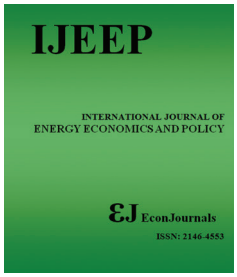

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Financial Performance and Total Resources: Trend and sensitivity Analysis of Indian Oil Exploration and Production Companies

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ABSTRACT

The firms involved in the exploration and production (E&P) of natural gas resources and crude oil play a crucial role in the energy sector and contribute to the economy. Exploration and production refer to discovering, drilling, and extracting natural gas resources and crude oil from beneath the earth's surface. Exploration and production firms provide a base for the downstream companies to make crude oil consumable. The financial performance of the downstream companies depends on the cost efficiency of the E&P firms. The purpose of the study is to determine the relationship between the total resources and measures of financial performance. The study is based on secondary data and financial ratios, index numbers applied to get the financial performance, and variability of financial performance. Correlation is used to get the trend and quick impact of variability on the total assets on the financial measures in the short and long run. The study found that while return on total resources is positively influenced in the long run, profitability based on sales and short-term paying ability is negatively governed by the absolute quantity of expansion of all available resources. Although the long-term association is positive, there is a short-term lag in the positive increase of the total resources on the ROA. Overall, based on their average absolute amount of total resources, relatively, the mutual study of the mean growth rate of all resources and financial indicators of Indian E&P explore negativity.

Keywords: Exploration & Production, Total resources, Profitability, Financial governance, Solvency, Oil and gas, Indian oil firms
JEL Classifications: Q40, Q43, M40, L25

1. INTRODUCTION

The firms involved in the exploration and production (E&P) of crude oil and natural gas resources provide a base for the oil processing and distribution companies. These businesses are essential to the energy industry of India and are responsible for discovering, drilling, and extracting hydrocarbons from beneath the Earth's surface. E&P oil and gas operations are complex and require a combination of technical expertise, regulatory compliance, and strategic planning to ensure profitability and sustainability while minimizing environmental and safety risks. Some notable Indian oil and gas companies are involved in the exploration and production (E&P) of crude oil and natural gas resources. ONGC is the largest and most prominent E&P oil and gas company in India. It was established in 1956 and is owned by the Indian government. The company is engaged in the exploration, development, and production of crude oil and natural gas. It operates both onshore and offshore fields across India and abroad. Oil India Limited (OIL) is another major public sector E&P oil and gas company in India. It was founded in 1959 and is also owned by the Indian government. OIL primarily operates in the northeastern states of India and is involved in E&P activities both domestically and internationally. Reliance Industries Limited (RIL) is primarily known for its involvement in the downstream and petrochemical sectors, RIL also has interests in E&P oil and gas through its subsidiary, Reliance Exploration & Production. RIL

has made significant discoveries in the KG-D6 block off the east coast of India. Hindustan Oil Exploration Company (HOEC) is a private-sector E&P oil and gas company in India. The company is involved in exploration and production activities in various blocks across India. These companies, both public and private sector, collectively contribute to India's domestic oil and gas production, reducing the country's dependence on imports and ensuring a stable supply of energy resources. They are also involved in various exploration and drilling projects internationally to secure energy resources for India's growing energy needs. Numerous internal and external factors might impact the financial success of Indian oil and gas industrial companies.

Global Oil Prices, Government Policies and Regulations, E&P Costs, Demand for Oil and Gas, Fluctuations in exchange rates, Technological Advancements, Competition, Environmental Concerns, Political instability, conflicts, and trade tensions, Supply Chain Disruptions, Financial Markets, Access to capital, Energy Transition, Health and Safety Issues, Corporate Governance and Management Practices significantly impact financial performance. The abovementioned factors are external and cannot be controlled to enhance the financial performance of the Indian E&P firms. After the efficient practices of the management, total resources, working capital, and revenue of the business organization affect the financial performance. The increased working capital is a result of the enterprises' combined resources (Elgayar et al., 2024). While the higher working capital is the base for higher revenue if the external factors are not the constraints. So, there is a need to know that the investments in the total resources affect the quantitative consequences of the E&P Indian oil and gas firms.

2. LITERATURE REVIEW

The availability of funds, their structure, and the managerial or operational effectiveness of the corporate organization all influence a company's financial performance. A study by Mohammed et al. (2020) revealed a substantial negative correlation between leverage and the firm's profitability. They did note, though, that there isn't much of a relationship between profitability and liquidity. Additionally, a company's choice of leverage is critical since it determines its profitability and demonstrates its ability to endure in the marketplace. Furthermore, the debt-to-equity ratio is important since it shows that businesses need to reduce their capital cost to achieve the optimum capital composition, which would strengthen their position financially. Conversely, if assets, financial leverage, operating leverage, and ROA (return on assets) are dependent variables. According to Lopez-Valeiras et al. (2016), debt has a negative moderating influence on the relationship between earning potential of the business and size of the business. and earning potential of the business. Dhingra and Dev (2016) discovered that the capital structure or leverage of the company controls the financial strength of the corporate organization. Kalyani and Mathur's (2017) research indicate that sales, operating leverage, and asset growth are significant variables in influencing profitability. A notable correlation has been seen between operating leverage, asset growth, and net profit ratio in a subset of Indian oil and gas enterprises. Ramya et al. (2018) discovered that resource use affects a company's ability to turn a profit. They recommended making the best use of the company's resources to increase profitability.

Taqi et al. (2020) assert that financial leverage positively affects profitability. To increase profitability, they recommended enhancing the capital structure's debt. The firm's profitability is increased by having the ideal capital structure. According to Reddy and Narayan (2018), a company's short-term paying ability—which is represented in its ongoing ability to satisfy financial responsibilities—influences its capital structure. As the company's liquidity rises, its leverage falls and vice versa. Leverage does not appear to have a significant impact on capital structure or profitability, nevertheless. Additionally, financial leverage has a strong positive correlation with returns on equity (ROE), earnings per share (EPS), and return on assets (ROA); however, there is no significant correlation with the non-profit ratio (NPR), according to Meghanathi and Chakrawal (2021). Regression analysis further shows that leverage had no appreciable impact on RIL's profitability during the study period. Baidoo (2022) posits that there is a significant inverse link between leverage and key capital structure elements such as liquidity, profitability, corporate size, and crude oil price. He recommended using internal funding sources in the context of significant oil and gas firms in Ghana. According to Alhassan and Islam (2021), debt significantly reduces a company's profitability. For companies in the oil and gas sector, retained earnings and equity capital are preferable to debt financing.

According to Nurwulandari (2021), liquidity directly affects profitability, firm size, and capital structure negatively and significantly, but it has a minor negative impact on corporate value. Firm size and profitability have a moderately beneficial impact on business value. The influence of capital composition on firm value is negative and significant, serving as an obstacle against the direct effects of firm size, liquidity, and profitability. According to Kanagaraj and Gouwsigan (2021), market share, cost reduction, and resource efficiency are the main factors that affect profitability. From the perspective of the investment as well as the investor, cutting expenses to increase profitability makes reasonable. According to research by Kumar (2019), private sector businesses have relatively high liquidity, high solvency, and low asset management efficiency when compared to public sector companies. In terms of profitability, enterprises in the public and private sectors are nearly comparable. Ali (2022) reports that, in comparison to bigger production of Indian oil and gas corporations, smaller production companies indicate a better post-COVID-19 connection growth in context of earnings, profitability, liquidity, total revenues, and expenditure. He recommended raising the external funding in capital composition, together with cost and management efficiency improvements, to boost larger-scale production enterprises' profitability. A firm's financial health is influenced by liquidity, profitability, asset productivity, and solvency; as a result, there is no statistically significant correlation between financial distress and the activity ratio (Amoa-Gyarteng, 2021; Daruwala, 2023).

Pattiruhu and Paais (2020) found no evidence of a positive or significant relationship between dividend policy and business

size, return on equity (ROE), or current ratio (CR). In contrast, the influence of return on assets (ROA) and the debt-to-equity ratio (DER) is positive and significant for dividend policy. The size of the company has a positive and rather significant impact on the solvency of Indian pharmaceutical companies (Ali, 2020). According to Kallmuenzer and Peters (2018), a firm's profitability is adversely impacted by its micro level. As stated by Ghafoorifard et al. (2014) argue that there is a relationship between the size, age, and performance of the enterprises. Venkataraman and Subramaniam (2022) found that a firm's financial success is influenced by its capacity to handle its current assets and current liabilities (working capital) efficiently. This was determined through an analysis of Indian E&P Companies. According to Ali and Shaik's (2022) analysis of Saudi Arabian oil and gas enterprises, company size has a detrimental effect on the financial performance of these companies. Regarding the control of financial performances by total resources in the context of E&P Indian firms, no study is currently available.

3. RESEARCH METHODOLOGY

The study is based on the secondary data obtained from the financial statements of the concerned Indian E&P (Exploration & Production) companies. The financial data extracted from the Income statement and Balance sheet of Oil & Natural Gas Corporation (ONGC), Oil India Ltd. (OIL), Reliance Industries Ltd. (RIL), and Hindustan Oil Exploration Corporation Ltd. (HOEC) for the period 2014 to 2023. Profitability ratio (PBT), and return on assets ratio (ROA) are computed to get the profit earning capacity while the current ratio and Debt-equity ratios are computed to get the short-term and long-term paying ability or financial position of the oil exploration and production companies (Ali and Fatima, 2023).

$$1.\ \text{PBT} = \frac{\text{PBT}}{\text{TR}}100$$

$$2.\ \text{ROA} = \frac{\text{NI}}{\text{TA}}$$

$$3.\ \text{CR} = \frac{\text{CA}}{\text{CL}}$$

$$4.\ \text{D/E} = \frac{\text{LTD}}{\text{SHE}}$$

The FBI (fixed base Index) numbers and CBI (chain-based Index) numbers calculated to get the long term and short-term growth trend of the financial measures of the oil and exploration companies.

$$5.\ \text{FBI}_{\text{FV}} = \frac{\text{CYfv}}{\text{BYfv}}100$$

$$6.\ \text{CBI}_{\text{FV}} = \frac{\text{CYfv}}{\text{PYfv}}100$$

Karl Pearson's correlation coefficient was calculated between the FBI of Total resources and financial indicators to get the long-term relationship trend of total resources and financial measures. A relationship between CBI of total resources and financial measures was established to get the quick impact of variations of total resources on the financial measures. Spearman's Rank correlation calculated to get the relative relationship between the size and financial measures of the E&P firms of India (Ali and Fatima, 2023).

$$7.\ \textit{Rank Correlation}\ (rs) = 1 - \frac{6\sum(D*D)}{n(n*n-1)}$$

$$8\ \textit{Karl Pearson's Correlation}\ (r) = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sqrt{\sum(x-\bar{x})^2 * \Sigma(y-\bar{y})^2}}$$

4. ANALYSIS AND INTERPRETATIONS

The relationship between total resources and financial measures, such as profitability ratios and solvency ratios, was divided into two distinct groups for the co-movement analysis in order to determine the trend and sensitivity of the relationship.

4.1. Trend and Concurrent Movement of Financial Indicators and Total Resources

The growth pattern and concurrent movement of the absolute amount of total resources (Appendix 1) and financial indicators illustrate the long-term administration of the financial indicators by the total resources. The average association between total resource variability and financial performance indicators is examined in E&P Indian enterprises through the co-variability of total assets and relational financial parameters.

4.1.1. Trend and co-variability of total resources and PBT ratio

In the long run, the growth trend and co-variability of the absolute amount of total resources (Appendix 1) and profitability reveal the earning capacity trend in the context of sales and its governance by the total resources based on the means of indexes of profitability ratio and indexes of absolute amount of total resources.

From Table 1, it is evident that there is a negative correlation between the growth of the absolute amount of total resources and the profitability ratio of E&P companies of India except RIL. This refers to the growth of E&P companies which negatively governs the profit-earning capacity. The profitability of oil E&P firms and the absolute amount of total resources have a lower and negative association (−0.2) according to the mutual growth analysis (Appendix 2). In the long run, Mutual analysis refers to the negative growth of the profitability in the bigger organizations, comparatively.

4.1.2. Trend and co-variability of total resources and ROA ratio

The earning capability pattern in the context of total resources and its governance by total resources based on the means of indexes of ROA ratio and absolute amount of total resources (Appendix 1) is revealed over time by the growth trend and co-variability of the absolute amount of total resources and return on assets.

From Table 2, it is obvious that there is a lower but positive correlation between the growth of the absolute amount of total resources and the ROA ratio of oil E&P companies of India except RIL. Growth of resources enhances the rate of return on the resources in E&P in India. The return on assets ratio of E&P businesses and the absolute amount of total resources have a moderately negative correlation (−0.4) according to the mutual growth study (Appendix 2). In general, the larger organizations' long-term return on assets are adversely impacted by resource increases.

4.1.3. Trend and co-variability of total resources and current ratio.

The short-term payment capability trend and its governance by the total resources based on the means of indexes of current ratio and absolute amount of total resources (Appendix 1) are shown over the long term by the growth trend and co-variability of the absolute amount of total resources and current ratio.

From Table 3, it is obvious that there is a moderate but negative correlation between the growth of the absolute amount of total resources and the current ratio of oil exploration and production companies of India except HOEC. The short-term paying capacity of the HOEC is highly negatively correlated with an increase of absolute total resources. Overall, this refers to negativity between the growth of the E & P companies and their short-term paying ability. The reciprocal growth study shows that the present ratio of oil E&P enterprises and the absolute number of total resources have a moderately negative association (−0.55) (Appendix 2). In general, larger businesses' long-term ability to pay short-term costs is negatively affected by resource growth.

4.1.4. Trend and co-variability of total resources and D/E ratio

In the long run, the growth trend and co-variability of the absolute amount of total resources (Appendix 1) and D/E ratio reveal the long-term paying ability trend and its governance by the total resources based on the means of indexes of current ratio and absolute amount of total resources.

Table 4 makes it clear that the debt-to-equity ratio of Indian E&P businesses and the increase of the absolute amount of total resources have a hybrid link. The debt-to-equity ratio of oil E&P businesses and the absolute amount of total resources have a somewhat negative association (−0.40) according to the mutual growth analysis (Appendix 2). In general, larger E&P businesses' long-term ability to pay is negatively influenced by resource growth.

4.2. Growth Sensitivity and Concurrent Movement of Total Resources and Financial Measures

The administration of the financial indicators as stipulated by the total resources in the short run is described by the growth sensitivity and co-variability of the absolute amount of total

Table 1: Concurrent movement and trend of total resources and profitability ratio

Year	ONGC		OIL		RIL		HOEC	
	TA_{FBI}	PBT_{FBI}	TA_{FBI}	PBT_{FBI}	TA_{FBI}	PBT_{FBI}	TA_{FBI}	PBT_{FBI}
2014	100	100	100	100	100	100	100	0
2015	104.41	85.41	103.88	83.37	108.22	125.53	25.59	0
2016	111.33	79.97	112.26	76.79	124.52	214.73	28.95	100
2017	124.07	85.28	130.01	49.17	148.74	236.47	31.19	1328.49
2018	146.13	89.36	126.26	75.87	168	220.9	32.4	641.37
2019	151.66	95.8	136.1	62.14	211.04	178.68	41.44	522.46
2020	148.87	55.66	122.84	38.1	264.35	167.74	54.57	646.66
2021	159.8	63.31	145.16	18.27	237.68	155.26	62.68	540.21
2022	169.23	97.77	142.82	74.78	239.04	154.84	77.22	226.67
2023	184.17	91.64	155.31	90.26	242.28	143.62	95.12	354.67
Mean	139.97	84.42	127.46	66.88	184.39	169.78	54.92	436.05
R1(R2)	2 (3)		3 (4)		1 (2)		4 (1)	
r	−0.09		−0.37		0.01		−0.32	

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com

Table 2: Concurrent movement and trend of total resources and ROA ratio

Year	ONGC		OIL		RIL		HOEC	
	TA_{FBI}	ROA_{FBI}	TA_{FBI}	ROA_{FBI}	TA_{FBI}	ROA_{FBI}	TA_{FBI}	ROA_{FBI}
2014	100	100	100	100	100	100	100	
2015	104.41	76.90	103.88	81.03	108.22	95.48	25.59	
2016	111.33	65.61	112.26	68.74	124.52	100.00	28.95	100.00
2017	124.07	65.25	130.01	39.93	148.74	95.99	31.19	967.12
2018	146.13	61.73	126.26	70.84	168.00	90.97	32.40	968.49
2019	151.66	79.69	136.10	63.82	211.04	75.75	41.44	2980.82
2020	148.87	40.88	122.84	70.61	264.35	53.18	54.57	2139.73
2021	159.80	31.86	145.16	40.28	237.68	61.04	62.68	860.27
2022	169.23	107.85	142.82	91.33	239.04	74.25	77.22	383.56
2023	184.17	95.40	155.31	147.19	242.28	82.94	95.12	1426.03
Mean	139.97	72.52	127.46	77.38	184.39	82.96	54.92	1228.25
R1(R3)	2 (4)		3 (3)		1 (2)		4 (1)	
r	0.01		0.15		−0.89		0.02	

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com

resources (Appendix 1) and financial indicators. The co-variability of total assets and relational financial indicators in E&P Indian businesses examines the average correlation between the variability of total assets and financial performance indicators.

4.2.1. Sensitivity and co-variability of total resources and PBT ratio

In the short run, growth sensitivity and co-variability of the absolute amount of total resources and profitability reveal the earning capacity sensitivity in the context of sales and its governance by the total resources based on the means of indexes of profitability ratio and absolute amount of total resources.

Table 5 makes it clear that there is a hybrid association between the short-term profitability ratio of E&P companies in India and the increase of the absolute amount of total resources. The immediate impact of growing resources is beneficial in larger organizations but harmful in smaller E&P enterprises.

Table 3: Concurrent movement and trend of total resources and current ratio

Year	ONGC		OIL		RIL		HOEC	
	TA_{FBI}	CR_{FBI}	TA_{FBI}	CR_{FBI}	TA_{FBI}	CR_{FBI}	TA_{FBI}	CR_{FBI}
2014	100	100	100	100	100	100	100	100
2015	104.41	100.64	103.88	254.79	108.22	254.79	25.59	1206.90
2016	111.33	110.26	112.26	432.88	124.52	432.88	28.95	1310.34
2017	124.07	99.36	130.01	243.84	148.74	243.84	31.19	1144.83
2018	146.13	28.21	126.26	126.71	168.00	126.71	32.40	1562.07
2019	151.66	39.10	136.10	95.89	211.04	95.89	41.44	1841.38
2020	148.87	42.95	122.84	118.49	264.35	118.49	54.57	824.14
2021	159.80	55.13	145.16	65.07	237.68	65.07	62.68	1058.62
2022	169.23	62.82	142.82	90.41	239.04	90.41	77.22	468.97
2023	184.17	82.69	155.31	128.77	242.28	128.77	95.12	500.00
Mean	139.97	72.12	127.46	165.68	184.39	165.68	54.92	1001.72
R1(R4)	2 (4)		3 (2.5)		1 (2.5)		4 (1)	
r	−0.61		−0.46		−0.58		−0.85	

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com

Table 4: Concurrent movement and trend of total resources and debt-equity ratio

Year	ONGC		OIL		RIL		HOEC	
	TA_{FBI}	D/E_{FBI}	TA_{FBI}	D/E_{FBI}	TA_{FBI}	D/E_{FBI}	TA_{FBI}	D/E_{FBI}
2014	100		100	100	100	100	100	
2015	104.41		103.88	82.98	108.22	95.35	25.59	
2016	111.33		112.26	78.72	124.52	88.37	28.95	
2017	124.07		130.01	65.96	148.74	81.40	31.19	
2018	146.13	100.00	126.26	55.32	168.00	72.09	32.40	
2019	151.66	84.62	136.10	55.32	211.04	90.70	41.44	
2020	148.87	53.85	122.84	76.60	264.35	151.16	54.57	
2021	159.80	53.85	145.16	127.66	237.68	95.35	62.68	100.00
2022	169.23	23.08	142.82	82.98	239.04	95.35	77.22	275.00
2023	184.17	23.08	155.31	68.09	242.28	104.65	95.12	258.33
Mean	139.97	56.41	127.46	79.36	184.39	97.44	54.92	211.11
R1(R5)	2 (4)		3 (3)		1 (2)		4 (1)	
r	−0.84		−0.07		0.49		0.78	

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com

Table 5: Concurrent movement and growth sensitivity of total resources and profitability ratio

Year	ONGC		OIL		RIL		HOEC	
	TA_{CBI}	PBT_{CBI}	TA_{CBI}	PBT_{CBI}	TA_{CBI}	PBT_{CBI}	TA_{CBI}	PBT_{CBI}
2014	100	100	100	100	100	100	100	100
2015	104.41	85.41	103.88	83.37	108.22	125.53	25.59	1311.70
2016	106.63	93.63	108.07	92.10	115.07	171.06	113.13	−0.40
2017	111.44	106.64	115.81	64.04	119.45	110.12	107.72	1328.49
2018	117.79	104.78	97.12	154.30	112.95	93.42	103.89	48.28
2019	103.78	107.21	107.79	81.90	125.62	80.89	127.90	81.46
2020	98.16	58.11	90.26	61.31	125.26	93.88	131.68	123.77
2021	107.34	113.74	118.17	47.94	89.91	92.56	114.87	83.54
2022	105.91	154.42	98.39	409.43	100.57	99.73	123.19	41.96
2023	108.83	93.74	108.75	120.69	101.35	92.75	123.18	156.47
Mean	106.43	101.77	104.82	121.51	109.84	105.99	107.12	327.53
R6(R7)	2 (4)		3 (3)		1 (2)		4 (1)	
r	0.34		−0.36		0.08		−0.68	

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com

The profitability ratio of oil E&P businesses and the absolute amount of total resources have a lower and negative association (−0.10), according to the mutual growth analysis (Appendix 3). In general, the expansion of resources has a short-term beneficial impact on larger Indian E&P businesses but a negative impact on smaller ones.

4.2.2. Sensitivity and co-variability of total resources and ROA ratio

Growth sensitivity and co-variability of an absolute total resource amount (Appendix 1) and return on assets, measured in the short run, reveal the earning capacity sensitivity in the context of total resource governance, which is based on the means of return on asset ratio indexes and absolute total resource amount.

As can be seen from Table 6, there is a short-term negative association between the growth of the absolute amount of total resources and the ROA ratio of Indian E&P companies. The ROA ratio of oil E&P businesses and the absolute amount of total resources have a smaller and negative association (−0.10), according to the mutual growth analysis (Appendix 3). Overall, the return on assets of smaller E&P companies in India is short-term adversely influenced by the increase of resources, however negligibly.

4.2.3. Sensitivity and co-variability of total resources and current ratio

The short-term paying capacity sensitivity in the context of total resources and its governance by total resources based on the means of indexes of current ratio and absolute amount of total resources (Appendix 1) is revealed in the short run by growth sensitivity and co-variability of the absolute amount of total resources and current ratio.

Table 7 makes it clear that, in the near term, there is a moderately negative association between the current ratio of E&P businesses in India and the expansion of the absolute amount of total resources. The present ratio of oil E&P businesses and the absolute amount of total resources have a lower and negative correlation (−0.10), according to the mutual growth analysis (Appendix 3). In general, the short-term paying capacity of smaller E&P enterprises in India is adversely impacted by the scarce resource growth.

4.2.4. Sensitivity and co-variability of total resources and D/E ratio

The short-term paying capacity sensitivity in the context of total resources and its governance by total resources based on the means of indexes of Debt-Equity ratio and absolute amount of total resources (Appendix 1) is revealed by growth sensitivity and co-variability of both the absolute amount of total resources and the Debt-Equity ratio.

Table 6: Concurrent movement and sensitivity of total resources and ROA ratio

Year	ONGC		OIL		RIL		HOEC	
	TA_{CBI}	ROA_{CBI}	TA_{CBI}	ROA_{CBI}	TA_{CBI}	ROA_{CBI}	TA_{CBI}	ROA_{CBI}
2014	100	100	100	100	100	100	100	
2015	104.41	76.8953	103.88	81.03044	108.22	95.48495	25.59	
2016	106.63	85.3286	108.07	84.82659	115.07	104.7285	113.13	100
2017	111.44	99.4498	115.81	58.09199	119.45	95.98662	107.72	967.1233
2018	117.79	94.6058	97.12	177.4194	112.95	94.77352	103.89	100.1416
2019	103.78	129.094	107.79	90.08264	125.62	83.27206	127.90	307.7793
2020	98.16	51.3024	90.26	110.6422	125.26	70.19868	131.68	71.78309
2021	107.34	77.9249	118.17	57.04809	89.91	114.7799	114.87	40.20487
2022	105.91	338.527	98.39	226.7442	100.57	121.6438	123.19	44.58599
2023	108.83	88.4519	108.75	161.1538	101.35	111.7117	123.18	371.7857
Mean	106.43	114.158	104.82	114.7039	109.84	99.25798	107.12	250.4255
R6(R8)	2 (3)		3 (2)		1 (4)		4 (1)	
r	0.03		−0.56		−0.83		−0.28	

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com

Table 7: Concurrent movement and sensitivity of total resources and current ratio

Year	ONGC		OIL		RIL		HOEC	
	TA_{CBI}	CR_{CBI}	TA_{CBI}	CR_{CBI}	TA_{CBI}	CR_{CBI}	TA_{CBI}	CR_{CBI}
2014	100	100	100	100	100	100	100	100
2015	104.41	100.64	103.88	254.79	108.22	89.44	25.59	1206.90
2016	106.63	109.55	108.07	169.89	115.07	56.69	113.13	108.57
2017	111.44	90.12	115.81	56.33	119.45	97.22	107.72	87.37
2018	117.79	28.39	97.12	51.97	112.95	92.86	103.89	136.45
2019	103.78	138.64	107.79	75.68	125.62	116.92	127.90	117.88
2020	98.16	109.84	90.26	123.57	125.26	65.79	131.68	44.76
2021	107.34	128.36	118.17	54.91	89.91	208.00	114.87	128.45
2022	105.91	113.95	98.39	138.95	100.57	106.73	123.19	44.30
2023	108.83	131.63	108.75	142.42	101.35	100.90	123.18	106.62
Mean	106.43	105.11	104.82	116.85	109.84	103.46	107.12	208.13
R6(R9)	2 (3)		3 (2)		1 (4)		4 (1)	
r	−0.61		−0.23		−0.63		−0.95	

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com

Table 8: Concurrent movement and sensitivity of total resources and Debt-Equity (D/E) ratio

Year	ONGC		OIL		RIL		HOEC	
	TAC_{BI}	D/E_{CBI}	TAC_{BI}	D/E_{CBI}	TAC_{BI}	D/E_{CBI}	TAC_{BI}	D/E_{CBI}
2014	100		100	100	100	100	100	
2015	104.41		103.88	82.98	108.22	95.35	25.59	
2016	106.63		108.07	94.87	115.07	92.68	113.13	
2017	111.44		115.81	83.78	119.45	92.11	107.72	
2018	117.79	100	97.12	83.87	112.95	88.57	103.89	
2019	103.78	84.62	107.79	100.00	125.62	125.81	127.90	
2020	98.16	63.64	90.26	138.46	125.26	166.67	131.68	
2021	107.34	100.00	118.17	166.67	89.91	63.08	114.87	100
2022	105.91	42.86	98.39	65.00	100.57	100.00	123.19	275
2023	108.83	100.00	108.75	82.05	101.35	109.76	123.18	93.94
Mean	106.43	81.85	104.82	99.77	109.84	103.40	107.12	156.31
R6(R10)	2 (4)		3 (3)		1 (2)		4 (1)	
r	0.56		0.18		0.67		0.47	

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com

Table 8 clearly shows that, in the short term, there is a moderately positive association between the increase of the total resources in absolute terms and the debt-to-equity ratio of E&P businesses in India. The debt-to-equity ratio of oil E&P firms and the absolute amount of total resources have a lower and negative association (−0.40) according to the mutual growth analysis (Appendix 3). In general, the expansion of resources has a short-term detrimental impact on the longer-term financial viability of smaller E&P firms in India.

5. CONCLUSION

The absolute amount of resource expansion has a negative impact on the profitability of E&P businesses in India, but over time, the return on total resources is positively governed. Over time, the absolute growth of total resources in E&P Indian enterprises has a detrimental impact on the short-term paying ability. However, there is no conclusive evidence on the long-term growth potential and paying capacity of the entire resources. In the near term, larger E&P firms' ability to turn a profit is positively impacted by the growth of their total resources, while smaller E&P companies are severely impacted. The immediate reaction to the increase in the absolute negative ROA quantity. This is the long-term positive relationship's lag in the positivity of the enhancement of total resources on ROA. The short-term paying ability is adversely affected by the absolute expansion of the total resources, but the short-term solvency is improved. Overall, the mutual examination of the average enhancement of total resources and financial indicators of Indian E&P explores negativity based on their average absolute amount of total resources, relatively.

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APPENDIX

Appendix 1: Total resources (assets) of oil and exploration (E&P) companies of India (Rs. in crore)

Year	ONGC	OIL	RIL	HOEC
2014	199288.43	34874.45	367583	1651.55
2015	208079.88	36227.12	397785	422.68
2016	221876.85	39149.2	457720	478.17
2017	247249.49	45339.55	546746	515.1
2018	291228.18	44034.18	617525	535.16
2019	302234.81	47465.3	775745	684.47
2020	296680.75	42841.39	971699	901.29
2021	318453.58	50624.42	873673	1035.27
2022	337264.24	49807.58	878674	1275.34
2023	367037.09	54163.28	890565	1571.02
Mean	278939.33	44452.647	677771.5	907.005
Rank	2	3	1	4

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com

Appendix 2: Relational Concurrent movement trend of total resources and profitability, return on resources, short term paying ability and solvency of the Oil and Exploration (E&P) companies

Firm's Name	TA (R1)	PBT (R2)	ROA (3)	CR (4)	D-E (5)	(R1-R2) ^{2}	(R1-R3) ^{2}	(R1-R4) ^{2}	(R1-R5) ^{2}
ONGC	2	3	4	4	4	1	4	4	4
OIL	3	4	3	2.5	3	1	0	0.25	0
RIL	1	2	2	2.5	2	1	1	2.25	1
HOEC	4	1	1	1	1	9	9	9	9
						(R1-R2) ^{2}=12	(R1-R2) ^{2}=14	(R1-R2) ^{2}=15.5	(R1-R2) ^{2}=14
						r=−0.2	r=−0.4	r=−0.55	r=−0.4

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com

Appendix 3: Relational concurrent movement sensitivity of total resources and profitability, return on resources, short term paying ability and solvency of the oil and exploration (E&P) companies

Firm's name	TA (R6)	PBT (R7)	ROA (8)	CR (9)	D-E (10)	(R6-R7) ^{2}	(R6-R8) ^{2}	(R6-R9) ^{2}	(R6-R10) ^{2}
ONGC	2	4	3	3	4	1	1	1	4
OIL	3	3	2	2	3	0	1	1	0
RIL	1	2	4	4	2	1	9	9	1
HOEC	4	1	1	1	1	9	9	9	9
						(R1-R2) ^{2}=11	(R1-R2) ^{2}=11	(R1-R2) ^{2}=11	(R1-R2) ^{2}=14
						r=−0.1	r=−0.1	r=−0.1	r=−0.4

Source: According to the concerned companies' income statements and balance sheets that are accessible on moneycontrol.com