Introduction
The backbone of any organization is financially sound. It means how they are procuring the funds and utilizing the same funds in an effective utilization. Therefore continuous monitoring is required to take corrective measures to meet the short term and long term requirements adequately. Any financial statements are the source of information to the investors based on which the financial planning and decision making would take places. The financial statements consist of profit & loss account and balance sheet. The Profit & loss Account provides data about operating activities of the business concern and it projects the profit & loss of the business. Where as balance sheet gives the information about the assets & liabilities of the business. Through this source only we would assess the company’s strengths & weakness. Due to this only the pivotal decisions would take places through financial ratios. A single ratio or few ratios we could not take the financial decisions. It doesn’t serve our purpose. Therefore Altman Z score consisting of different financial ratios in one equation i.e

\[ Z = 1.2x1 + 1.4x2 + 3.3x3 + 0.6x4 + 0.99x5 \]

\[ X1 = \frac{\text{Working Capital}}{\text{Total assets}} \]
\[ X2 = \frac{\text{Retained Earnings}}{\text{Total assets}} \]
\[ X3 = \frac{\text{Earnings before interest and taxes}}{\text{Total assets}} \]
\[ X4 = \frac{\text{Market value of share}}{\text{Total assets}} \]
\[ X5 = \frac{\text{Sales}}{\text{Total assets}} \]

Variable used in Z score analysis:
The following variables (accounting ratio) has taken as variables to combine them into single index i.e., Altman Z score analysis which measure the efficiency in envisaging the bankruptcy.
X1:-It measures the relationship between working capital to total assets(WC/TA).This ratio measures of the net liquid assets of a business concern.
X2:-It measures the relationship between retained earnings/total assets. It indicates profitability to the firm size.
X3:-It is proportion of earnings before interest and taxes total assets(EBIT/TA).It says that how much firm has earned before interest and taxes out of total assets.
X4:-It measures the relationship of market value of equity to book value of total liabilities. It gives the market’s view of the company relative to the total liabilities. It measures how much
Financial Soundness Of Selected Indian Petroleum Companies Using Altman Z – Score Model

assets of an firm can decline in value before the liabilities exceed the assets and the concern becomes insolvent.

X5: It shows the relationship of sales to total assets (SA/TA). The assets turnover ratio is a standard financial measure for illustrating the sales generating capacity of the assets [3].

<table>
<thead>
<tr>
<th>Situation</th>
<th>Z score Value</th>
<th>Zones</th>
<th>Verdict</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Below 1.8</td>
<td>Bankruptcy Zone</td>
<td>Failure is</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>certain</td>
</tr>
<tr>
<td>II</td>
<td>1.8 – 2.99</td>
<td>Healthy Zone</td>
<td>Uncertain</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>to predict</td>
</tr>
<tr>
<td>III</td>
<td>Above 2.99</td>
<td>Too Healthy zone</td>
<td>Not to fall.</td>
</tr>
</tbody>
</table>

Objectives of the study:
1. This research paper study attempts to assess the financial performance of selected petroleum companies namely Indian oil corporation, Bharat Petroleum corporation limited, Hindustan petroleum by using the Altman Z score analysis
2. To know the contribution of individual ratio on Z index (Relative difference)
The study is completely descriptive and analytical. The Z index for a period of six years (2010-2011 to 2015-16) has been calculated for 3 petroleum companies namely Bharat petroleum, Indian Oil Corporation, Hindustan petroleum, were included in the study (see appendix). Data has been gathered for 6 years (2010-11 to 2015-2016) from secondary sources such as annual reports of companies [4].

Calculation of x1,x2,x3,x4,x5,& z values of Bharat petroleum corporation limited

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>Z values</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2011</td>
<td>0.75135</td>
<td>0.12234</td>
<td>0.10649</td>
<td>0.01542</td>
<td>6.83722</td>
<td>8.20241</td>
</tr>
<tr>
<td>2011-2012</td>
<td>0.34223</td>
<td>0.07623</td>
<td>0.14002</td>
<td>0.01233</td>
<td>5.12561</td>
<td>6.06121</td>
</tr>
<tr>
<td>2012-2013</td>
<td>0.32908</td>
<td>0.09152</td>
<td>0.18269</td>
<td>0.00929</td>
<td>5.39111</td>
<td>6.46866</td>
</tr>
<tr>
<td>2013-2014</td>
<td>0.22625</td>
<td>0.10364</td>
<td>0.22557</td>
<td>0.0067</td>
<td>5.98423</td>
<td>7.08937</td>
</tr>
<tr>
<td>2014-2015</td>
<td>0.02451</td>
<td>0.14903</td>
<td>0.26005</td>
<td>0.0137</td>
<td>6.12222</td>
<td>7.16542</td>
</tr>
<tr>
<td>2015-2016</td>
<td>0.02707</td>
<td>0.14506</td>
<td>0.26536</td>
<td>0.01759</td>
<td>4.4353</td>
<td>5.51274</td>
</tr>
</tbody>
</table>

Calculation of Regressor, & z values of Bharat petroleum corporation limited.

Interpretation:

X1= working capital + Total Assets:- It has been observed that the working capital to total assets of Bharat Petroleum Corporation Limited had drastic changes since 2010-11; 0.751355, for the next subsequent years are 0.34223, 0.32908, 0.22625, 0.02451, 0.02707.

It means that in the year 2010-2011 the company has following conservative current policy for the next years it has switch over to aggressive current policy.

X2=Retained Earnings + Total Assets:- It has been observed that retained earnings to total assets of Bharat Petroleum Corporation Limited is in the year 2010-11; 0.122335 for the next 5 years are 0.076231; 0.091519; 0.1036 : 0.149029; 0.145065
It means that from 0.122 falls down to 0.076 in the year 2011-12 relatively it has increases to 0.091 in the year 2012-13 for the next years consistently it has increasing i.e 0.10364; 0.14903; slightly it has falls down last year i.e 2015-16 0.14506.

There may be more chances are there to borrow the amount from outside if the retained earnings to total assets are decreases.

X3=Earnings Before Interest & Taxes + Total Assets :- It has been found that EBIT to total assets of Bharat Petroleum Corporation Limited has been increasing since 2010-11; 0.106492 for the next years are 0.14002, 0.18269, 0.22557, 0.26005, 0.26536
It is quite apparent that the firm’s profits has been increasing since 2010-11

X4=Market Value Of Equity + Book Value of Total Liabilities:- It has been found that the Market Value Of Equity + Total Assets of Bharat Petroleum Corporation Limited is gradually decreasing since 2010-11, 0.01542 and the next year ratios are as follows 0.01233, 0.00929, 0.0067, 0.0137, 0.01759. After 2011-12 it has continuously falls down again it gets recovery in the year 2014-15 0.0137 2015-16 0.01759 respectively.
The higher the value it is better s ratio

X5=Sales +Total Assets:- It has found that the sales to total assets of Bharat Petroleum Corporation Limited gradually it is increasing except in the last year 2015-16. The ratios in the
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year 2010-11 us 6.83722 and the next years are as follows 5.12561; 5.39111; 5.98423; 6.12222; 4.4353 decreasing. It is significantly less than the most other variables.

X2=Retained Earnings + Total Assets:- In the above graph it has depicted that X2 contribution on Z score index is significantly better than the other variables.

<table>
<thead>
<tr>
<th>Year</th>
<th>X1=WC/TA</th>
<th>X2=RE/TA</th>
<th>X3=EBIT/TA</th>
<th>X4=MVE/TA</th>
<th>X5=SALES/TA</th>
<th>Z values</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2011</td>
<td>0.75135</td>
<td>0.12234</td>
<td>0.10649</td>
<td>0.01542</td>
<td>6.83722</td>
<td>2.66296</td>
</tr>
<tr>
<td>2011-2012</td>
<td>0.34223</td>
<td>0.07623</td>
<td>0.14002</td>
<td>0.01233</td>
<td>5.12561</td>
<td>2.68995</td>
</tr>
<tr>
<td>2012-2013</td>
<td>-0.657766</td>
<td>0.09152</td>
<td>0.18269</td>
<td>-0.908481</td>
<td>5.39111</td>
<td>2.76738</td>
</tr>
<tr>
<td>2013-2014</td>
<td>0.09152</td>
<td>0.10364</td>
<td>0.22557</td>
<td>-0.896364</td>
<td>5.98423</td>
<td>3.22218</td>
</tr>
<tr>
<td>2014-2015</td>
<td>0.01542</td>
<td>0.14903</td>
<td>0.26005</td>
<td>-0.850971</td>
<td>6.12222</td>
<td>4.4353</td>
</tr>
<tr>
<td>2015-2016</td>
<td>0.12234</td>
<td>0.01233</td>
<td>0.00929</td>
<td>-0.990711</td>
<td>4.4353</td>
<td>3.14629</td>
</tr>
</tbody>
</table>

X1=Working Capital/Total Assets:- In the above graph that the X1 contribution on Z score index is gradually decreasing. It is significantly less than the most other variables.

X2=Retained Earnings + Total Assets:- In the above graph it has depicted that X2 contribution on Z score index is significantly better than the other variables.

X3=EBIT/Total Assets:- In the above graph it has found that X3 contribution of z score index is significantly better that the remaining variables that is X1,X2,X4.

X4=Market Value/Book Value of Total Liabilities:- In the above graph it remains constant for the year 2011-12 to 2014-15 slightly it gets increases after 2014-15.

X5=Sales + Total assets:- sales +Total Assets ratio gets negative in the year 2011-12 for the next years slightly it gets increases. Last year it falls down to negative. It indicates that the production is not up to the mark.

Interpretation:-

X1=Working Capital + Total Assets:- It has been found that the working capital to total assets of Hindustan Petroleum...
Limited is decreasing since 2010-11, in the year 2010-2011 ratio is 0.115008, and the next subsequent years are - 0.008113, -0.066, 0.057098, 0.057794, 0.009929. The company is implementing aggressive current policy.

**X2** = Retained Earnings ÷ Total Assets: - It has been observed that the retained earnings to total assets of Hindustan petroleum Limited are drastically decreasing since 2010-2011 is 0.0163 and the next subsequent years are 0.008, 0.007, 0.014, 0.02, 0.03 respectively.

There are more chances are there if the retained earnings to total assets ratios are decreasing year by year it means that they are borrowing the amount from outside.

**X3** = Earnings Before Interest & Taxes ÷ Total Assets: - It has been found that the EBIT/Total assets ratio of Hindustan Petroleum Limited are quite similar with minute changes.

**X4** = Market Value of the Share ÷ Book Value of total liabilities: - It has been observed that the market value of the share/book value of total liabilities has been decreasing from 2010-11 to 2013-14 again it has increase for the next consecutive years

**X5** = Sales ÷ Total assets: - It has found that the sales to total assets ratio gradually increasing since 2010-2011. In the year 2015-16 it has decreases by 12%. It means that effective utilization of assets for the production purposes.

<table>
<thead>
<tr>
<th>Year</th>
<th>WC÷TA</th>
<th>RE÷TA</th>
<th>EBIT÷TA</th>
<th>MVE÷TA</th>
<th>SALES÷TA</th>
<th>RD X1</th>
<th>RD X2</th>
<th>RD X3</th>
<th>RD X4</th>
<th>RD X5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-11</td>
<td>0.115008</td>
<td>0.0162629</td>
<td>0.053189</td>
<td>0.00873</td>
<td>2.343777</td>
<td>1.645721</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011-12</td>
<td>-0.08354</td>
<td>0.008113</td>
<td>0.047231</td>
<td>0.006195</td>
<td>2.645721</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012-13</td>
<td>-0.066</td>
<td>-1.08354</td>
<td>0.045825</td>
<td>0.005134</td>
<td>2.708769</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Interpretation:-**

The interpretation of X1,X2,X3,X4 are not contributing on Z index value. Its quite apparent from the diagram more or less its contribution is same.

**X5** = Sales ÷ Total Assets: - It has been found that sales to total assets are gradually increasing since 2010-2011 and the next subsequent years are 2.645721, 2.708769, 2.992963, 3.213309 and the last year is i.e., 2015-2016 is 2.80604. It is quite clear that for production maximum utilization Interpretations:-

**X1** = Working Capital ÷ Total Assets: - It has been observed that the X1 ratio of Indian Oil Corporation is decreasing. In the year 2010-2011 the ratio of X1 is 0.138213 and the next subsequent years are 0.005599, 0.018594, 0.018594
Interpretation Of Individual Ratios Of Hindustan Petroleum Corporation Limited By Using The Relative Difference

Calculation of x1, x2, x3, x4, x5 and z values of indian oil corporation limited

Interpretation Of Individual Ratios Of Indian Oil Corporation Limited By Using The Relative Difference

The interpretation of x1, x2, x3, x4 are not contributing on Z index value. Its quite apparent from the diagram more or less its contribution is same.

**X5=Sales ÷ Total Assets:** It has been observed that the X5 ratio’s relative difference of Indian Oil Corporation is contributing much more than the other variables on Z index.

Interpretations:

- **X1, X2, X3 are not contributing on Z index value.**

**Conclusion:**

1. It has concluded that the Bharat Petroleum Corporation Limited relative difference variables are as follows X1 is
gradually decreasing. X2 is slightly less contributing than X1, X3. X3 is slightly more contributing than X2&X4. X4 is constant through the period of study it does not contributed on Z index Value. X5 is relatively more contributing than remaining variables.

2. It has concluded that the relative difference variables X1,X2,X3,X4, are not much contributing on Z index value. It remains constant through the period of study. X5 is contributing on Z index value.

3. It has concluded that the relative difference variable X1,X2,X3,X4 are not much contributing on Z index value it remains constant. X5 is contributing more than the other variables.

The over all conclusion of the study says that all the variables are contributing on Z index value only in Bharat Petroleum Corporation Limited may be due to some internal factors in the company.

References
[2]. Dr.M.Selvam & S.vanitha & M.Babu in their paper predicted the financial health and viability of India cements Ltd., They concluded that the cement company under the study was just on the range of financial collapse.