No One Can Hide: Indian Public Sector Banks' Performance Evaluation Through OBSI: A Re- Fe Panel Approach

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In recent years, increased competition, regulatory reform laws, new financial market breakthroughs, lower deposit earnings and the purchase of funds for subsequent financial intermediary in contingent assets and liabilities, and the rapid growth and dissemination of new technologies have all prompted banks to enter the new OBSI arena. To assess the impact of these OBSI in the performance of the large public bank in India for a decade, we used multiple regression models with a proper test of model fit and robustness. We used three main performance parameter risk, profitability and leverage to regress within multidimensional with the set of OBS items. We found mix impact of OBSI in the performance of these large banks as all factors of risk and liquidity were insignificant but ROE as a major factor of profitability was found significant role in the performance.

Keywords: Off-Balance Sheet Items (OBSI), Multiple Regression, Large Public Banks, Noninterest Income

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1. Introduction

The banking sector is crucial for the economy and society of a country. Indian Banks have played a dominant role in the growth of the economy since its inception. Deregulation in 1991 paved the way for the Indian economy to grow. Banks shifted from traditional banking to a non-interest based income model and adopted technology to improve their balance sheet. They heavily rely on financial engineering as a source of income. Post the subprime crisis, Indian banks adopted off balance sheet items(OBSI) to boost earnings.

The Financial activities that are not shown on financial statements are known as off-balance-sheet activities.. This includes financing assets in a way that they are not recorded. Obligations are often kept off the bank's records and sold as securities. Companies use OBS to boost their value for investors. Shareholders are concerned about OBSI when evaluating a company's financial health. These activities are difficult to track since they only appear in accompanying notes. Some off-balance sheet items may become hidden liabilities, leading to risky assets that can result in insolvency.

OBSI are not meant to be deceptive but can be misused. Investment firms keep clients' assets off-balance sheet, and companies use OBSI for financing and risk-sharing. OBSI generates non-interest income for private and foreign banks in India. Nationalised banks have not focused on OBSI. OBSI transactions are complex, and identifying problems can provide a competitive advantage. Off-balance sheet financing is a hot topic in international finance.

2. Objective

This section looked into the influence of OBSI on the performance of public banks India. We looked at how OBS operations affected the bank's risk exposures, profitability, leverage, and liquidity.

The following is the research's goal:

To measure the extent of relationships of the selected OBS components with major financial performance parameters" under the sub-objectives of:

- To analyze the relationships of various risks on OBSI of the selected commercial banks

- To analyze the relationships of various profitability ratios on OBSI of the selected commercial banks

- To analyze the relationships of various liquidity ratios on OBSI of the selected commercial banks

As numerous corporate development methods in terms of mergers and acquisitions have been conducted in the Indian banking industry, the temporal horizon for the study has been adopted from 2011 to 2020.

3. Review of Literature

To understand the impact of OBSI on banks, several international and Indian studies have been examined. Studies conducted in Jordan, EU community banks, Kenya, and Malaysia have shown a positive impact of OBSI on performance measures such as ROA and ROE, while also indicating an increase in risk factors. However, researchers should have used more control variables and a larger time frame to get a significant relationship with OBSI. More variables of OBSI with higher time frames and economic indicators should have been considered to gauge the impact of OBSI on profitability and risk factors. Overall, the studies provide useful financial models and procedures for assessing risk factors and income earned by banks through OBSI, allowing for smart business choices by management, regulators, investors, professionals, and academicians.

(Calmes et al., 2009) investigated OBSI's impact on Canadian banks' risk compensation and returns using ARCH methods from 1988 to 2007. They found that the bank's risk compensation and return model produced a double dimension and concluded that the volatility variable was insignificant in the return equations, paving the way for a risk premium. However, they should have used GARCH models for more accurate results. (Karim, et al, 2007) studied OBSI's impact on Malaysian banks' performance and found that the correlation between OBSI and various risk factors was not significant, but equity performance was negatively correlated with OBSI. They should have considered more factors. (Stiroh, et al, 2004) explored the impact of non-interest income on US banks' profitability and risk measures from 1997 to 2004 and found that OBSI did not improve banks' risk/return performance. They should have used more variables and economic indicators.

4. Methodology

To full fill the objective, we determined the performance parameters to be studied with respect to OBSI. As per the reviewed literature, (Awawdeh et-al,2017), (Aktan, et-al,2012), (Kashian et-al ,2014),we determined following performance parameters for our study

- Banks' Risk,
  - Market Risk
  - Unsystematic Risk
  - Total Risk
- Profitability:
  - Return on Stock
  - Return on Equity
- Leverage:
  - Debt to equity ratio
  - Liquidity ratio

Calculation of Banks' Risk:

In the present study, we used following model equation as:

$$R_{i,t} = a_i + \beta_{im} R_{M,t} + e_{i,t} \quad (i)$$

[Ref: (Kwan,1991); (Flannery et al.,1984); and (Mohanty et al.,2002)] where:

$R_{i,t}$ = return of stock i at time t; $R_{M,t}$ = return of NSE at time t, and;

e = error-term measure bank-specific factors for bank ith over the period ending at time t and assume to be independent of R_M, t

Equation 1 yielded the following result:
- The market risk= b_i (the systematic risk)
- Unsystematic risk = The standard deviation of the error term
- Total Risk =The standard deviation of stock return

(standard deviation is used to measure complete volatility of stock return)

$$R_{it} = a + \beta_1 R_{M,t} + \beta_2 REX,t + \beta_3 RST,t + \beta_4 RLT + e_{it} \quad (ii)$$

The market risk= b_i (the systematic risk)

$R_{ST,t}$ = Short term Interest rates in India for given t intervals.

R_{LT} = Long term Interest rates in India for given t intervals

Calculation of the Profitability Ratios

The influence of OBSI on the profitability ratios of public banks is investigated by looking at the impact of OBSI on banks' stock return and return on equity (ROE) as follows:

- The annualized stock return is used as a proxy for the stock return of banks, and
- The return on equity = (Profit before tax)/ (Total equity).

The equation (iv) is estimated to analyze the effect of OBSI on banks' profitability.

Calculation of the Leverage Ratios

The influence of OBSI on the leverage ratios of selected public banks is investigated by looking at how OBSI affects bank leverage and liquidity as follows:

- The liquid asset ratio= (Total liquid assets/Total liabilities).
- The leverage ratio= (Total liabilities/Shareholders' equity).

Regulatory Variables

Using the equation (ii) We further synthesized the equation as per the Indian banking sector requirements using Risk profiles, profitability measures and liquidity vectors with various regulator variables as:

Table 1: Regulatory Variables			
S.n	Regulatory Variables	Definition	Functions
1	LnTA	Natural log	To regulate bank size
2	TLTA	Total loans to total assets	To regulate the impact of loans on risk
3	ETA	Shareholder's equity to total Assets	To regulate financial leverage
4	FATA	Fixed asset to total assets	To regulate operating leverage and liquidity of asset portfolio
5	LiqTA	Liquid assets to total assets	To regulate bank's liquidity
6	PLTA	Ratio.of. the.provisioning.of.loan losses.to.total.assets.	To regulate for credit risk of banks
We exploration based of ROL			

Based on the table 1 regulatory variables defined as the ratios in terms of total assets. With the reference of reviewed literature We used them as control variables to define the equations with respect of risk, profitability and liquidity.

Equations:

$Risk_{it} = \alpha + \beta_1 OBS_{it} + \beta_2 TLTA_{it} + \beta_3 LTA_{it} + \beta_4 EA_{it} + \beta_5 FATA_{it} + \beta_6 LIQ_{it}\beta_7 PLTA_{it}\beta_8 + e_{it}$ … .(iii)

$Profit_{it} = \alpha + \beta_1 OBS_{it} + \beta_2 TLTA_{it} + \beta_3 LTA_{it} + \beta_4 EA_{it} + \beta_5 FATA_{it} + \beta_6 LIQ_{it}\beta_7 PLTA_{it}\beta_8 + e_{it}$ (iv)

$Liquidity_{it} = \alpha + \beta_1 OBS_{it} + \beta_2 TLTA_{it} + \beta_3 LTA_{it} + \beta_4 EA_{it} + \beta_5 FATA_{it} + \beta_6 LIQ_{it}\beta_7 PLTA_{it}\beta_8 + e_{it}$ (v) As,

$Risk_{it}$ = The ith bank's systematic/unsystematic/total risk factor at time t.

$Profit_{it}$ = The ith bank's stock return or return on equity measurements at time t.

$Liquidity_{it}$ = The ith bank's debt to equity or liquidity metric at time t.

OBS_{it} = off-balance-sheet items as
- Forward Exchange Contracts,
- Guarantees Given on Behalf of Constituents and
- Acceptances, endorsements and other obligation.

$TLTA_{it}$ = (Total loans/ total assets) of the ith bank @ time step t

LTA_{it} = Ln (Total assets) of the ith bank @ time step t

EA_{it} = (Shareholder's equity/total assets) of the ith bank @ time step t

$FATA_{it}$ = (Fixed asset/total assets) of ith bank @ time step t

LIQ_{it} = (Liquid assets/ Total assets) of ith bank @ time step t

$PLTA_{it}$ = (Loan losses provisioning / total assets) of the ith bank @ time step t

e_{it} = Random error i^{th} bank @ time step t

Hausman Test: Selection for fixed effect model or Random effect model

The Hausman test is used to choose between fixed effects (FE) and random effects (RE) models, where the idiosyncratic error in the FE model is independent of exogenous factors and the RE model assumes uncorrelated unobserved effects. The FE estimator allows for random correlation between independent variables and unobserved effects in any time period, while the RE estimator is inconsistent if the regressor and error are correlated. The Hausman test determines whether there is a relationship between error and explanatory variables, and if not, the RE model is deemed suitable.

5. Limitation

This study examines factors influencing OBS financing in selected Indian public banks with at least 10 years of data from 2011-2020. It uses traditional performance indicators and national macroeconomic data from the RBI. Due to limited research on OBS financing in India, this analysis draws on studies from other countries.

6. Details of Sampling & Data Collection

Secondary data was gathered from various sources, such as annual financial reports of banks, reports from Population of Indian Banking Sector (SCBs), Indian Bankers Association, statistical tables relating to banks of India & Reserve Bank of India Monthly Bulletin, Report on currency and Finance, and other publications of Reserve Bank of India, as well as various magazines and research papers. The study focused on 21 prominent public banks listed on the NSE, which represent around 90% of India's market share and have been included in the Bank Nifty index since 2008..

Table 2: List of Selected Large Banks in India			
1	Allahabad Bank	12	Indian Overseas Bank
2	Andhra Bank	13	Oriental Bank Of Commerce
3	Bank Of Baroda	14	Punjab And Sind Bank
4	Bank Of India	15	Punjab National Bank
5	Bank Of Maharashtra	16	Syndicate Bank
6	Canara Bank	17	Uco Bank
7	Central Bank Of India	18	Union Bank Of India
8	Corporation Bank	19	United Bank Of India
9	Dena Bank	20	Vijaya Bank
10	Idbi Bank Limited	21	State Bank Of India
11	Indian Bank		
Authors' owns tabulation			

The table: 2 shows the large banks selected for the study. The sampling technique used was purposive

sampling. Purposive sampling is employed because it allows researchers to focus on certain factors

within a population that will best help them answer research questions.

The Off-Balance Sheet Activities Profile for Large Public Banks

Table 3: Components of OBSI of Selected Large Public Sector Banks						
Year	Liability on account of outstanding forward exchange contracts *	Guarantees Given on Behalf of Constituents		Acceptances, endorsements and other obligations	In Crs.	
		In India	Outside India		Others	Total OBS
2024	33,25,100	6,10,200	1,82,450	5,05,600	5,28,208	51,51,558
2023	33,05,400	5,95,300	1,78,900	4,92,300	5,50,447	51,22,347
2022	32,40,800	5,70,600	1,72,300	4,78,900	5,09,700	49,72,300
2021	31,85,200	5,48,900	1,65,700	4,60,400	4,89,300	48,49,500
2020	2,457,177.52	456,987.77	127,279.21	332,340.09	301,602.02	3,675,386.61
2019	2,341,986.03	447,812.29	142,273.52	345,248.00	247,802.81	3,525,122.65
2018	2,400,712.02	436,855.32	120,824.73	367,311.88	263,184.55	3,588,888.49
2017	1,914,312.38	398,051.55	133,291.24	390,788.17	249,043.84	3,085,487.18
2016	1,852,783.54	373,379.07	135,232.69	379,588.34	227,403.04	2,968,386.68
2015	1,518,523.47	339,538.15	133,249.87	366,289.21	194,188.31	2,551,789.00
2014	1,160,847.38	307,332.24	93,589.17	337,961.94	157,660.91	2,057,391.64
2013	845,801.30	254,465.38	58,852.82	273,558.98	176,827.74	1,609,506.21
2012	932,778.23	194,931.35	44,969.32	250,159.64	344,900.51	1,767,739.04
2011	889,450.77	138,195.59	25,105.72	187,626.56	492,452.73	1,732,831.38
Authors' own calculation						

Table:3 describes the basic components of off-balance-sheet activities undertaken the large public sector banks in India. These components are offered as extended services to the investors, corporates and retail customers as:

☐ Forward Contracts
☐ Guarantees Given on Behalf of Constituents
☐ Acceptances, endorsements and other obligations

With the reference of the reviewed literature, we defined the off-balance sheet activities as the ghost activities for the firms where they do not want to reflect the earnings/losses of these activities in their defined portfolios.

7. Findings and Discussion

In this section of research, we examined the impact of OBSI on various risk factors, profitability, leverage, and liquidity position. This study will contribute to Indian literature to understand the contribution of OBSI in various performance factors of banking.

Breusch-Pagan / Cook-Weisberg test for Heteroscedasticity for PSBs

To test the heteroscedasticity of errors, we employed the Breush-Pegan Test on the refined data set.

Table 4: Breusch-Pagan / Cook-Weisberg test Results			
S.n	Independent Variables	Chi Square	P
1	BSR	1.74	0.05**
2	RE	4.7	0.03**
3	DE	28.34	0.00***
4	LA	170.69	0.00***
5	MR	6.30	0.00***
6	UR	129.19	0.00***
7	TR	181.73	0.00***
*** implies significance at 2%.			
** implies significance at 5%.			
* implies significance at 10%			
Authors' own calculations.			

Table 4 represents results of the test with the p value of individual variables for the following hypothesis as:

H_0: There is constant variance for independent variables

So based on table 4 we rejected the null hypothesis as P value for all interdependent variables is under the significant zone of 5% to 2%.

Variance Influence Factor for Autocorrelation for PSBS

In multiple regression or panel data regression, variance influence plays a significant part as it measures the autocorrelation among the set of variables. Its value communicates that behavior of an independent variable is influenced by its correlation with other independent variables.

S.n	Control Variables	VIF	1/VIF
Table 5: VIF Test for Autocorrelation.		
1	OBS	3.77	0.265
2	TA	4.06	0.205
3	ETA	1.78	0.562
4	TLTA	1.66	0.602
5	FATA	1.16	0.862
6	LiqTA	1.37	0.730
7	PLTA	1.25	0.800
We' own calculation			

The table 5 represents the VIF values of selected control variables used in the study. As per the table VIF for all variables are under standard limit of 5. So the autocorrelation among control variables are under control and set variables are good to use for the study.

Hausman Test for the Selected Public Banks

To determine which multiple regression model (FE/RE) suitable on calculated data for public sector banks we performed the Hausman test.

S.n	Variable	Hausman Test	P-value
Table 6: Results of Hausman Test for PSBs		
1	BSR	-1.7	0.089*
2	ROE	-7.55	0.00**
3	DE	-0.98	0.326
4	LA	-0.76	0.449
5	MR	4.06	0.00**
6	UR	0.23	0.821
7	TR	1.34	0.653
** implies significance at 5%.			
* implies significance at 10%			
We' own calculations.			

Table 6 presents the results of Hausman test to determine the FE or RE model for selected variables with p-values for the hypothesis for all variables as.

H_0: FE model is suitable for the variable

H_1: RE model is suitable for the variable

As per the Table 6 the Hausman test results for BSR, ROE and MR were found under significant zones as the values are .089,0.00,0.00.

So the null hypothesis is rejected and we performed RE model for theses variables. For the rest of variables, we executed the FE model as the p value was not under significant zone.

The Relationships of Various Risks with OBSI of the Selected PSBS

As Per the Hausman test acceptability of panel, concerned panel data regression has been employed with respect to all three calculated risk as: total, systematic and unsystematic risk.

S.n	Control Variables	Total		Systematic		Unsystematic	
Table 7: Panel Data Results of the Relationships of Various Risks						
		Coefficient Values	t- ratio Values	Coefficient Values	t-ratio Values	Coefficient Values	t- ratio Values
1	OBS	3.73	1.25	0.21	0.73	3.52	1.22
2	TA	-0.34	-0.09	0.68	1.96**	-1.02	-0.29
3	TLTA	-13.49	-0.4	-2.85	-0.88	-10.63	-0.33
4	ETA	-5.03	-0.13	-1.26	-0.34	-3.77	-0.1
5	FATA	57.16	0.2	-32.83	-1.17	90	-0.32
6	LiqTA	18.76	0.47	-1.93	-0.5	20.7	-0.54
7	PLTA	-102.52	-0.82	-28.89	-2.39**	-73.63	-0.61
8	Cons	-26.36	-0.68	-9.04	-2.42**	-17.31	-0.47
** implies significance at 5%.							
* implies significance at 10%							
Authors' own calculations.							

Table 7 presents the panel data results of the relationships of various risks with OBSI for the selected PSBs for the hypothesis testing as:

H1: There is a substantial association between OBSI and total risk
H1: There is a substantial association between OBSI and systemic risk
H1: There is a substantial association between OBSI and un-systemic risk

Table 7 shows that OBSI have a positive relationship with all types of risk, but their impact on total, systematic, and unsystematic risk is insignificant. This could be because public sector banks in India are not yet relying on OBSI as their main source of funding. The study also found a significant relationship between TA and PLTA in the market risk factor, which aligns with a similar study in the Malaysian banking sector.

The Relationships of Various Profitability Ratios with OBSI of the Selected PSBS

The profitability ratio is an important part of banks' performance so we calculated following profitability measures:

- The mean of annual stock. return.
- ROE. = (Net Income)/ (Total equity).

Table 8: Panel Data Results of the Relationships of Profitability with OBSI

S.n.	Control Variables	BSR		ROE	
		Coefficient	t ratio	Coefficient	t ratio
1	OBS	0.24	0.42	2.8	2.12**
2	TA	-0.107	-0.13	-8.05	-4.36**
3	TLTA	-12.54	-1.39	-1.82	-0.1
4	ETA	0.34	0.02	-15.76	-.64
5	FATA	50.98	0.7	-48.1	-.32
6	LiqTA	10.81	1.08	31.58	1.47
7	PLTA	-58.33	-2.08**	-668.31	-11.76**
8	Cons	6.5	0.76	95.5	5.36**
** implies significance at 5%.					
* implies significance at 10%					
Authors' own calculations.					

As per the results received in Table 8 through panel data regression we can conclude that the OBSI are positively related to both types of profitability ratios as coefficient variable is positive for both factors.

Hypothesis testing

H1: There is a substantial association between OBSI and BSR

More specifically banks' stock return is not significant with respect to OBSI at 5% significant level. This designates that the use OBSI might have amplified the stock return.

H1: There is a substantial association between OBSI and systemic ROE

However, ROE has positive and substantial association with OBSI. As ROE is defined by net income divided by shareholders' equity whereas the shareholders' equity is calculated by company's assets minus its debt. So any increment in income generation by OBSI items in public sector will increase the ROE.

The Relationships of Various Liquidity Ratios with OBSI of the Selected PSBS

The effects of OBS activities on bank's leverage and liquidity positions are analyzed through fixed effect regression as per the Hausman Test.

Banks Leverage ratios is calculated are calculated as:
- Debt to equity ratio
- Liquidity ratio

Table 9: Panel Data Results of the Relationships of Liquidity Ratios with OBSI

S.n.	Control Variables	DE		LA	
		Coefficient Value	t- ratio	Coefficient Value	t- ratio
1	OBS	50.05	.08	.017	4.03
2	TA	1199.9	1.53	-.018	-3.04**
3	TLTA	-397.68	-.05	-.48	-9.92**
4	ETA	2484448	297.71**	-071	-0.97
5	FATA	-127292	-2.02	-.411	.82
6	LiqTA	-11035.22	-1.28	Omitted	
7	PLTA	28287.7	1.05	-0.06	-0.32
8	Cons	17531.8	-2.09**	0.4	7.73**
** implies significance at 5%.					
* implies significance at 10%					
Authors' own calculations.					

Hypothesis testing

H1: There is a substantial association between OBSI and DE
H1: There is a substantial association between OBSI and LA

As per the results in table 9, OBS activates have positive but insignificant impact on DE and LA ratio as the coefficients are .08 and 4.03 but not under 5% significant level. We can conclude that OBSI might not widely and efficiently used in the national banking operations in India."

8. Conclusion

Since the Asian banking crisis, developing countries' banking systems have followed the west to generate profits from fee-based services, resulting in an opening era of cut-throat competition in the banking sector. In this research, panel data regression analysis was used to examine the impact of OBSI on selected public banks' performance, focusing on risk, profitability, and leverage. The findings show that the link between OBSI and risk and liquidity was minimal, but ROE had statistically significant results, consistent with previous research. The relationship between liquidity ratios and OBSI was positive but insignificant. Omitting OBSI in the definition of bank performance may lead to partial conclusions.

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