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NON-INTEREST INCOME AND FINANCIAL PERFORMANCE: AN ECONOMETRIC STUDY OF SELECTED INDIAN PUBLIC SECTOR BANKS

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Abstract:
The traditional revenue streams of Indian banks have been significantly changed as a result of the high pace of innovation and development of financial products. The primary objective of this paper is to determine upto what extent, non-interest income from digital banking sources affects the profitability of public sector banks in India. Besides, the impact of diversification in income streams and the growing proportion of Non-Interest income on profitability of Indian PSBs have also been studied. This study is based on the performance of India's top five public sector banks between 2011–12 to 2020–21. The ROA has been selected as the dependent variable. Bank size, NIM, RNPA, loans, and capital adequacy are taken as control variables, while the independent variable is non-interest income, which is evaluated as the ratio of Non interest income to total assets. The results showcased that Non-Interest Income shows a significant and positive relation with the Profitability of Indian Public Sector Bank.

Keywords: Digital Banking, ROA, Non- Interest Income, Public sector banks, RNPA, Income Streams,

JEL Classification: E50, N30, L32, G21

1. INTRODUCTION:

The popularity of Digital banking goes up at a significant level in the world. The main reason behind this situation is to increase customer satisfaction by providing a chance to the customers to make their banking operations at a more comfortable level. For some years, Indian banks have concentrated on non-interest income streams to supplement their usual

interest-earning activities. This shift toward innovation adoption and new revenue streams has been more obvious for new private and foreign banks, while the public sector and older private banks appear to be hesitant. The influence of the shift to new revenue streams and the resulting increased diversification on Indian bank performance (as evaluated by profitability and income stability) is examined in this article. Globalization and financial liberalisation in the banking industry extended banking operations, resulting in a wide range of products and services (Raluca, 2012). In the last year, the focus on financial services has changed away from traditional operations and towards atypical activities (Lozano-Vivas & Pasiouras, 2010). Commercial banks' conventional duty has been to provide intermediation and generate net interest income through two basic activities: collecting deposits on which they pay interest and issuing loans for which they receive interest income (Craigwell & Maxwell, 2005). Commercial banks, on the other hand, have increasingly extended beyond their conventional purpose and sources of income to include a broader range of non-interest-generating operations (Sherene & Tapper, 2010). The noninterest income mix has also altered dramatically in recent years (Feldman & Schmidt, 1999). Fee income has become the backbone of noninterest income for banks, replacing the old mainstays of service charges and trust income (Hoang, 2014).

The impact of non-interest income on banks' financial structure and operational success has been the subject of numerous studies. As a result, the studies have demonstrated significant consequences regarding independent risks, systemic risks, and crucial bank profitability indicators, but no consensus has been reached among the conclusions. The first thing that most studies have in common is that they focus mostly on the financially developed nations, where the banking system differs significantly from that of developing markets in terms of scale, maturity, and institutional environment (Ahamed, 2017; Meslier, Tacneng, & Tarazi, 2014).

2. REVIEW OF LITERATURE:

Markus K. Brunnermeier's research (2020) In contrast to banks with more liquidity and interest income, it is discovered that banks with more non-interest revenue contribute less to systemic risk. Increased leverage and nonperforming loans at banks also increase systemic risk. After breaking down total systemic risk into its three components, he found that noninterest income had a positive relationship with a bank's tail risk, a positive relationship with a bank's interconnectedness risk, and an insignificant relationship with a bank's exposure to macroeconomic and financial issues. While trade and other non-interest income have a positive association with systemic risk and slightly more of an impact on the economy than trading income, noninterest revenue is more volatile and has a skewed relationship with interest income.

Van Dan Dang (2020) used a GMM model to compare the effects of two market segments on bank performance in the Vietnamese market from 2007 to 2018. He concluded that in order to develop better strategies, banks should be fully aware of the cost-benefit aspects of lending and fee-based activities, as the former proposes a straightforward risk-return trade-off and the latter highlights the advantages related to the bank's overall profitability. The inverse reciprocal relationship between the two categories of activities could be used by banks to actively navigate income flows and bank's targets.

Syed Moudud-Ul-Huq (2019), in his study it is found that income and asset diversification benefits vary widely, and the BRICS banks profit more from utilising both diversification techniques. However, the ASEAN-5 banks are unable to demonstrate the substantial benefits of asset diversification. While there are many different sources of income, interest is not a significant factor in determining the effectiveness and stability of a bank. Instead, ASEAN-5 banks should encourage commission and other kinds of income as regional diversification strategies.

Kumar et al. (2019) looked at the effect of digital banking and diversification of revenue on profitability and sustainability of industries in the wake of the financial crisis. They discovered that diversifying non-interest revenue streams based on technology can increase banking system stability, overall profitability, and risk-adjusted performance.

Smita Roy Trivedi (2015) examined how new revenue sources and banking innovations affected bank performance. According to her research, profitability is boosted by diversification and raising the proportion of both fee-based NII in the total income of banks, but these effects have no statistically significant impact on risk-adjusted performance and, consequently, stability. The study warns that diversification policies may have a negative impact, which is consistent with the findings of additional research conducted in the the United States, India, Europe and Australia, even though the results show that diversification has a good influence on profitability.

Hidayat et al. (2012) In their analysis of the relationship between product variety and bank risks. It is discovered that while product diversification promotes stability for small banks while decreasing risk for large banks, it does the opposite for smaller banks.

Robert DeYoung and Tara Rice, (2003) identified in their research that shows a variety of empirical connections between noninterest income, corporate strategy, market circumstances, technological improvements, and financial performance. According to their research, well-managed banks gradually diversify into businesses that don't pay interest, and small increases in non-interest income are linked to lower risk-return tradeoffs.

3. NON-INTEREST INCOME IN INDIA

Intermediation, including taking deposits and disbursing loans, is the main business of banks. Even though this still makes up the majority of what banks perform, the modern economy requires other payment-related services. Banks gain non-interest income when they offer these additional services. It is now essential to combine interest and non-interest income. Non-interest income comprises of Revenue from fees and commissions, such as those for remittance services, turnover fees, custody fees, and transaction advisory services etc. Non-interest income mostly consists of earnings from fees and other commercial ventures that are unrelated to lending. It is the revenue generated from offering a range of services. Underwriting commission, consulting fees, wealth management fees, monthly account service fees, deposit and digital transaction fees, annual fees, inactivity fees, , insufficient funds fees, profit and loss on asset revaluation, Internet banking fees, fees on deposit slip, ATM fees, Internet banking fees, etc. are a few examples. It also includes trading profits, foreign exchange gains, income from fiduciary operations, fees and commissions for services related to syndication, underwriting, derivatives transactions, gains from trading etc. It can be

both beneficial as well as harmful to the growth of the banks if not balanced properly. Non-interest income earned by using technology enabled products including mobile banking, online banking, ATM fees, debit and credit card charges have been taken into account in this research.

4. OBJECTIVES OF THE STUDY

I. To investigate the relationship between non-interest income and the profitability of public sector banks in India.

II. To find out how the growing share of non-interest income and income diversification affect the profitability of India's public sector banks.

5. RESEARCH HYPOTHESIS:

I. H01: The profitability of Indian public sector banks and non-interest revenue do not significantly correlate.

II. H02 The increasing share of non-interest income and income diversification have no effect on profitability of Indian public sector banks.

6. RESEARCH METHODOLOGY:

6.1 Data Sources: This study is primarily based on secondary data that was generated from several sources, including the Report on Trend and Progress of Banking in India, Individual bank's annual reports, the State Level Bankers Committee, www. Moneycontrol.com, the RBI Database, statistical tables of RBI , financial stability reports, etc.

6.2 Sample Size:

Top 5 Indian Public sector banks in terms of market Capitalisation from NSE has been taken as our sample. They are: SBI, PNB, Canara Bank, Bank of Baroda, Central Bank of India.

6.3 Period of the study:

This study covers a period of 10 years from 2011-12 to 2020-21

6.4 Variables

Dependent variable:

VARIABLES	PROXIES/DEFINITION
ROA	$\frac{Net\ Profit}{\text{Total Assets}}$

Independent variable:

VARIABLES	PROXIES/DEFINITION
NON INTEREST INCOME	NII / Total Assets

Control Variable:

VARIABLES	PROXIES/DEFINITION
BANK SIZE	Natural logarithm of the total assets of the banks
LOANS	Log of amount of Loans by

	banks
CAPITAL ADEQUECY RATIO	CAR Ratio of the banks
NIM	Net Interest Margin
RNPA	Net NPA to Total advances ratio

6.5 Diversification Score (Stiroh and Rumble, 2006)

$DIV\ (1) = 1 - (SH_{NON}{}^2 + SH_{IN}{}^2)$

$DIV(2) = 1 - (SH_{FOT}{}^2 + SH_{OT}{}^2)$

where,

Share of Interest Income in Total Income (SHIN)

Share of other income or non-interest income in total income (SHNON)

SHFOT stands for Share of 'Fee-Income' in Non-Interest/Other Income.

SHOT stands for the percentage of "other components in NII.

6.6 Statistical Package used:

For data analysis, SPSS-20 and E-VIEWS 11 have been used.

6.7 Econometric Modelling

This paper used a quantitative research approach by examining secondary data. The cross-sectional units (firms) from the same time period are included in the panel data utilised in this study (Wooldridge, 2009). Cross-sectional and time series data are combined to form panel data. Some of the most crucial methods employed are listed below: For modelling panel data, there are three essential techniques: fixed effect regression, random effect regression, and pooled regression. We only investigate fixed effects and random effects models since we assume that the dataset's cross sectional groupings are heterogeneous.

6.7.1 FIXED EFFECTS MODEL AND RANDOM EFFECTS MODEL:

A fixed effect model, which assumes the equal constant and slopes across individuals (groups and entities), is used to analyse individual differences in intercepts. When the "individual effect" is thought of as a constant factor that does not alter over time, the "fixed effect" model is produced.

A random effects model takes into account both variation within and across cross-sectional units. This approach determines the error variance for distinct groups (or times) based on the presumption that individual effects (heterogeneity) are unrelated to any regressor.

$$ROA_{it=}\ \beta_{0i} + \beta_1 NII + \beta_2 Bank\ Size + \beta_3 Loans_{it} + \beta_4 Capital\ adequacy + \beta_5 NIM_{it} + \beta_6 RNPA_{it} + \beta_7 NII_{it} + \mu_{it} \text{----------Eq-1}$$

$$ROA_{it=}\ \beta_{0i} + \beta_1 DIV(1) + \beta_2 DIV(2) + \beta_3 Bank\ Size + \beta_4 Loans_{it} + \beta_5 Capital\ adequacy + \beta_6 NIM_{it} + \beta_7 RNPA_{it} + \beta_8 NII_{it} + \mu_{it} \text{--------- ----Eq 2}$$

β_{0i}= Intercept

$\mu_{it=}$ Error Term

ε_{it}= within the firms error

To decide between a fixed effect model and a random effect model, the Hausman test is used.

6.7.2 APPLICATION OF DIAGNOSTIC TESTS:

Before going to the above regression models some diagnostic test have been carried out. These are;

The Levin–Lin–Chu (LLC) test— Levin, Lin, and Chu proposed an unit root test that is applied to verify the data's stationarity and prevent erroneous correlation to assure the reliability of the regression. The data were analysed using panel data analysis, which included the random and fixed effects models.

VIF FOR Multicollinearity: To check if there is any correlation exists among the independent variables, Variance inflation factor have been calculated.

CUSUM Test: To check the stability of the dataset, CUSUM Test is used.

7. EMPIRICAL ANALYSIS:

Table 1: Descriptive Statistics

	ROA	NII	Bank_SIZE	Loan	CRAR	NIM	RNPA	DIV S-1	DIV S-2
Mean	6.486	123699	4.632	5.591	0.186	10.349	5.144	4.667	9.480
Median	5.790	894545.	4.667	4.951	0.122	0.014	3.915	5.144	5.191
Maximum	21.600	503700	5.144	27.852	0.906	3.358	0.363	3.915	0.138
Minimum	-9.494	27994	3.915	23.442	0.0000	0.269	-0.497	0.363	5.037
Std. Dev.	5.191	132024	0.363	10.34	0.210	0.873	2.260	0.4975	8.811
Skewness	0.138	1.077	-0.497	-0.014	1.331	279.58	3.203	-0.014	8.945
Kurtosis	5.037	3.352	2.260	3.358	4.424	0.138	0.201	3.358	5.037
Jarque-Bera	8.811	9.940	3.203	0.269	19.011	5.037	8.945.	0.269	2.799.
Probability	0.012	0.006	0.201	0.023	0.000	8.811	0.050	0.043	0.020
Sum	324.30	6.180	231.617	279.5	9.306	0.012	279940	279.58	1.0778
Sum Sq. Dev.	1320.6	8.54E+	6.46285	5248	2.1725	324.30	13202	3.3588	3.3520

Source: SPSS output

Table 1 presents the descriptive statistics of our analysis variables. ROA is profit before tax to total assets, NII is non-interest income to total assets. Bnak size refers to natural log of the total assets of the concerned banks. Loan indicates Log of amount of Loans by banks. CRAR (Capital to risk weighted assets ratio) = CAR ratio of the banks. NIM is net interest margina and RNPA is the net NPA to total advances ratio. DIV S-1 and S-2 are the respective diversification scores (Stiorh and Rumble, 2006)

A descriptive statistic is used to show the mean and standard deviation of all the study's relevant variables. In order to understand the variable's maximum and minimum values, it also displays the variable's minimum and maximum values. The above table confers that the mean value of ROA is 6.48. 5.79 and 21.6 are the median and maximum values respectively. Jarque bera is 8.81 for this and it corresponds to a p value of 0.01 which is significant. Similar is the case of all other independent variables except Bank size and NIM.

Stationarity test:

Table 2: Test Results of the Stationarity of the Panel Data

Levin–Lin–Chu (LLC) test	**ROA**	NII	Bank_SIZE	Loan	CRAR	NIM	RNPA	DIV S-1	DIV S-2
Test Statistics	9.41147	3.77741	0.38227	4.2656	4.79345	8.5647	9.5479	1.2564	4.4456
P Value	0.0000	0.0001	0.0003		0.0000	0.0123	0.0115	0.0000	0.0025

Source: E-views ouput

A stationarity test, also known as the Levin-Lin-Chu (LLC) test, has been used to determine the unit root of a data set.
H_0- There is unit root in the dataset.
H_1- There is absence of unit root in the data set.
Here the p value is < 5%, hence the Null hypotheis is rejected implies that there is absence of unit root in our dataset and dataset is completely stationary.

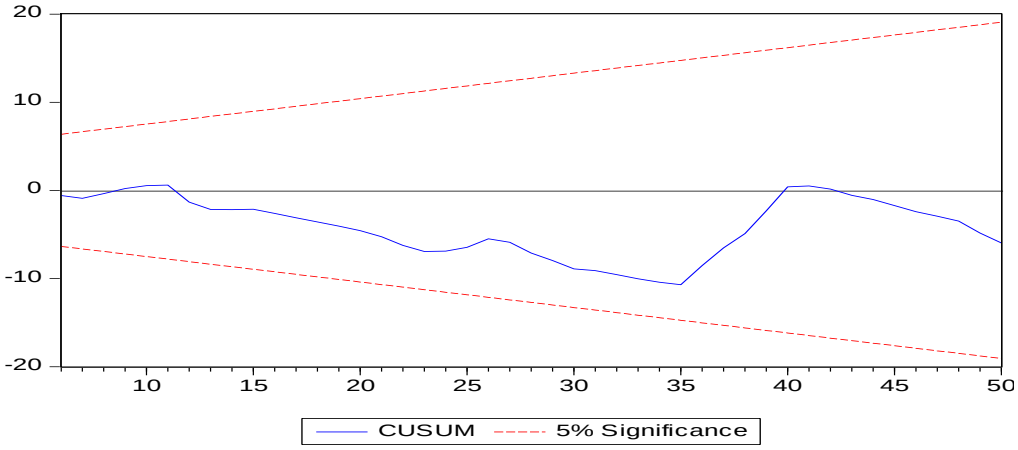
Table 3: Multicolinearity Test:

VARIABLES	ROA	NII	Bank_SIZE	Loan	CRAR	NIM	RNPA	DIV S-1	DIV S-2
VIF	**0.0000**	**1.1382**	**1.1352**	**12.0828**	**4.5647**	**15.2356**	**2.3666**	**8.5645**	**7.5648**

Source: E-views ouput

In order to make sure that multicollinearity is not a problem, it is necessary to examine the correlation between the independent variables prior to running the panel data models. As can be seen in the table, all of the variables' VIFs are lower than 10, except Loan and NIM. These two factors are therefore excluded from the study.

CUSUM TEST:



Source: *E-Views output*

To qualify with predicted coefficients and be regarded as stable, CUSUM statistic plots must stay within the 5% significance threshold level. We may be confident that our model is stable because the plots of the CUSUM statistic hardly cross the critical value lines and lie between the two red lines. This dataset has continuous stability.

Table 4: RESULTS OF FIXED EFFECTS MODEL:
Dependent Variable: ROA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NII	9.93E-08	7.87E-08	-1.261675	0.0152
BANK_SIZE	-9.281686	4.202931	-2.208384	0.0337
CRAR	0.065538	0.032605	2.010072	0.0520
RNPA	-11.21984	3.554798	-3.156252	0.0032
DIV S--1	8.568778	2.254888	7.456999	0.0012
DIV S-2	-5.5458	5.256444	5.654777	0.0001
C	52.43231	19.47321	2.692535	0.0107
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.895479	Mean dependent var		6.486000
Adjusted R-squared	0.857735	S.D. dependent var		5.191552
S.E. of regression	1.958151	Akaike info criterion		4.413374
Sum squared resid	138.0368	Schwarz criterion		4.948741
Log likelihood	-96.33436	Hannan-Quinn criter.		4.617245
F-statistic	23.72522	Durbin-Watson stat		2.255598
Prob(F-statistic)	0.000000			

Source: *E-Views output*

Table 5: RESULTS OF RANDOM EFFECTS MODEL:

Dependent Variable: ROA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TBNII	8.657888	6.33E-08	-1.412791	0.0146
BANK_SIZE	3.352870	2.756855	-1.216194	0.2303
CRAR	0.054583	0.031323	1.742605	0.0882
RNPA	10.89606	3.103569	-3.510816	0.0010
DIV S--1	5.655555	9.354888	4.547888	0.0012
DIV S-2	-24.84659	12.82071	1.938004	0.0589
	Effects Specification			
			S.D.	Rho
Cross-section random			4.067503	0.8118
Idiosyncratic random			1.958151	0.1882
	Weighted Statistics			
R-squared	0.868670	Mean dependent var		1.365122
Adjusted R-squared	0.703663	S.D. dependent var		2.256151
S.E. of regression	2.013338	Sum squared resid		182.4088
F-statistic	4.132928	Durbin-Watson stat		1.775288
Prob(F-statistic)	0.006172			
	Unweighted Statistics			
R-squared	0.270552	Mean dependent var		6.486000
Sum squared resid	963.3519	Durbin-Watson stat		0.658820

Source: *E-Views output*

To select the appropriate model, Hausman test has been performed.

RESULTS OF HAUSMAN TEST:

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.572214	4	0.1603

Source: *E-Views output*

The H0 = Random effects model will be appropriate
H1= Fixed effects model will be appropriate.

It is found that the probability value is 0.16, which is greater than 5%, and the chi square value of 6.57. Therefore, the Random effects model will be the proper model and the H0 will be accepted.

8. ANALYSIS:
The result that we found from the Random effects model is that;

ROA = 8.65 **TBNII** + 3.35* **BANK SIZE** + 0.054583* **CRAR** + 10.89606 ***RNPA**+ 5.65 **DIV S-1 + -24.84 DIV S-2 +** ε_{it}

R^2 is referred as the variation percentage of the entire variables which is explained by the model. It is calculated as 1 minus the ratio of the error sum of squares (which is the variation that is not explained by model) to the total sum of squares (which is the total variation in the model). In our study, R^2 = 0.86 refers to the conclusion that the above dependent variables are collectively responsible to explain 86% variation in the dependent variable i.e. ROA. Value of F-statistic= 4.13 and probability value is 0.006 confers that this model is properly fit and has an adequate explanatory power. The ratio of total profit has an intercept value of 24.84659, when the values of all independent variables are equal to 0, TBNII shows a positive and significant co relationship with the ROA meaning that when the income generated from Net Interest income rises the company earns a rising profit and vice versa. So the 1st hypothesis of this study stands true and the null hypothesis is hereby rejected and this corresponds to the results obtained by Zangina Isshaq (2019), Shoaib Nisar (2018), Peter Nderitu Githaiga(2019), Hardeep Singh Mundi (2019), Roland Craigwell (2006), and contradicts to the study of Bokyung Park, et al (2019),

9. KEY FINDINGS:

- Non-Interest Income exerts a positive and significant connection with the profitability of Indian public sector banks.
- Income diversification has an phenomenal impact on the total revenue and the rising proportion of Technology based income in total income.
- Non-interest income diversification has a negative connection with the profitability of banks in India.
- Fee-based income is becoming the most prominent source in non-traditional income streams of banks.
- Banks with better management may be able to depend on non-interest income and maintain stability in earning profit.

10. CONCLUSION, SUGGESTIONS AND POLICY RECOMMENDATIONS

The study identifies how income from new business lines, financial technologies, and launch of innovative products impacts bank profitability. Our findings suggests that diversification of total income and 'non-interest' income exerts a positive and significant impact on profitability. As a result, banks may depend upon the NII as a major source of income besides interest income. In order to keep their revenue consistent in the future, public sector banks must select a reliable source of technology and fee-based income. To achieve financial sustainability, the government should work to encourage the banking industry to innovate and apply innovative financial technologies in their sources of income. Through an extensive review of the literature that also helped with the construction of the hypothesis, the study created a conceptual framework. Investigating the impact of income diversification on banks' financial performance was the study's main objective. Public sector banks in India served as the subject of the research's analysis unit. This study's conclusions showed that income diversification improved financial performance. To improve performance, managers should think about striking the ideal balance between lending and non-lending activities. On the

other hand, banking laws and regulations typically place restrictions on how much non-lending activity banks can engage in. In particular, banks are only allowed to engage in lending-related operations, which reduce the effect of revenue diversification on financial performance. In order to enable banks to use their intellectual capital resources through non-lending operations and subsequently improve their financial performance, regulatory authorities should loosen such prohibitions. Alternately, the regulator can enforce prudent diversification ceilings that adequately protect banks from the volatility of interest revenue.

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