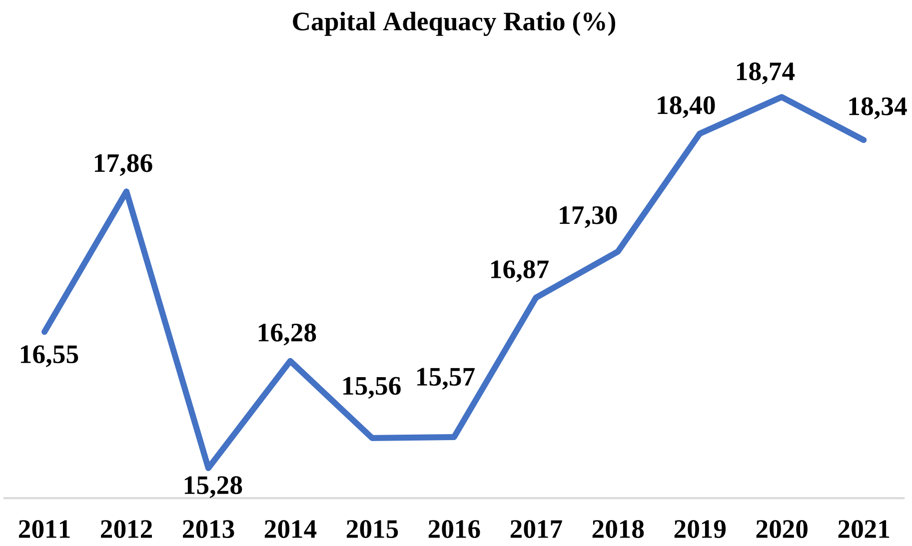
Source: BRSA (2021)

Appendix M RETURN ON ASSETS



Source: BRSA (2021)

Appendix N DEVELOPMENT OF CAPITAL ADEQUACY RATIO



Source: BRSA (2021)