Net Interest Margin [NIM] in Turkish Financial Sector

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Abstract. Recently, movements in the financial markets have demonstrated that management of net interest margin (NIM) is important for the well functioning of the financial sector in general and banking sector in particular. In this regard, net interest margin (NIM) accepted as the main indicator of financing balance and profitability of the banking sector and hence its stability and improved capacity for financing of sustainable real economic growth. According to literature, asset, liability and equity structure, non-interest income such as fees & commission, market concentration and efficiency, quality of management and some economic variables have been considered as factors affecting the NIM. This paper mainly investigates the relationship of NIM of the selected banking groups in Turkey with the macroeconomic, market and banking sector specific variables. It has also been identified whether the ownership affect the reaction of the NIM to explanatory variables.

Keywords: Interest Margin in Turkey, Interest Rate Risk, NIM and Resilience.

1 Motivation and Issue of the Study

As main actors in the financial sector, banks play an important role in economic growth. In that framework, investment decisions made mainly by the firms have a crucial effect on the potential size and direction of economic activities. Kunt et al(1999), Kasman et al(2010), Maudos and de Guevara (2014) and Dumicic et al(2013) found that financial intermediation cost, which constitutes a large part of the funding cost, can directly affect investment decisions and distribution of capital among countries or firms. When the issue is handled from the point of view of banks, it is known that intermediation cost has a significant impact on banks' profitability and hence the capacity of banks to provide resources to economy accordingly.

In this context, the most important component of banks' funding costs and profitability is the net interest margin(NIM). The net interest margin can also be viewed as a proxy for the income generation capacity of the intermediation function of banks and classified as a core banking income. In particular, assessing the sustainability of bank revenues may require the analysis of the stability of core banking income. For this study, the net interest margin is defined as the ratio of the difference between interest income and interest expense to total average assets. It can be interpreted as how successful the banks are in the placements (and collections thereby) they make within the

financing possibilities. Since the net interest margin is negative indicates that the income from the placements falls behind the cost of resources, it is interpreted as the bank's placement decision or funding model is not optimal ECB(2010). Besides, financial resilience of banks imply sustainable growth for economies.

2 Literature Survey

There are many studies on the subject of interest margin. Studies involving different approaches are presented in this section.

The pioneering work to examine the factors determining the interest margin is the dealership model developed by Ho and Saunders(1981). This study was developed further by Mc Shane and Sharpe(1985), Allan(1988), Angbazo(1997), Saunders and Schumacher(2000), Angelini and Cetorelli(2003), Liebeg and Schwaiger (2006) and William(2007) in the following years. In the mentioned studies, banks' placement and resource types and their risks(security issuance rather that deposit collection), non-interest income(e.g. commissions), measurement of competition(HHI or Lerner), operational cost, changing risk appetite, interbank competition, interest rate volatility were modeled. In terms of effect on NIM, Zarruk and Madura(1992) and Cruz and Fernandez(2020) searched the effect of deposit insurance and capital regulations, Angelini and Cetorelli(2003) investigated Basel II Capital Accord, Piatti(2010) searched the IAS and Basel II and concluded that implementation of new regulations would change optimum level of NIM by increasing the operational cost. Diant et al(2015) worked on countercyclical behavior of NIM. Hanzlik and Teply(2019 and 2020) analyzed the relationship of NIM and interest rate in low-interest rate environment for EU banks and concluded that NIM eroded for all banks. Barik and Raje(2019) searched NIM in India as a measure of efficacy of banking sector and its determinants. Nucera at al (2017) studied the impact of negative interest rate on banking sector capital and stated that negative policy rate put pressure on the profitability of financial institutions. Kansoy(2012) worked on the determinants of NIM in Turkey and concluded that operation diversity, credit risk and operating cost are important determinants, Yagcilar and Kalayci(2020) searched the bank-level determinants of NIM in Turkey and found credit risk, cost management, generating alternative income have more significant effects than macro variables.

3 Possible Reasons of Interest Rate Risk and Its Effects

In general terms, interest rate risk can be defined as the effect of adverse interest rates' movements on a bank's financial position. It might be quite natural to accept this risk in banking activities and when well managed assuming this risk can be an important source for profitability and increase in share value. However, excessive interest rate risk can pose a major threat to bank revenues and the capital base.

Changes in interest rates affect bank revenues by causing changes in the bank's net interest income and other interest-sensitive income and expenses. Changes in interest rates also affect the fundamental value of bank assets, liabilities and off-balance sheet instruments because of future cash flows. The present value of future cash flows (and

in some cases, the cash flows themselves) changes as interest rates change. The main interest rate risks that banks and financial institutions exposed to are repricing risk (re-pricing risk), income curve risk (yield curve risk), fundamental risk (basic risk) and option risk (optionality risk)(BCBS 2004 and 2016).

4 Data and Methodology

4.1 Data Evaluation

Data for the regression analysis covers the period of 2006Q4-2021Q2. Both accounting data and market data have been employed. Source for banking data was Banking Regulation and Supervision Authority's database, market data downloaded from the database of Central Bank of Republic of Turkey (CBRT) and data on macro economic variables were announced mainly by TurkStat.

In order to understand dynamics of NIM movements of the banking sector possible relation with macroeconomic, market and banking sector specific variables in Turkey, econometric analysis has been conducted. Model specifications and results are provided in the next section.

4.2 Model

This paper aims to identify the relationship of net interest margin (NIM) of the selected banking groups in Turkey with the macroeconomic, market and banking sector specific variables. In the regression analysis framework, movements in the NIM identified as dependent variable. As for the explanatory variables, real economy and financial markets in the general economy were captured and measured by gdp growth rate, unemployment rate, realized inflation rate, 12 and 24-month expected inflation rate reflecting the overall economic condition, loan to asset size ratio, loan to deposit ratio, asset size to equity ratio linking the asset-liability structure and funding feature of the banking sector and interest rate on reference bond issued by Turkish Treasury and US Dollar/TL exchange rate tracking the market condition as floating market variables in the country.

In the analysis, it has also been identified whether ownership affects the reaction of NIM to independent variables. For this purpose, ownership groups were identified as deposit taking public banks, deposit taking local private banks and deposit taking foreign banks.

$$\text{Model}_i$$
$$NIM\ Movement_i = \beta_{i0} + \beta_{i1}\ GDP + \beta_{i2}\ UR + \beta_{i3}\ INFA + \beta_{i4}\ INFE12 + \beta_{i5}\ INFE24 + \beta_{i6}\ INT + \beta_{i7}\ EXC + \beta_{i8}\ LtD + \beta_{i9}\ LEV + \beta_{i10}\ LtA + \mathcal{E}$$

i: Deposit taking public, deposit taking local private, deposit taking foreign,

β_{i0} = Constant term, $\beta_{i1:10}$ = Coefficient of explanatory variable,

GDP = Growth rate, UR = Unemployment rate, INT = Interest rate on reference bond, EXC = US Dollar/TL exchange rate, INFA = Actual inflation rate, INFE12 = Expected inflation rate for the next 12 month, INFE24 = Expected inflation rate for the next 24 month, LtD = Loan/Deposit, LEV = Asset Size/Equity, LtA = Loan/Asset.

Before regressing the data by using multivariate linear OLS estimation for defined banking groups, variables were checked for the stationarity and since all variables identified as integrated of order one, first order difference applied and stationarity maintained. As for the post estimation procedures, normality, constant variance and serial correlation of residuals checked by using Shapiro-Wilk Test for normality, Breusch-Pagan/Cook-Weisberg Test for heteroskedasticity and Breusch-Godfrey LM Test/Durbin's Test for no serial correlation. F and t test employed and statistically significant variables and models have been determined accordingly.

Table 1. Summary Results for the Regression - Private Local Bank Group

Model: Private Local	Coefficient	p > l t l
Exc	-0,3415	0,006
Infe12	0,0894	0,048
Ltd	-0,0245	0,316
Lta	-0,0635	0,271
Int	-0,0125	0,489
Cons	0,0576	0,122
R^2 :0,2500 - F: 0,0089		

Table 1 displays private local banking group and exchange rate, inflation expectations for the next twelve months are statistically significant in explaining movements in NIM.

Table 2. Summary Results for the Regression – Deposit Public Bank Group

Model: Public	Coefficient	p > l t l
Exc	-0,3384	0,055
Infe12	0,0675	0,290
Ltd	0,0353	0,313
Lta	-0,1576	0,060
Int	0,0040	0,875
Cons	0,0565	0,287
R^2 : 0,1181 F: 0,2422		

For the deposit taking public banking group, exchange rate and loan to asset ratio with α=0,10 are statistically significant in explaining movements in NIM.

Table 3. Summary Results for the Regression – Foreign Bank Group

Model: Foreign	Coefficient	p > l t l
Exc	-0,2991	0,061
Infe12	0,1065	0,069
Ltd	0,0093	0,768
Lta	-0,1471	0,053
Int	-0,0420	0,079
Cons	0,0403	0,401
R^2 : 0,1870 F: 0,0501		

As can be traced from Table 3, for the deposit taking foreign banking group, loan to asset ratio, exchange rate(α=0,10), interest rate(α=0,10) and inflation expectations for the next twelve months(α=0,10) are statistically significant variables in explaining movements in NIM.

Hence, regression results indicated that in the statistically significance sense, the effect of macro variables that were defined as real gdp growth rate and unemployment rate has no correlation with the NIM for all banking groups. As being a relatively high inflation country, inflation expectation for the next 12 months found to be statistically significant for private and foreign banking groups with positive sign as expected and meaning that banks forecast price movements properly and set margin level accordingly. For the market variables as measured by the US Dollar/TL exchange rate(Exc) and interest rate on reference bond(Int); exchange rate found to be statistically significant with negative coefficient for all analyzed banking groups reflecting increase in operation diversity-for example assuming fx denominated assets-lowers the margin level of interest rate. Besides, market interest rate is significant with α=0,10 only for foreign banking group with a negative sign implying high interest rate environment erodes and lowers margin. As for the banking sector specific variables, loan to asset ratio(Lta) that mainly reflects the assumed credit risk in the assets is statistically significant for deposit taking public and foreign banking groups with α=0,10 and negative sign indicating increasing credit risk lowers the margin set by the related banking groups. Loan to deposit ratio(Ltd) is not statistically significant for all analyzed banking groups.

5 Conclusion

This research investigated the relationship of NIM with the macro economic, market and banking sector specific factors for the deposit taking local private, public and foreign bank groups in Turkey for the period of 2006Q4-2021Q2.

Regression results indicated that in the statistically significance sense, the effect of macro variables namely the gdp growth rate and unemployment rate have no correlation with the NIM for all banking groups. For private and foreign banking groups, 12-month inflation expectations found to be statistically significant with positive sign as expected. As for the market variables, exchange rate($/TL) found to be statistically significant with negative coefficient for all analyzed banking groups reflecting increase in operation diversity and market interest rate is significant with α=0,10 only for foreign banking group with a negative sign implying high interest rate environment erodes and lowers margin. As for the banking sector specific variables, loan to asset ratio(Lta) is statistically significant for deposit taking public and foreign banking groups and Loan to deposit ratio(Ltd) is not statistically significant for all analyzed banking groups. Therefore, regression analysis on determinants of NIM for the banking groups in Turkey suggest that statistically significant factors affecting NIM vary across deposit taking banking groups.in Turkey for the period of 2006Q4-2021Q2.

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