

Altman Z Score with reference to Public Sector Banks in India

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ABSTRACT

The study aims to verify the validity of the Z" Score model and to identify a trend in the Z" Score of the Top 5 Public Sector Banks in India according to their Market Capitalization. For this, Altman Z score for a period of five years from 2012-17 has been calculated using ratio analysis. It has been found that the Z" Score model is a reliable predictor of current position of Top 5 Public Sectors Banks in India.

Keywords: Altman Z" score, Bankruptcy, Market Capitalization, Ratio Analysis

Introduction

The **Z-score formula for predicting bankruptcy** was published in 1968 by Edward I. Altman, who was, at the time, an Assistant Professor of Finance at New York University. The formula may be used to predict the probability that a firm will go into bankruptcy within two years. Z-scores are used to predict corporate defaults and an easy-to-calculate control measure for the financial distress status of companies in academic studies. The Z-score uses multiple corporate income and balance sheet values to measure the financial health of a company. The Z-score is a linear combination of four or five common business ratios, weighted by coefficients. The coefficients were estimated by identifying a set of firms which had declared bankruptcy and then collecting a matched sample of firms which had survived, with matching by industry and approximate size (assets). Altman applied the statistical method of discriminant analysis to a dataset of publicly held manufacturers. The estimation was originally based on data from publicly held manufacturers, but has since been re-estimated based on other datasets for private manufacturing, non-manufacturing and service companies. The original data sample consisted of 66 firms, half of which had filed for bankruptcy. All businesses in the database were manufacturers, and small firms with assets of < \$1 million were eliminated.

The original Z-score formula was as follows:

$$Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

X_1 = working capital / total assets.

X_2 = retained earnings / total assets.

X_3 = earnings before interest and taxes / total assets.

X_4 = book value equity / total liability

Altman found that the ratio profile for the bankrupt group fell at -0.25 avg, and for the non-bankrupt group at +4.48 avg.

In its initial test, the Altman Z-Score was found to be 72% accurate in predicting bankruptcy two years before the event, with a Type II error (false negatives) of 6% (Altman, 1968). In a series of subsequent tests covering three periods over the next 31 years (up until 1999), the model was found to be approximately 80%–90% accurate in predicting bankruptcy one year before the event, with a Type II error (classifying the firm as bankrupt when it does not go bankrupt) of approximately 15%–20% (Altman, 2000).

From about 1985 onwards, the Z-scores gained wide acceptance by auditors, management accountants, courts, and database systems used for loan evaluation (Eidleman). The formula's approach has been used in a variety of contexts and countries, although it was designed originally for publicly held manufacturing companies with assets of more than \$1 million. Later variations by Altman were designed to be applicable to privately held companies (the Altman Z'-Score) and non-manufacturing companies (the Altman Z"-Score). Neither the Altman models nor other balance sheet-based models are recommended for use with financial companies. This is because of the opacity of financial companies' balance sheets and their frequent use of off-balance sheet items. There are market-based formulas used to predict the default of financial firms (such as the Merton Model), but these have limited predictive value because they rely on market data (fluctuations of share and options prices to imply fluctuations in asset values) to predict a market event (default, i.e., the decline in asset values below the value of a firm's liabilities).

Original Z-Score component Definitions

NOTE: The symbol " / " means the same thing as " ÷ ", representing division.

X_1 = Working Capital / Total Assets

X_2 = Retained Earnings / Total Assets

X_3 = Earnings before Interest and Taxes / Total Assets

X_4 = Book value of Equity / Total Liabilities

Z score bankruptcy model:

$$Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

Zones of discrimination:

$Z > 2.99$ – “Safe” Zone

$1.81 < Z < 2.99$ – “Gray” Zone

$Z < 1.81$ – “Distress” Zone

Literature review

The emergence of the financial crisis in 2008, brought with it a tide of corporate failures rooted in the American subprime mortgage crisis. A January 2011 report put forward by the U.S. Financial Crisis Inquiry Commission concluded that "*the crisis was avoidable and was caused by: Widespread failures in financial regulation, including the Federal Reserve's failure to stem the tide of toxic mortgages; Dramatic breakdowns in corporate governance including too many financial firms acting recklessly and taking on too much risk; An explosive mix of excessive borrowing and risk by households and Wall Street that put the financial system on a collision course with crisis; Key policy makers ill prepared for the crisis, lacking a full understanding of the financial system they oversaw; and systemic breaches in accountability and ethics at all levels.*" (Tucker, 2011, p.1) Deterring away from this domestic view, monetarist and chairman of the Federal Reserve took a more macroeconomic view coining the famous ‘global savings glut’ theory. In a statement made at a lecture in Virginia 2005, he spoke about the correlation between excessive savings made in developing countries, particularly China, and the US current account deficit along with low long-term interest rates globally (Bernanke, 2005). Nevertheless, numerous economists are assigning the causations to be rooted “in high interest rates, recession-squeezed profits and heavy debt burdens. Furthermore, industry-specific characteristics, such as government regulation and the nature of operations, can contribute to a firm’s financial distress” (Charitou, Neophytou & Charalambous, 2000, p.3). Failure has been also significantly linked to the “prevailing tight monetary policy; the investor’s expectations’ about economic conditions; and the state of the economy” (Dambolena & Khouri, 1980, p.1019). The identification of early warning signals in failing firms can deter managers from making poor investment decisions and implementing preventative actions to offset possible future catastrophes. Telmoudi et al (2011) stated: “*Prediction may avoid high social costs affecting stakeholders (i.e. investors, managers, governments, etc. and limit its undesirable impact on a country’s economic performance. Firms are always endeavouring to find a countermeasure for undesirable situations where bankruptcy plays an increasingly important role because it has a significant impact on the profitability of business units. It serves to provide owners with a timely early warning system.*” In 1968 Edward Altman advanced upon Beaver’s work by incorporating four more variables into the model to give an overall more precise prediction of manufacturing corporate failure. Altman’s multi-discriminant analysis (MDA) model differed to Beaver’s model in relation to the ratios chosen of highest prediction. Altman classifies the companies into two mutually exclusive groups; bankrupt and non-bankrupt (Altman, 1968, p.591). The aforementioned corporate failure prediction models are both beneficial and limited, however, “no technique is consistently superior to other techniques” (Collins & Green, 1982; Tam, 1991; Taffler, 1995). A major limitation to research made in relation to predicting corporate failures is the focus exclusive to statistical models (Appiah, 2011). Altman’s discriminant analysis became a dominant model used in corporate failure prediction literature due to its simplicity and accuracy. His multi-discriminant approach allowed him to develop the equation into a combination of five ratios consisting of liquidity, profitability, financial leverage, solvency, and sales activity (sales to total assets). This linear equation distinguished between failing and non-failing companies. The result of the combination of ratios gives rise to a discriminant score otherwise known as the ‘Z score’. Altman applied 22 ratios to 66 manufacturing firms (with an equal number of failures and non-failures). From the 22 ratios he utilized, the best five predictors were chosen. These were then presented in the linear equation as shown below.

The original Altman model took the following form:

$$Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

Where:

X₁=Working capital/Total assets;

X₂=Retained earnings / Total assets;

X₃=Earnings before interest and taxes/Total assets;

X₄=Book value of equity/ Total liabilities;

Boundary values:

Z > 2.99 Safe Zone: Considered financially healthy

1.81 < Z < 2.99 Grey Zone: Could go either way

Z < 1.81 Distress Zone: Risk that company will go bankrupt within two years

Source: (Altman, 1968, p.594)

Research methodology

Objectives of the Study

The primary reason for this investigation is not just verify the validity of the Z" Score model but to predict possible 'future' failures. To identify a trend in the Z" Score of the Top 5 Public Sector Banks in India according to their Market Capitalization.

The Z score model is a form of discriminant analysis. This is a multivariate technique utilized in the social and physical sciences for many decades. The first application of discriminant analysis to the problem of failure prediction in business was performed in 1966 (Beaver, 1966) and concentrated on the manufacturing sector of the economy (Altman & Loris, 1976). Since then, the model has evolved to pertain to the contemporary business environment. Along with the model being a valid indicator of corporate failure, it is imperative that it has adapted to suit a wider range of firms. This flexibility to modification is the main reason it is one of the most widely used corporate predictors today and is as relevant today as it was in the late sixties. In this case the evolution of the Z Score that will be used in this study is Altman's Z" Score.

Methodology of the Study

The present study estimates Z score for Top 5 Indian Public Sector Banks for a period of five years from 2012-17. The study applies Altman Z score model to Indian banking industry. This model is a hybrid model which calculates Z score for the corporate house on the basis of four variables viz., **Working Capital, Retained Earnings, Earnings before Interest and Tax, Book Value of Equity, Total Liability and Total Assets**. The data used in the study is a secondary data collected from Economics Times, Reserve Bank of India and annual Financial Reports of Banks. The calculation of Z score has been done with the help of following equation:

$$Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

Where,

X₁ is the ratio of Working Capital to Total assets. It estimates company's ability to cover financial obligations.

X₂ is the proportion of Retained Earnings to Total Asset. This ratio measures cumulative profitability over time as a proportion of total assets.

X₃ is the ratio of Operating profit to Total Assets. It depicts the managerial efficiency in terms of profitability of the business. Earnings before interest and tax (EBIT) have been used as a proxy to operating profit.

X₄ is the ratio of Book value of equity to Total Liabilities of the corporate house. It expresses the financial leverage i.e. the proportion of equity. A high value of ratio depicts firm's aggressiveness in financing its growth with debt. If the cost of the debt financing outweighs the return that the company generates on the debt, it could even lead to the possible bankruptcy.

Altman model suggests that if a financial institute secures more than 2.6 score, it should be placed in safe zone. But if it is unable to secure even 1.1 Z score it should be assumed in distress zone and it is more prone to bankruptcy. If the value of Z score is in between 1.1 and 2.6, it should be treated in grey zone. The present study computes Z score for Top 5 Private Sector Banks in India. The study ranks these banks on the basis of liquidity, profitability and capital adequacy ratio so as to analyze whether the hybrid model has an edge over the others or it produces the same results.

Research Design

Method of Data Collection

The data used in the study is a secondary data collected from Economics Times, Reserve Bank of India and annual Financial Reports of Banks.

Sample Design

The data used in the Research is the data collected from the Bank Employees by the Journalists, Statisticians, analysts etc.

Limitations

- Official statistics may **reflect the biases of those in power** – limiting what you can find out.
- Official statistics – **the way things are measured may change over time, making historical comparisons difficult** (As with crime statistics, the definition of crime keeps changing.)
- **Documents may lack authenticity**– parts of the document might be missing because of age, and we might not even be to verify who actually wrote the document, meaning we cannot check whether its biased or not.
- **Representativeness – documents may not be representative of the wider population** – especially a problem with older documents. Many documents do not survive because they are not stored, and others deteriorate with age and become unusable. Other documents are deliberately withheld from researchers and the public gaze, and therefore do not become available.

Data analysis and interpretation

- **STATE BANK OF INDIA**

STATE BANK OF INDIA 2012-20016						
		CA	CL	TA	X1	
X1: Working Capital /Total Assets	2012	54175	86885	92851	-0.35228	
	2013	102053	96495	103166	0.053874	
	2014	90019	84270	96652	0.059481	
	2015	70385	66077	73290	0.05878	
	2016	6810.8	956.7	48263.6	0.121294	
X2: Retained Earnings/ Total Assets	2012	9258	92851		0.099708	
	2013	3389	101321		0.033448	
	2014	2883	96652		0.029829	
	2015	1971	73290		0.026893	
	2016	399.6	48263.6		0.00828	
X3: EBIT/Total Assets	2012	2774	380	1,249	3,643	0.03923
	2013	1972	328	84	1728	0.01705
	2014	1761	393	195	1563	0.01617
	2015	1240	328	171	1083	0.01477
	2016	977	291.8	21.8	1247	0.02583
X4: Book Value Equity /Total liabilities	2012	BVE(TA-TL)	TL		X4	
	2012	3764	89087		0.042251	
	2013	1823	99,498		0.018322	
	2014	4065	92587		0.043905	
	2015	2692	70598		0.038131	
	2016	5591.4	42672.2		0.131031	

BRE Constant- 3.26		
$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$		Addition 3.25
Z''YE 2012	-1.67791813	1.57208187
Z''YE 2013	0.596302337	3.846302337
Z''YE 2014	0.642211501	3.892211501
Z''YE 2015	0.612608571	3.862608571
Z''YE 2016	1.133891456	4.383891456

INTERPRETATION

A score below 1.8 means the company is probably headed for bankruptcy, while companies with scores above 3 are not likely to go bankrupt. Investors can use Altman Z-scores to determine whether they should buy or sell a particular stock if they're concerned about the underlying company's financial strength. Investors may consider purchasing a stock if its Altman Z-Score value is closer to 3 and selling or shorting a stock if the value is closer to 1.8.

Average Z Score= 3.508. Here, in case of SBI, the Z Score is 3.058, i.e., above 3, which means, the Bank is not likely to go towards Bankruptcy.

• BANK OF BARODA

BANK OF BARODA 2012-2016					
		CA	CL	TA	X1
X1: Working Capital /Total Assets	2012	49,297	19,932	538,978	0.0545
	2013	47,485	18,862	332,961	0.086
	2014	49,688	44,611	301,256	0.0169
	2015	45,700	46,331	267,431	-0.0024
	2016	88,683	61,032	324,200	0.0853
		RE	TA		X2
X2: Retained Earnings/Total	2012	21,744	538,978		0.0403438
	2013	21,149	332,961		0.06351872
	2014	20,079	301,256		0.06664982
	2015	19,622	267,431		0.07337312
	2016	17,300	324,200		0.05336164
		OR	OE	Non-operating income	EBIT
X3: EBIT /Total Assets	2012	590	1,863	109	-1,163
	2013	613	1921	73	-1235
	2014	1,249	2005	71	-685
	2015	907	2,049	77	-1065
	2016	1403	1687	62	-222
		BE (TA-TL)	TL		X4
X4: Book Value Equity /Total liabilities	2012	22,874	516,104		0.04432002
	2013	22,002	310,959		0.07075435
	2014	21,747	279,509		0.0778058
	2015	19,798	247,633		0.07994727

	2016	97,219	226,981		0.42831286
BRE Constant- 3.26					
Z" = 6.56X₁ + 3.26X₂ + 6.72X₃ + 1.05x₄			Addition 3.25		
Z"YE 2012			0.520948689		
Z"YE 2013			0.820345294		
Z"YE 2014			0.39423437		
Z"YE 2015			0.280897174		
Z"YE 2016			1.178578682		

INTERPRETATION

A score below 1.8 means the company is probably headed for bankruptcy, while companies with scores above 3 are not likely to go bankrupt. Investors can use Altman Z-scores to determine whether they should buy or sell a particular stock if they're concerned about the underlying company's financial strength. Investors may consider purchasing a stock if its Altman Z-Score value is closer to 3 and selling or shorting a stock if the value is closer to 1.8.

Average Z Score= 3.886. Here, in case of Bank of Baroda, the Z Score is 3.886, i.e., above 3, which means, the Bank is not likely to go towards Bankruptcy.

- **PUNJAB NATIONAL BANK**

PUNJAB NATIONAL BANK 2012-2016					
		CA	CL	TA	X1
X ₁ : Working Capital/Total Assets	2012	2,016,010	204795	3485181	0.51969037
	2013	2027953	184668	3424403	0.53827923
	2014	1928860	207880	3213886	0.53548259
	2015	1923319	190970	3098477	0.55909694
	2016	1991135	167893	3543974	0.51446258
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X ₂ : Retained Earnings/Total	RE	TA		X2	
	2012	1723	3485181		0.00049438
	2013	276	3424403		8.06E-05
	2014	1713	3213886		0.000533
	2015	1036	3098477		0.00033436
	2016	14,870	3543974		0.00419585
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X ₃ : EBIT /Total Assets	OR	OE	Non-operating income	EBIT	X3
	2012	47685	26,588	0	21,097
	2013	43377	25987	0	17390
	2014	46,277	26010	0	20,267
	2015	59339	28907	0	30432
	2016	43043	28726	0	14317
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X ₄ : Book Value Equity/Total liabilities	BE (TA-TL)	TL		X4	
	2012	138234	3,346,947		0.04130152
	2013	125,855	3,298,548		0.03815467
	2014	104,742	3,109,144		0.03368837
	2015	100,659	2,997,818		0.03357742
	2016	98,247	3445727		0.02851271

BRE Constant- 3.26		
$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$		Addition 3.25
Z''YE 2012	3.494825565	6.74482557
Z''YE 2011	3.605562769	6.85556277
Z''YE 2010	3.592252973	6.84225297
Z''YE 2009	3.770023354	7.02002335
Z''YE 2008	3.445638896	6.6956389

INTERPRETATION

A score below 1.8 means the company is probably headed for bankruptcy, while companies with scores above 3 are not likely to go bankrupt. Investors can use Altman Z-scores to determine whether they should buy or sell a particular stock if they're concerned about the underlying company's financial strength. Investors may consider purchasing a stock if its Altman Z-Score value is closer to 3 and selling or shorting a stock if the value is closer to 1.8.

Average Z Score= 6.82. Here, in case of Punjab National Bank, the Z Score is 6.82, i.e., above 3, which means, the Bank is not likely to go towards Bankruptcy.

• CENTRAL BANK OF INDIA

CENTRAL BANK OF INDIA 2012-2016					
		CA	CL	TA	X1
X1: Working Capital /Total Assets	2012	80204	45582	1723459	0.020089
	2013	117985	44004	1869074	0.039582
	2014	69253	48918	1620164	0.012551
	2015	673149	1303710	1,538,623	-0.40982
	2016	1349904	30117	2,250,665	0.586399
		RE	TA		X2
X2: Retained Earnings/Total	2012	6114	1723459		0.003548
	2013	5434	1869074		0.002907
	2014	5144	1620164		0.003175
	2015	4420	1538623		0.002873
	2016	4080	2250665		0.001813
		OR	OE	Non-operating income	EBIT
X3: EBIT /Total Assets	2012	2553	4,828		2,275
	2013	2553	5102		-558
	2014	2553	4804		2,460
	2015	2553	2853		2,049
	2016	2553	1,941		182
		BE (TA-TL)	TL		X4
X4: Book Value Equity/Total liabilities	2012	34,752	1,688,707		0.020579
	2013	33,990	1,835,084		0.018522
	2014	33,685	1,586,479		0.021233
	2015	22,764	1,515,859		0.015017

	2016	20,942	2,229,723		0.009392
BRE Constant- 3.25					
Z" = 6.56X, + 3.26X2 + 6.72X3 + 1.05x4					Addition 3.25
Z" YE 2012		0.156084062		3.4060841	
Z"YE 2013		0.286575594		3.5365756	
Z"YE 2014		0.10477709		3.3547771	
Z"YE 2015		-2.67224596		0.577754	
Z"YE 2016		3.863090325		7.1130903	

INTERPRETATION

A score below 1.8 means the company is probably headed for bankruptcy, while companies with scores above 3 are not likely to go bankrupt. Investors can use Altman Z-scores to determine whether they should buy or sell a particular stock if they're concerned about the underlying company's financial strength. Investors may consider purchasing a stock if its Altman Z-Score value is closer to 3 and selling or shorting a stock if the value is closer to 1.8. Average Z Score= 3.49. Here, in case of Central Bank of India, the Z Score is 3.49, i.e., above 3, which means, the Bank is not likely to go towards Bankruptcy.

- **IDBI BANK**

IDBI BANK 2012-2016					
		CA	CL	TA	X,
X,: Working Capital /Total Assets	2012	131.086	65.939	2904.402	0.02243
	2013	101.016	63.058	1979.807	0.019173
	2014	82.497	69.299	2,365.43	0.00558
	2015	73.558	68.705	1,586.50	0.003059
	2016	60.883	55.24	290.234	0.019443
X2: Retained Earnings /Total Assets	2012	-40.892	2904.402		-0.01408
	2013	-56.2	1979.807		-0.02839
	2014	18.579	2365.431		0.007854
	2015	16.612	1586.503		0.010471
	2016	-6.172	290.234		-0.02127
X3: EBIT /Total Assets	2012	79.634	-66.743	3.11	16.001 0.005509
	2013	45.199	-45.262	0	-0.06303 0.00
	2014	94.23	-64.156	0	30.078 0.012716
	2015	65.183	-27.094	0	38.089 0.024008
	2016	21.284	-8.723	0	12.561 0.043279
X4: Book Value Equity /Total liabilities	BE (TA-TL)	TL			X4
	2012	316.477	2587.925		0.12229
	2013	268.308	1,711.50		0.156768
	2014	367.565	1997.866		0.183979
	2015	384.744	1201.759		0.320151
	2016	234.897	55.337		4.244845

BRE Constant- 3.25		
Z" = 6.56X, + 3.26X2 + 6.72X3 + 1.05x4		Addition 3.25
Z"YE 2012	0.266671417	3.516671417
Z"YE 2013	0.197624157	3.447624157
Z"YE 2014	0.340833957	3.590833957
Z"YE 2015	0.551694481	3.801694481
Z"YE 2016	4.80614128	8.05614128

INTERPRETATION

A score below 1.8 means the company is probably headed for bankruptcy, while companies with scores above 3 are not likely to go bankrupt. Investors can use Altman Z-scores to determine whether they should buy or sell a particular stock if they're concerned about the underlying company's financial strength. Investors may consider purchasing a stock if its Altman Z-Score value is closer to 3 and selling or shorting a stock if the value is closer to 1.8.

Average Z Score= 4.478. Here, in case of IDBI Bank, the Z Score is 4.478, i.e., above 3, which means, the Bank is not likely to go towards Bankruptcy.

Conclusion

The empirical results suggest the Z" Score model is a reliable predictor of current position of Top 5 Public Sectors Banks in India. The Z" Scores of the control banks (SBI, PNB, BoB and Central Bank of India) are currently relatively low compared to IDBI Bank with a high Z" Score. These low Z" Scores could possibly mean future failures. The Z" Score has predicted the banking failures successfully but a number of factors could suggest that the analysis was somewhat biased. This study was to verify the Z" Score as a valid predictor and it required the data set of all Public and Private Sector Banks. The Z" Score is only valid five years prior to bankruptcy, perhaps a model with an increase in predictive capabilities of up to ten years or more would be beneficial to stakeholders.

BIBLIOGRAPHY

1. <http://www.moneycontrol.com/india/stockpricequote/banks-private-sector/hdfcbank/HDF01>
2. https://en.wikipedia.org/wiki/Altman_Z-score
3. https://www.google.co.in/search?ei=FNiYWqHRNoK80gT47IyYBQ&q=altman+Z+score+of+ICICI+Bank+&oq=altman+Z+score+of+ICICI+Bank+&gs_l=psy-ab.3..33i160k1.4199.9481.0.9865.24.18.0.0.0.372.2387.2-8j1.9.0....0...1c.1.64.psy-ab..15.9.2379..0j35i39k1j0i20i263k1j0i22i30k1j33i21k1.0.lvirxblihp4
4. <https://www.trendrr.net/1148/top-ten-best-largest-private-sector-banks-in-india-famous/>
5. https://www.google.co.in/search?ei=wD0xWsfzO4HsvgT1nqGQBA&q=idbi+bank+&oq=idbi+bank+&gs_l=psy-ab.3..0j0i67k1j0j0i131k1j0l6.1512.3108.0.3374.10.9.0.1.1.0.205.1072.0j4j2.6.0....0...1c.1.64.psy-ab.3.7.1079..35i39k1j0i131i67k1j0i131i20i263k1.0.M3XpyL9tMPs
6. https://en.wikipedia.org/wiki/Punjab_National_Bank
7. https://www.google.co.in/search?ei=hzKxWq64LsXovASLo6GgDA&q=bank+of+baroda&oq=bank+of+&gs_l=psy-ab.3.0.0i131i67k1l4j0i67k1l6.1126.2601.0.3934.8.7.0.1.1.0.206.670.0j3j1.4.0....0...1c.1.64.psy-ab.3.5.697..0j0i10i67k1.0.AXGtOt2VW-Q
8. https://en.wikipedia.org/wiki/Bank_of_Baroda
9. <https://www.google.co.in/search?q=sbi&oq=sbi+&aqs=chrome..69i57j0l5.1132j0j8&sourceid=chrome&ie=UTF-8>
10. https://en.wikipedia.org/wiki/State_Bank_of_India
11. http://www.moneycontrol.com/promo/mc_interstitial_dfp.php?size=940x400
12. <https://www.moneycontrol.com/>
13. <http://www.moneycontrol.com/india/stockpricequote/miscellaneous/sbietfnifty50/SBI27>
14. <http://www.moneycontrol.com/india/stockpricequote/finance-investments/idbimftaxinit96/IDB02>
15. <http://www.moneycontrol.com/india/stockpricequote/finance-housing/pnbhousingfinance/PHF>
16. <http://www.moneycontrol.com/india/stockpricequote/banks-public-sector/bankofbaroda/BOB>
17. <http://www.moneycontrol.com/india/stockpricequote/banks-public-sector/centralbankindia/CBO01>