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A Study on the Indian Banking Sector Stock Performance Over the Decades

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ABSTRACT:

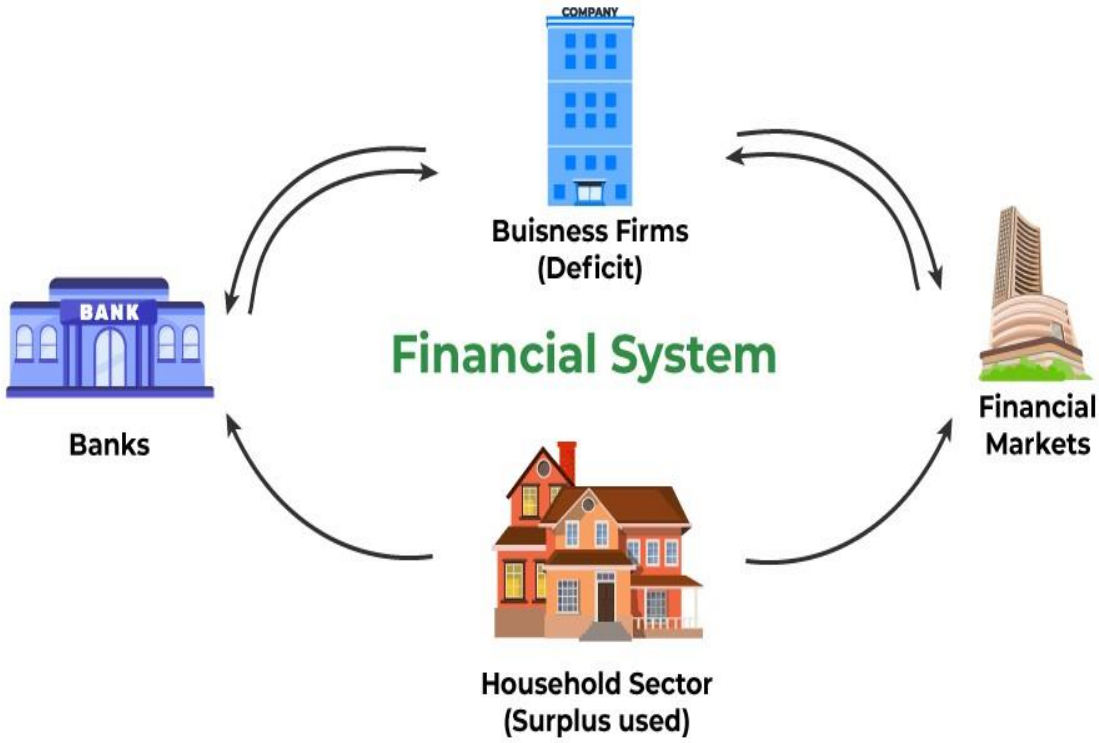
This research study has mainly focused on understanding how the banking sector stocks listed on the NSE have performed over the past 20 years. The main objective is to determine which type of banking sector companies, i.e., whether the big or small companies or whether the banks with better valuations have performed well or not. This is done by performing a regression analysis on various portfolio combinations constructed using the Fama-French three-factor model, which helps us in building the 6 types of portfolios based on factors such as market cap, price-to-book value, etc. The findings confirm that the coefficient tagged with the small minus big variables has always given better returns compared to the stocks that are valued low or high.

Keywords: Banking sector, NSE, Fama-French three factor model, digitalization, market returns, Fintech, UPI, financial system, Banks classification, evolution of Banking sector in India, growth drivers, etc.

INTRODUCTION:

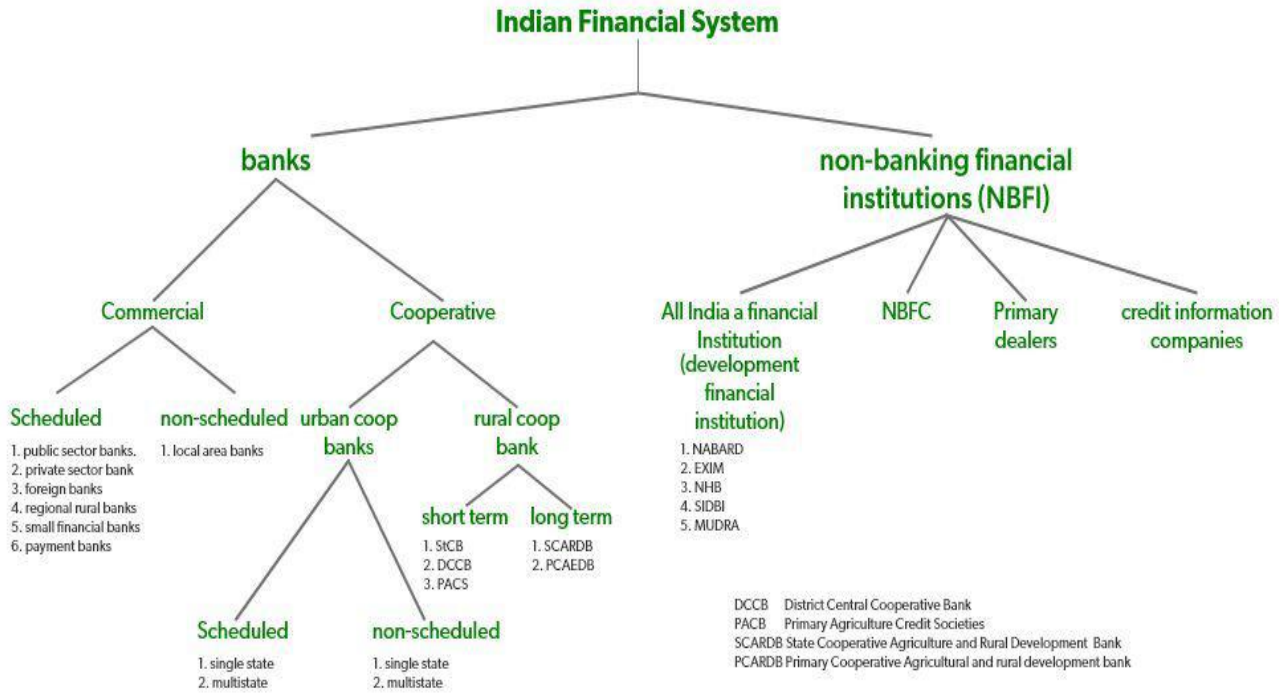
In the present day, globalization has played a key role in terms of developing a nation's economy. However, both developed and developing nations' economy depends upon a lot of factors such as GDP, governmental policies, skillful labor, natural resources, tech advancement, innovation, infrastructure, global trade, political stability, etc. For all these factors to be in line with the developmental activities, one of the main components of the economy is the financial system of the country. All of these are interconnected and sudden change or uncertainty in one could cause a spillover effect on the rest.

Additionally, to have a stable economy, a lot of things depend upon the monetary policy and how the government has its fiscal policies in alignment with the monetary policy. Therefore, all these are directly linked to the Indian financial system and this plays a key role in terms of building a nation's economy. Under the Indian financial system, financial institutions have an important role in terms of maintaining a strong financial system. They help in bringing the connection between savings and investments.



Types of financial institutions:

Financial institutions can be broadly divided into banking and non-banking institutions.



There are various divisions under each of these two categories which make up for various subdivisions. In our research, we consider institutions that fall under the banking-commercial division further which is divided into public, private, foreign, regional, and small financial banks.

History of the banking sector in India:

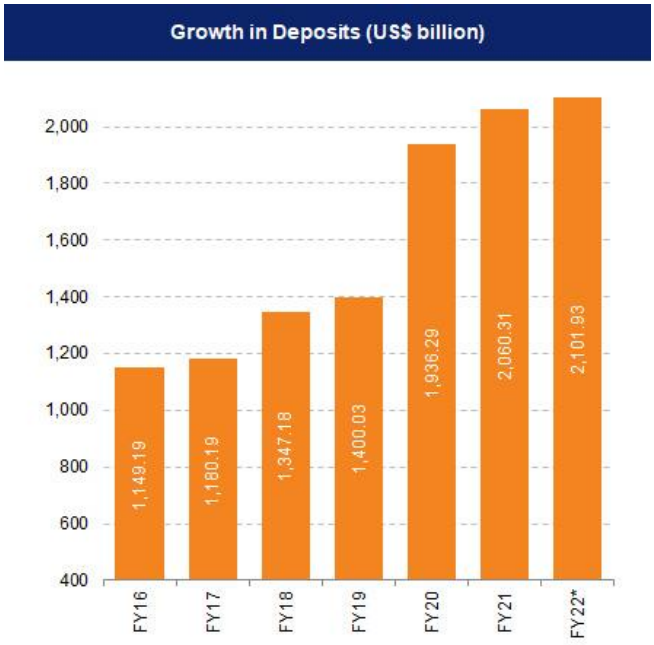
The banking sector in India was mostly under the control of foreign banks during the pre-independence period. Only post-independence, after the formation of government and due to its initiatives, has strengthened the banking system. State Bank of India, back in 1955 known as Imperial Bank of India, was the first nationalized bank, and during the late 1960s, the government undertook nationalizing more than 14 private sector banks.

Post LPG reforms, India's economy has grown tremendously due to these economic reforms. Liberalization happened in tax reforms, forex and trade policies, the financial sector, etc. The PSU which was only under the control of the government, was disinvested to private players but still majority stake

and control was under the government itself. With more private players coming into the market, there was a rapid import of technology as well as an inflow of funds through FDI. This led to the strong growth of not only the government banks but also foreign banks like ICICI, Citibank, HDFC, Axis Bank, and many private banks in India.

In recent years, we saw the nationalized banks getting merged due to the growing risk factor of NPAs. To cover the impact of NPAs on individual banks, the nationalized banks were merged to reduce the risk factor ratio and also by doing so, would increase their customer base, reduce business gaps, improve tech, and thereby increase profits.

At present, the Indian banking sector has strong backing from RBI regulation and it is well-capitalized. With new-age banking like payment banks and digi-banks, and also with the introduction of UPI, PM Jan Dhan schemes, there is a significant rise in banking tech which has resulted in financial inclusion. More accounts have been opened with a rising deposits.



In conclusion, the banking system in India has improved with timely technological advancements and has grown robust when compared to earlier periods. There are better risk management techniques in place to improve the asset's quality, more capital inflow, and enhanced regulatory measures to make sure the interests of the public are protected.

Key drivers influencing the banking sector growth:

Emphasis on reducing NPAs - one of the reasons why there is an improvement in the quality of assets. Post-2010, there was an increase in NPAs of almost every public sector bank due to non-recover of loans and advances. Due to this, the banks were in distress resulting in poor financial results. After emphasizing reducing NPAs, the numbers have declined from 11.8% to 5.6% in 2022, which is a decade-low percent.

Economic stability – increasing younger population, India is heading towards achieving a $5 trillion economy. Improved standard of living and steadily increasing consumer demand are improving the banking sector, education, and healthcare services, automobiles, etc. Increasing disposable income would generate much more demand for such services and with digitization of banking services, there is a significant rise in demand for loans as well.

Robust policies and reforms – In this digitalization era, the government has been successful in terms of implementing and bringing digitization into the banking sector. Pradhan Mantri Jan Dhan Yojana has given rise to financial inclusion and banking access to everyone who were left out previously. With improved reforms and initiatives, comes better governance of the banks. This has brought in more stability and growth in this sector. E-mudra loans have provided better credit facilities to women, and increased bank account opening.

Technology advancement – more fintech companies coming up with digital and convenient banking solutions have influenced the rapid growth of the digital banking sector. With more advancements and acceptance of digitization, India has been able to achieve financial inclusion in recent years. With UPI introduced by NPCI, the volume of digital payments and transactions has significantly risen.

LITERATURE REVIEW:

(Kailash Pradhan, 2022) have tried to explain about the linkage between the banking system and the growth of any nation's stock market. The research discusses about factors such as savings rate, strong banking system, per capita income, credit facilities for private sector companies, etc. on how they help both the economy and stock market to perform well in both short and long term. A strong financial system and banking infrastructure helps the stock market in a way as linkage of savings to reach the private sector as crucial financial resources.

(Jariwala, 2020) the author has explained about banking stocks that are listed on BSE and how the prices of these stocks move in accordance with the indices. He has performed descriptive statistical test to understand the movement of prices of these selected stocks, i.e., top 6 banking stocks by market cap.

Findings show that the returns of these 6 stocks and the bank index returns are much similar for the tested period and it implies that the random walk theory is observed.

(Rajveer S. Rawlin, 2021) this research has discussed about various economic factors, both macro and micro economic factors which influence the private sector banks performance. They have explained how factors such as asset quality, profitability, inflation, growth rates, exchange rates, etc., have impact on stock prices of private sector banks. The findings also conclude that these banks have provided much better returns in accordance with inflation adjustment over time.

(Dr. S. Sekar, 2020) in their study have considered variables such as ROE, EPS, Dividend per share, profit margins, ROA, etc., to study their impact on the market price of the banking stocks. They have regression analysis on these variables and found out that these factors have a significant influence on the market price movements. They have even discussed how important is the banking sector in providing banking services and also stated that the demand for these services is growing due to the growing population.

(Dippi Sinha Verma, 2015) have discussed about the link between the macroeconomic factors and the banking sector in India. To analyze various factors influencing the banks' stock returns and overall economic growth, the author has used CAPM and Arbitrage pricing theory. The monthly available macroeconomic factors data have been considered in this study and based on the regression analysis; they have tried to measure the impact of these factors on the bank index. In conclusion, they have discussed that macro factors have a slight impact on index movement but have a significant impact on the banking index.

(Dr. V.N. Sailaja, 2016) in their study, they have implemented descriptive analysis to understand the overall performance and volatility of both public and private sector banks. They have collected the stock price data from Yahoo Finance to perform their analysis. Among the public and private sector bank stocks, they have found out from their study that the private sector banks have performed better than the public sector and also have consistency in terms of price movements. They have discussed the importance of risk portfolio management, and construction while investing in the stock markets.

(Pawan Kumar Avadhanam, 2015) their study is about how the stocks of the banking sector and financial institutions have performed over time. To evaluate the performance of these stocks during the period of 1999 to 2008, they used models such as CAPM, ratio analysis, and trend analysis. They have collected the data from secondary sources such as NSE and BSE for building the research. From their findings, we can understand that the expected returns of these stocks are significantly different from the actual returns. They have emphasized that stock valuation also plays a key role in terms of investment decisions.

(Dr. Meda Srinivasa Rao, 2020) the author has considered listed banking stocks and their data from two different periods, i.e., the UPA government ruling period and the NDA ruling period. This is done to understand what were the risks and returns gained during these two distinct governmental ruling periods. Based on their outcome from statistical analysis, they have concluded that the private sector has posted two-digit return figures compared to the public sector during the UPA government and there is a significant shift in return in both these post the NDA government. This shows that even political stability would impact the stock price movements.

(Kapur, 2010) in this research, we get to understand how the Fama-French model could explain sectorial returns and the performance of various stocks. The author has considered various industrial sectorial returns in the US market to understand the relationship between the market returns and these sector's returns, and performances. Overall, from the model, findings show that there is a strong link between market returns and the size & value of the company.

(Chu, 2022) the research work discusses the Fama-French three and five-factor models and their application in analyzing stock market returns, performance, and also asset allocation, and pricing of stocks.

OBJECTIVES:

1. To understand how the Indian banking sector has performed over the last 20 years by considering publicly listed banks.
2. To understand the factors that are major in terms of influencing the banking sector stocks price, returns, and performance.
3. With the use of the Fama-French three-factor model, we have tried to understand how the banking stocks listed on the NSE have performed and also determine whether the model's assumptions are applicable to the Indian banking stocks.
4. With the help of the above-mentioned model, we would decide on what type of company. i.e., whether to invest in small or big companies based on portfolio construction and returns.

RESEARCH METHODOLOGY:

For the purpose of our study, we have analyzed various existing literature for choosing the model to be used. Based on the understanding from those works, we have arrived at the decision to implement the Fama-French three-factor model as it would consider listed banking companies' stock based on factors such as market capitalization, size of the company, and also the value, i.e., the price to book ratio which we have arrived based on the formula – price/book value.

Data collection and sources: we have collected data of 8 banking stock companies that are listed on the NSE. Data variables such as year-end market cap, the book value of the company, year-end share prices, NIFTY 50 price levels, etc. from https://capitaline.com/

The data has been collected from the year 1999 till 2023. We have even considered a risk-free return rate in India for the same period mentioned above from the RBI website.

Data analysis, results, and interpretation:

Capitaline Code	Company Nan	Year End	Market Capitalisatic	Book Value (Unit Cur	Year End Price Date (NS	Year End Price (NS
5554	Axis Bank	199903	184.66	15.62	3/31/1999	2.81
5456	Bank of Baroda	199903	1346.8	98.54	3/31/1999	28.06
3709	Federal Bank	199903	78.59	148.6	3/31/1999	0.9
4987	HDFC Bank	199903	1383	16.95	3/31/1999	6.96
5418	ICICI Bank	199903	452.1	18.69	3/31/1999	4.98
5531	IndusInd Bank	199903	298.4	33.33	3/31/1999	46
2330	Kotak Mah. Bank	199903	66.85	90.33	3/31/1999	0.81
1375	St Bk of India	199903	11231.24	197.65	3/31/1999	29.04

These are the 8 stocks that we have considered for understanding the banking sector returns and performance in India.

Steps in building the model:

Firstly, after consolidating all the data variables points of all the 8 banking stocks mentioned above, we calculate their P/B ratio values for year each.

Next, we consider the Nifty50 closing price to calculate the market return for each year starting from 2000 till 2023.

Capitaline Code	Company Name	Year End	Market Capitalisation	Book Value (Unit Curr)	Year End Price Date (NSE	Year End Price (NSE	Rf	NIFTY 50	P/B Ratio	NIFTY_R
5554	Axis Bank	199903	184.66	15.62	3/31/1999	2.81	0.080	1480	0.18	
5554	Axis Bank	200003	521.66	18.16	3/31/2000	7.94	0.085	1263	0.44	-0.159
5554	Axis Bank	200103	323.81	22.85	3/30/2001	4.99	0.078	1059	0.22	-0.176
5554	Axis Bank	200203	765.32	32.05	3/28/2002	7.97	0.060	1050	0.25	-0.009
5554	Axis Bank	200303	924.21	39.88	3/31/2003	7.86	0.050	1879	0.20	0.582
5554	Axis Bank	200403	3398.44	49.07	3/31/2004	29.73	0.053	2080	0.61	0.102
5554	Axis Bank	200503	6627.33	87.95	3/31/2005	47.52	0.053	2836	0.54	0.310
5554	Axis Bank	200603	9931.12	103.06	3/31/2006	71.21	0.070	3966	0.69	0.335
5554	Axis Bank	200703	13804.09	120.49	3/30/2007	98.08	0.081	6138	0.81	0.437
5554	Axis Bank	200803	27942.52	245.13	3/31/2008	157.97	0.044	2959	0.64	-0.730
5554	Axis Bank	200903	14880.96	284.53	3/31/2009	82.99	0.040	5201	0.29	0.564
5554	Axis Bank	201003	47368.42	395.99	3/31/2010	233.65	0.042	6134	0.59	0.165
5554	Axis Bank	201103	57626.85	462.77	3/31/2011	280.77	0.077	4624	0.61	-0.283
5554	Axis Bank	201203	47348.59	552	3/30/2012	229.24	0.081	5905	0.42	0.245
5554	Axis Bank	201303	60891.99	707.5	3/28/2013	260.14	0.079	6304	0.37	0.065
5554	Axis Bank	201403	68618.45	162.69	3/31/2014	292.1	0.080	8282	1.80	0.273
5554	Axis Bank	201503	132844.06	188.47	3/31/2015	560.2	0.083	7946	2.97	-0.041
5554	Axis Bank	201603	105928.79	223.12	3/31/2016	444.15	0.080	8185	1.99	0.030
5554	Axis Bank	201703	117548.37	232.83	3/31/2017	490.8	0.075	10530	2.11	0.252
5554	Axis Bank	201803	130739.49	247.2	3/28/2018	510.5	0.070	10862	2.07	0.031
5554	Axis Bank	201903	199585.36	259.27	3/29/2019	777.25	0.076	12168	3.00	0.114
5554	Axis Bank	202003	107026.24	301.05	3/31/2020	379	0.050	13981	1.26	0.139
5554	Axis Bank	202103	213696.47	331.63	3/31/2021	697.45	0.036	17354	2.10	0.216
5554	Axis Bank	202203	233500.37	374.71	3/31/2022	761.15	0.061	18105	2.03	0.042
5554	Axis Bank	202303	264132.36	406.24	3/31/2023	858.5	0.073	21731	2.11	0.183

Here is the data point of just Axis bank stock from 1999 till 2023 and also the calculated P/B ratio. Like wise we have 7 other banking stocks data points.

Next, we group these 8 stocks based on their size and value i.e., the size of the company – for the purpose of SMB (small minus big factor) and, the value of the company – for the purpose of low minus high book value companies.

Size of the company

company name	market cap
Axis Bank	74646.40
Bank of Baroda	24002.40
Federal Bank	7644.27
HDFC Bank	234883.28
ICICI Bank	142788.00
IndusInd Bank	29965.76
Kotak Mah. Bank	96132.02
St Bk of India	145257.19

Value of the company

company name	P/B ratio
Axis Bank	1.13
Bank of Baroda	0.40
Federal Bank	0.48
HDFC Bank	1.43
ICICI Bank	1.04
IndusInd Bank	2.54
Kotak Mah. Bank	2.61
St Bk of India	0.58

company name	market cap	ranking based on mkt cap
HDFC Bank	234883.28	B
St Bk of India	145257.19	B
ICICI Bank	142788.00	B
Kotak Mah. Bank	96132.02	B
Axis Bank	74646.40	S
IndusInd Bank	29965.76	S
Bank of Baroda	24002.40	S
Federal Bank	7644.27	S

company name	P/B ratio	based on P/B
Kotak Mah. Bank	2.61	H
IndusInd Bank	2.54	H
HDFC Bank	1.43	M
Axis Bank	1.13	M
ICICI Bank	1.04	M
St Bk of India	0.58	L
Federal Bank	0.48	L
Bank of Baroda	0.40	L

Based on this, we list down these companies by considering the average market cap and average P/B ratio for all the years and arrange it in large to small values. This only done for the purpose of constructing 6 various combinations of portfolios.

The portfolio combinations are mentioned below in the table.

Portfolios		
S/H	IndusInd Bank	
S/M	Axis Bank	
S/L	Federal Bank	Bank of Baroda
B/H	Kotak Mah. Bank	
B/M	HDFC Bank	ICICI Bank
B/L	St Bk of India	

Here, under Small cap / High P/B comes – IndusInd Bank, Small / Medium – Axis Bank, Small / Low – Federal Bank and Bank of Baroda, Big / High – Kotak Mahindra Bank, Big / Medium – HDFC and ICICI, Big / Low – SBI.

We have considered only these 8 stocks as the data available from 1999 till 2023 was of only these 8 stocks. There are many other listed stocks that were listed post 2004-05. The reason for considering the period from 1999 to 2023 is because the model stands good for a period of more than 15-20 years.

We have then calculated the portfolio returns of all these above-mentioned portfolio combinations.

P1	S/H		
Year	IndusInd Bank	IndusInd Bank_R	P1_R
199903	46		
200003	46.05	0.001	0.001
200103	29.75	-0.437	-0.437
200203	18	-0.502	-0.502
200303	19.85	0.098	0.098
200403	50.35	0.931	0.931
200503	64.7	0.251	0.251
200603	83.85	0.259	0.259
200703	64.25	-0.266	-0.266
200803	136.25	0.752	0.752
200903	105	-0.261	-0.261
201003	185.25	0.568	0.568
201103	309.3	0.513	0.513
201203	333.9	0.077	0.077
201303	448.9	0.296	0.296
201403	530.6	0.167	0.167
201503	959	0.592	0.592
201603	988.5	0.030	0.030
201703	1425.15	0.366	0.366
201803	1796.75	0.232	0.232
201903	1780	-0.009	-0.009
202003	351.3	-1.623	-1.623
202103	954.45	0.999	0.999
202203	935.4	-0.020	-0.020
202303	1067.95	0.133	0.133

P2	S/M		
Year	Axis Bank	Axis Bank_R	P2_R
199903	2.81		
200003	7.94	1.039	1.039
200103	4.99	-0.464	-0.464
200203	7.97	0.468	0.468
200303	7.86	-0.014	-0.014
200403	29.73	1.330	1.330
200503	47.52	0.469	0.469
200603	71.21	0.404	0.404
200703	98.08	0.320	0.320
200803	157.97	0.477	0.477
200903	82.99	-0.644	-0.644
201003	233.65	1.035	1.035
201103	280.77	0.184	0.184
201203	229.24	-0.203	-0.203
201303	260.14	0.126	0.126
201403	292.1	0.116	0.116
201503	560.2	0.651	0.651
201603	444.15	-0.232	-0.232
201703	490.8	0.100	0.100
201803	510.5	0.039	0.039
201903	777.25	0.420	0.420
202003	379	-0.718	-0.718
202103	697.45	0.610	0.610
202203	761.15	0.087	0.087
202303	858.5	0.120	0.120

P3	S/L				
Year	Federal Bank	Bank of Baroda	Federal Bank_R	Bank of Baroda_R	P3_R
199903	0.9	28.06			
200003	1.33	9.2	0.391	-1.115	-0.362
200103	1.27	12.09	-0.046	0.273	0.114
200203	2.66	9.52	0.739	-0.239	0.250
200303	2.36	17.15	-0.120	0.589	0.234
200403	9.45	48.54	1.387	1.040	1.214
200503	11.84	43.55	0.225	-0.108	0.058
200603	15.43	46.11	0.265	0.057	0.161
200703	16.52	43.01	0.068	-0.070	-0.001
200803	21.66	56.67	0.271	0.276	0.273
200903	13.79	46.87	-0.452	-0.190	-0.321
201003	26.69	127.81	0.660	1.003	0.832
201103	41.86	192.97	0.450	0.412	0.431
201203	42.65	159.23	0.019	-0.192	-0.087
201303	48.07	135.08	0.120	-0.164	-0.022
201403	47.88	144.15	-0.004	0.065	0.031
201503	66.03	163.5	0.321	0.126	0.224
201603	46.45	147	-0.352	-0.106	-0.229
201703	91.45	172.95	0.677	0.163	0.420
201803	89.2	142.3	-0.025	-0.195	-0.110
201903	96.45	128.65	0.078	-0.101	-0.011
202003	41.05	53.55	-0.854	-0.876	-0.865
202103	75.8	74.1	0.613	0.325	0.469
202203	97.4	111.6	0.251	0.410	0.330
202303	132.3	168.85	0.306	0.414	0.360

P4	B/H		
Year	Kotak Mah. Bank	Kotak Mah. Bank_R	P4_R
199903	0.81		
200003	5.84	1.975	1.975
200103	2.88	-0.707	-0.707
200203	7.09	0.901	0.901
200303	7.9	0.108	0.108
200403	20.16	0.937	0.937
200503	33.95	0.521	0.521
200603	69.81	0.721	0.721
200703	119.85	0.540	0.540
200803	156.48	0.267	0.267
200903	70.55	-0.797	-0.797
201003	187.04	0.975	0.975
201103	228.93	0.202	0.202
201203	272.68	0.175	0.175
201303	326.5	0.180	0.180
201403	390.53	0.179	0.179
201503	656.63	0.520	0.520
201603	680.65	0.036	0.036
201703	872.2	0.248	0.248
201803	1047.8	0.183	0.183
201903	1334.5	0.242	0.242
202003	1296.05	-0.029	-0.029
202103	1753	0.302	0.302
202203	1753.85	0.000	0.000
202303	1732.85	-0.012	-0.012

P5	B/M				
Year	HDFC Bank	ICICI Bank	HDFC Bank_R	ICICI Bank_R	P5_R
199903	6.96	4.98			
200003	25.72	48.55	1.307	2.277	1.792
200103	22.84	30.09	-0.119	-0.478	-0.299
200203	23.66	22.53	0.035	-0.289	-0.127
200303	23.46	24.32	-0.008	0.076	0.034
200403	37.88	53.87	0.479	0.795	0.637
200503	54.49	71.42	0.364	0.282	0.323
200603	77.43	107.1	0.351	0.405	0.378
200703	95.42	155.15	0.209	0.371	0.290
200803	133.13	139.89	0.333	-0.104	0.115
200903	97.34	60.51	-0.313	-0.838	-0.576
201003	193.35	173.18	0.686	1.052	0.869
201103	234.59	202.95	0.193	0.159	0.176
201203	259.93	161.85	0.103	-0.226	-0.062
201303	312.68	190.04	0.185	0.161	0.173
201403	374.4	226.37	0.180	0.175	0.178
201503	511.35	286.82	0.312	0.237	0.274
201603	535.58	215.14	0.046	-0.288	-0.121
201703	721.28	251.68	0.298	0.157	0.227
201803	943.05	278.35	0.268	0.101	0.184
201903	1159.45	400.5	0.207	0.364	0.285
202003	861.9	323.75	-0.297	-0.213	-0.255
202103	1493.65	582.1	0.550	0.587	0.568
202203	1470.35	730.3	-0.016	0.227	0.106
202303	1609.55	877.25	0.090	0.183	0.137

P6	B/L		
Year	St Bk of India	St Bk of India_R	P6_6
199903	29.04		
200003	19.32	-0.408	-0.408
200103	18.97	-0.018	-0.018
200203	20.75	0.090	0.090
200303	25.47	0.205	0.205
200403	57.16	0.808	0.808
200503	61.77	0.078	0.078
200603	91.37	0.391	0.391
200703	93.82	0.026	0.026
200803	160.03	0.534	0.534
200903	106.71	-0.405	-0.405
201003	207.82	0.667	0.667
201103	276.53	0.286	0.286
201203	209.64	-0.277	-0.277
201303	207.28	-0.011	-0.011
201403	191.77	-0.078	-0.078
201503	267.05	0.331	0.331
201603	194.25	-0.318	-0.318
201703	293.4	0.412	0.412
201803	249.9	-0.160	-0.160
201903	320.75	0.250	0.250
202003	196.85	-0.488	-0.488
202103	364.3	0.616	0.616
202203	493.55	0.304	0.304
202303	523.75	0.059	0.059

After building all the 6 portfolios and calculating each of those portfolio returns, we group consolidate those returns into SMB and LMH, small cap – big cap companies returns and Low value – high value companies returns for each year.

Year	SMB	LMH
200003	-0.8941771	-1.3731863
200103	0.0786438	0.6195318
200203	-0.2158641	-0.0292938
200303	-0.0095699	0.1167074
200403	0.364215	0.0772962
200503	-0.0477664	-0.3179462
200603	-0.2219776	-0.2138411
200703	-0.2678211	-0.1242123
200803	0.1954213	-0.1055299
200903	0.1841745	0.1655979
201003	-0.0252865	-0.0222166
201103	0.1545364	0.0009818
201203	-0.0163592	-0.3075422
201303	0.0195024	-0.2549183
201403	0.0115855	-0.1967718
201503	0.1139345	-0.2783372
201603	-0.0092977	-0.3067858
201703	-0.0006412	0.1092848
201803	-0.0154305	-0.3427979
201903	-0.1256724	0.0028771
202003	-0.8114011	0.1491934
202103	0.1975484	-0.1084564
202203	-0.0041071	0.3267197
202303	0.1429354	0.149541

Year	P1_R	P2_R	P3_R	P4_R	P5_R	P6_R	Rf	NIFTY_R	P1_R - Rf	P2_R - Rf	P3_R - Rf	P4_R - Rf	P5_R - Rf	P6_R - Rf	NIFTY_R - Rf	SMB	LMH
200003	0.001	1.039	-0.362	1.975	1.792	-0.408	0.085	-0.159	-0.084	0.954	-0.447	1.890	1.707	-0.493	-0.244	-0.894	-1.373
200103	-0.437	-0.464	0.114	-0.707	-0.299	-0.018	0.078	-0.176	-0.514	-0.542	0.036	-0.784	-0.376	-0.096	-0.254	0.079	0.620
200203	-0.502	0.468	0.250	0.901	-0.127	0.090	0.060	-0.009	-0.562	0.408	0.190	0.841	-0.187	0.030	-0.069	-0.216	-0.029
200303	0.098	-0.014	0.234	0.108	0.034	0.205	0.050	0.582	0.048	-0.064	0.184	0.058	-0.016	0.155	0.532	-0.010	0.117
200403	0.931	1.330	1.214	0.937	0.637	0.808	0.053	0.102	0.878	1.278	1.161	0.884	0.585	0.756	0.049	0.364	0.077
200503	0.251	0.469	0.058	0.521	0.323	0.078	0.053	0.310	0.198	0.416	0.006	0.469	0.270	0.025	0.258	-0.048	-0.318
200603	0.259	0.404	0.161	0.721	0.378	0.391	0.070	0.335	0.189	0.334	0.091	0.651	0.308	0.321	0.265	-0.222	-0.214
200703	-0.266	0.320	-0.001	0.540	0.290	0.026	0.081	0.437	-0.347	0.239	-0.082	0.459	0.209	-0.055	0.356	-0.268	-0.124
200803	0.752	0.477	0.273	0.267	0.115	0.534	0.044	-0.730	0.708	0.433	0.229	0.223	0.071	0.490	-0.774	0.195	-0.106
200903	-0.261	-0.644	-0.321	-0.797	-0.576	-0.405	0.040	0.564	-0.301	-0.684	-0.361	-0.837	-0.616	-0.445	0.524	0.184	0.166
201003	0.568	1.035	0.832	0.975	0.869	0.667	0.042	0.165	0.526	0.993	0.790	0.933	0.827	0.625	0.123	-0.025	-0.022
201103	0.513	0.184	0.431	0.202	0.176	0.286	0.077	-0.283	0.436	0.107	0.354	0.125	0.099	0.209	-0.360	0.155	0.001
201203	0.077	-0.203	-0.087	0.175	-0.062	-0.277	0.081	0.245	-0.004	-0.284	-0.168	0.094	-0.143	-0.358	0.164	-0.016	-0.308
201303	0.296	0.126	-0.022	0.180	0.173	-0.011	0.079	0.065	0.217	0.047	-0.101	0.101	0.094	-0.090	-0.014	0.020	-0.255
201403	0.167	0.116	0.031	0.179	0.178	-0.078	0.080	0.273	0.087	0.036	-0.049	0.099	0.098	-0.158	0.193	0.012	-0.197
201503	0.592	0.651	0.224	0.520	0.274	0.331	0.083	-0.041	0.509	0.568	0.141	0.437	0.191	0.248	-0.124	0.114	-0.278
201603	0.030	-0.232	-0.229	0.036	-0.121	-0.318	0.080	0.030	-0.050	-0.312	-0.309	-0.044	-0.201	-0.398	-0.050	-0.009	-0.307
201703	0.366	0.100	0.420	0.248	0.227	0.412	0.075	0.252	0.291	0.025	0.345	0.173	0.152	0.337	0.177	-0.001	0.109
201803	0.232	0.039	-0.110	0.183	0.184	-0.160	0.070	0.031	0.162	-0.031	-0.180	0.113	0.114	-0.230	-0.039	-0.015	-0.343
201903	-0.009	0.420	-0.011	0.242	0.285	0.250	0.076	0.114	-0.085	0.344	-0.087	0.166	0.209	0.174	0.038	-0.126	0.003
202003	-1.623	-0.718	-0.865	-0.029	-0.255	-0.488	0.050	0.139	-1.673	-0.768	-0.915	-0.079	-0.305	-0.538	0.089	-0.811	0.149
202103	0.999	0.610	0.469	0.302	0.568	0.616	0.036	0.216	0.963	0.574	0.433	0.266	0.532	0.580	0.180	0.198	-0.108
202203	-0.020	0.087	0.330	0.000	0.106	0.304	0.061	0.042	-0.081	0.026	0.269	-0.061	0.045	0.243	-0.019	-0.004	0.327
202303	0.133	0.120	0.360	-0.012	0.137	0.059	0.073	0.183	0.060	0.047	0.287	-0.085	0.064	-0.014	0.110	0.143	0.150

Next is the final table that consists of all 6 portfolio returns, risk-free return rates, Nifty returns, and each portfolio excess of market returns are calculated.

The above is the Fama-French three factor model equation. And in the final table, we have all of these factors listed for all 23 years.

Excess of market return here is nothing but the expected return minus the risk-free rate. Therefore, from the final table, we consider each of the portfolio returns as the dependent variable and market risk premium, SMB, and LMH as the independent variables to build regression models for each of these 6 portfolios.

Summary stats for all 6 portfolios:

Fama-French	P1							
SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.875615026							
R Square	0.766701674							
Adjusted R Square	0.731706925							
Standard Error	0.279201812							
Observations	24							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regression	3	5.123671167	1.70789	21.90904913	1.57E-06			
Residual	20	1.559073038	0.077954					
Total	23	6.682744205						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Upper 95.0%*
Intercept	0.071900095	0.060250887	1.193345	0.246698561	-0.053781	0.197581	-0.053781	0.197581242
NIFTY_R - Rf	-0.118420496	0.210807532	-0.561747	0.580529688	-0.558157	0.321316	-0.558157	0.321316309
SMB	1.832220112	0.234051637	7.828273	1.62725E-07	1.343997	2.320443	1.343997	2.320443272
LMH	-0.96253168	0.189741313	-5.072863	5.81444E-05	-1.358325	-0.566738	-1.358325	-0.566738237

Fama-French	P2							
SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.538989812							
R Square	0.290510018							
Adjusted R Square	0.18408652							
Standard Error	0.454862871							
Observations	24							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regression	3	1.694360494	0.564787	2.72975447	0.071029			
Residual	20	4.138004626	0.2069					
Total	23	5.832365119						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Upper 95.0%*
Intercept	0.136619188	0.098157999	1.391829	0.179260655	-0.068135	0.341373	-0.068135	0.341373186
NIFTY_R - Rf	-0.195903256	0.343438025	-0.570418	0.574747379	-0.912302	0.520496	-0.912302	0.520495911
SMB	0.627086712	0.381306263	1.644575	0.115684764	-0.168304	1.422478	-0.168304	1.422477639
LMH	-0.812522407	0.309117902	-2.628519	0.016100663	-1.457331	-0.167714	-1.457331	-0.167713763

Fama-french	P3							
SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.659592697							
R Square	0.435062526							
Adjusted R Square	0.350321905							
Standard Error	0.332971612							
Observations	24							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regression	3	1.707637586	0.569213	5.13404929	0.008536			
Residual	20	2.217401885	0.11087					
Total	23	3.925039471						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Upper 95.0%*
Intercept	0.12464279	0.071854243	1.734662	0.098187243	-0.025243	0.274528	-0.025243	0.274528114
NIFTY_R - Rf	-0.079580576	0.251405688	-0.316542	0.754870967	-0.604004	0.444842	-0.604004	0.444842499
SMB	0.963684479	0.279126236	3.452504	0.00251701	0.381437	1.545932	0.381437	1.545931605
LMH	-0.032349933	0.226282453	-0.142963	0.88775022	-0.504367	0.439667	-0.504367	0.439666992

Fama-french	P4							
SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.727258226							
R Square	0.528904527							
Adjusted R Square	0.458240206							
Standard Error	0.406194673							
Observations	24							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regression	3	3.704817301	1.234939	7.484746466	0.001505			
Residual	20	3.299882249	0.164994					
Total	23	7.00469955						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Upper 95.0%*
Intercept	0.153813776	0.087655553	1.754752	0.094610569	-0.029033	0.33666	-0.029033	0.336660055
NIFTY_R - Rf	-0.130441897	0.306691764	-0.425319	0.675145358	-0.77019	0.509306	-0.77019	0.509305913
SMB	-0.222294143	0.340508278	-0.65283	0.52129988	-0.932582	0.487994	-0.932582	0.487993679
LMH	-1.006476417	0.276043734	-3.646076	0.001606719	-1.582294	-0.430659	-1.582294	-0.430659279

Fama-french	P5							
SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.693317482							
R Square	0.480689131							
Adjusted R Square	0.402792501							
Standard Error	0.350061525							
Observations	24							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regression	3	2.268588083	0.756196	6.170859112	0.003832			
Residual	20	2.450861425	0.122543					
Total	23	4.719449508						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Upper 95.0%*
Intercept	0.078277215	0.075542193	1.036205	0.312473397	-0.079301	0.235855	-0.079301	0.235855469
NIFTY_R - Rf	-0.094180614	0.264309194	-0.356327	0.725326798	-0.64552	0.457159	-0.64552	0.457158704
SMB	-0.000956045	0.293452512	-0.003258	0.997432839	-0.613087	0.611175	-0.613087	0.611175169
LMH	-0.86426944	0.237896498	-3.632964	0.001656462	-1.360513	-0.368026	-1.360513	-0.36802604

Fama-french	P6							
SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0.561002908							
R Square	0.314724263							
Adjusted R Square	0.211932903							
Standard Error	0.321554231							
Observations	24							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regression	3	0.949736926	0.316579	3.061777386	0.051751			
Residual	20	2.067942476	0.103397					
Total	23	3.017679402						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Upper 95.0%*
Intercept	0.101071081	0.069390408	1.456557	0.160759751	-0.043675	0.245817	-0.043675	0.245816935
NIFTY_R - Rf	-0.169281817	0.24278515	-0.697249	0.493672823	-0.675723	0.337159	-0.675723	0.337159131
SMB	0.64624149	0.269555179	2.397437	0.026390871	0.083959	1.208524	0.083959	1.20852374
LMH	0.063341836	0.218523374	0.289863	0.774904898	-0.39249	0.519174	-0.39249	0.519173607

Each of these models have various significant values, but the main objective of our model is to check how different companies with different size and value have performed. And this could be seen in the co-efficient values seen the each of the models.

To conclude we can say, that in all the regression models, the small companies that are less in terms of size have performed better than the ones with more market cap and book values.

CONCLUSION:

The results of the research on the stocks of the Indian banking industry and the resultant impact of fintech show that the financial framework in India has become stronger and worked on because of quick innovation & tech upgrades. This shows that the financial system in India has worked in contrast with prior periods. The essential factors that have been influencing the development of the financial area are the focus on bringing down NPAs, monetary steadiness, and innovation & tech upgrades. Through the execution of the Pradhan Mantri Jan Dhan Yojana, monetary incorporation to banking administrations have been made accessible to people who were recently avoided. This industry has had expanded development and steadiness because of upgraded administration of the financial system, which has been achieved by further developed changes and drives.

There are considerable risks and obstacles related to the quick developments in the fintech business. These risks should be constrained by fostering a strong administrative structure and management.

The findings of the review demonstrate that the banking sector in India is ready for a tremendous future because of the utilization of fintech. To work on the data security and development of the financial sector, the activities and changes that have been executed by the public authority have been fairly important. From the models, we could see that banks with small market capitalization have always been on the upper side in terms of returns in the long term when compared to companies with better value.

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