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Do the Size of Oil and Gas Firms Govern their Financial Performance? With Special Reference to Indian Oil and Gas Firms

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ABSTRACT

The amount of profitability, liquidity, solvency, and resource utilization are used to evaluate a corporate organization's financial performance. The firm's size is determined by revenue, overall resources, and the availability of capital to execute the business operations. The study tries to get the governance of the financial performance by the size of firms in the Indian oil and gas sector. The study is based on secondary data taken from the website of Indian oil and gas companies. ANOVA, stacked column chart, and Tukey's homogeneity analysis applied for to get the disparity, variations and growth trend, and homogeneity of relative financial measures of financial performance. In Indian oil and gas firms, profitability is governed by the size of the firms negatively and directly while return on resources is negatively but negligibly by the size of the firms. There is no governance of liquidity and solvency by the size of firms in the Indian oil and gas industry. The larger manufacturing Indian oil and gas companies must increase their managerial and cost effectiveness in order to increase their profitability and absolute profits, while the smaller production Indian oil and gas companies must include debt in order to increase their level of activity and absolute profits.

Keywords: Oil and Gas, Firm Size, Financial Performance, Profitability, Liquidity, Ratio Analysis
JEL Classification: Q40, Q43, M40, M41, L25

1. INTRODUCTION

The financial performance of a business organization is measured by assessing the profit-earning capacity, short-term and long-term playability, and utilization of resources. The financial performance of businesses is governed by various internal and external factors. Size is the prominent factor that governs the absolute and relative financial variables of the businesses (Ali, 2020b). The size of the business organization is determined by the total resources, activity level, and funds availability to run the operational activities (Ali, 2021). The size of the firm is directly and positively related to the growth of absolute measures of the businesses. Absolute financial performance i.e. revenue and profits increase directly and proportionately to the increase in the size of the business if other factors remain constant. But, the relative measures of financial performance i.e. profitability, liquidity, solvency, and utilization of the resources of the businesses expected to be stationary. The governance of financial performance by the size of the firm is indicated by fluctuations in the relative financial measurements in accordance with variations in business size.

Normally, firms enjoy higher relative financial performances by operating their activities at a larger level of production. Possibly, enhancement in the relative financial measures is due to fixed cost, semi-fixed cost, quantity discount on the purchase of raw materials, grabbing the larger supply order at the enhanced sale price, or installation of advanced technology of production or processing, etc. One of the industries most important to the growth and development of the economy is the oil and gas sector in India. In India, there is a variety size of oil and gas companies operating their business activities. If the enhancement in the size of the Indian oil and gas firms enhances their relative measures of financial performance, it would be progressive enhancements in the absolute measures of financial performance. So, there is a

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need to study the size of the firms and their impact on their relative financial performance.

2. LITERATURE REVIEW

The financial performance of the firms is governed by the availability of the funds and their composition. Dhingra and Dev (2016) found that the financial strength of the business organization is governed by the leverage or capital structure of the firm. According to Taqi et al. (2020), financial leverage has a favorable impact on profitability. They suggested improving the debt in the capital structure to enhance profitability. The optimum capital structure enhances the profitability of the firm. Lopez-Valeiras et al. (2016) studied that debt has a negative mediating effect on the association between size and financial performance. While, Reddy and Narayan (2018) indicated that a company's capital structure is influenced by its liquidity, which is reflected in its continued capacity to meet financial obligations. The firm's leverage decreases as its liquidity increases and vice versa. However, there is no indication of a major effect of leverage on profitability or capital structure. Further, Mohammed et al. (2020) carried out a study and found that the profitability of the firm is significantly and negatively correlated with leverage. However, they observed that there is little connection between liquidity and profitability. Also, the choice of leverage for a company is crucial since the leverage management style governs the company's profitability, showing the firm's ability to survive in the market. Additionally, the ratio of debt to equity is crucial, indicating that enterprises must lower their cost of capital to attain the appropriate capital structure, which would improve the financial health of the business. Contrarily, Kalyani and Mathur (2017) studied that sales, operating leverage, and asset growth are important factors in determining profitability provided that ROA and assets, financial leverage, sales, and operating leverage are dependent variables. Some selected Indian oil and gas companies exhibit a significant association between operating leverage and asset growth and net profit ratio. Also, Meghanathi and Chakrawal (2021b) revealed that financial leverage has a substantial positive association with earnings per share (EPS), return on equity (ROE), and return on asset (ROA) but no significant relationship with non-profit ratio (NPR). Also, the regression analysis indicates that during the study period, leverage had no discernible effects on the profitability of Reliance Industries Ltd. According to Baidoo (2022), leverage has a notably negative relationship with profitability, corporate size, the price of crude oil, liquidity, and other important capital structure factors.

He suggested utilizing the internal sources of funds in the context of Ghanaian major oil and gas companies. Alhassan and Islam (2021) indicated that debt has a sizable detrimental effect on a company's profitability. Similarly, to this, retained earnings and equity capital are better for businesses than debt financing in the oil and gas industry. To maximize shareholder value, they suggested that oil and gas companies increase equity capital, increase revenues, increase retain earnings, and decrease debt financing. The liquidity in the Indian oil and gas companies governs profitability. Meghanathi and Chakrawal (2021a) found that Reliance Industries Ltd's liquidity and profitability performance is superior to those of other chosen oil and gas firms in India. Also, Mistry and Vyas (2021) found that profitability is positively affected by the current ratio and the fixed asset turnover ratio while negatively governed by the debt-equity ratio. Nurwulandari (2021) observed that while liquidity directly has a negative and negligible impact on company value, it directly has a negative and large impact on profitability, firm size, and capital structure. Business value is positively and marginally affected by profitability and firm size. Capital structure has a negative and substantial impact and acts as a barrier between the impact of liquidity, profitability, and firm size on company value, directly. Ramya and Chandran (2018) found that the profitability of businesses depends on the utilization of resources. They suggested the optimum utilization of the business's resources to enhance profitability. Kanagaraj (2021) advocated that profitability is mostly dependent on resource efficiency, cost containment, and market share. It is worthwhile to reduce costs to boost profitability, not just from the standpoint of the investment but also from the investor's point of view. According to a study by Arise and Adegbie published in 2021, the financial stability factors of liquidity, profitability, capital adequacy, asset quality, and tangibility of listed oil and gas companies in Nigeria were significantly impacted by post-business process re-engineering procedures. They encouraged the listed Nigerian oil and gas companies to implement business process re-engineering techniques to achieve sound financial stability and overall financial performance in the oil and gas industry. Kumar (2019) studied that in comparison to public sector organizations, private sector enterprises have been found to have comparatively high liquidity, high solvency, and low asset management efficiency. Private-sector businesses are virtually identical to public-sector businesses in terms of profitability. Ali (2022) asserts that compared to larger-scale production of Indian oil and gas corporations, smaller-scale production businesses show a superior post-COVID-19 relational rise in total revenue, expenditure, earnings, profitability, and liquidity. He suggested improving cost and management efficiency as well as the external funds in capital composition to increase the profitability in greater-scale production companies. Sulaiman (2012) discovered that restructuring had a substantial impact on the profitability, liquidity, and solvency position of these businesses, indicating an improvement in managerial effectiveness, adequate capital, stronger operational capability, and assurance of the businesses' survival. Liquidity, profitability, asset productivity, and solvency all affect a firm's financial health and, consequently, financial distress and financial distress and activity ratio do not correlate statistically significantly (Amoa-Gyarteng, 2021). Pattiruhu and Paais (2020) observed that the business size, current ratio (CR), and return on equity (ROE) had no positive or noteworthy effects on dividend policy. The impact of debt-to-equity ratio (DER) and return-on-assets (ROA), in contrast, is favorable and considerable for dividend policy. While the solvency of Indian pharmaceutical enterprises is positively and to some extent influenced by the firm's size (Ali, 2020b). Kallmuenzer and Peters (2018) observed that the micro level of the firm negatively affects its profitability of the firms. Abbasi and Malik (2015) found a moderatingly favorable effect on expanding companies' financial success. According to According to Ghafoorifard et al. (2014), there is a connection between the firms' age, size, and financial performance.

3. RESEARCH METHODOLOGY

The study's secondary data, which covers the financial years 2015-2022, was collected from the websites of the relevant Indian oil and gas businesses. Profitability ratio (PBT ratio), Return on resources ratio (Return on assets ratio-ROA), Liquidity ratio (Current Ratio), and solvency ratios (Debt-Equity Ratio) are applied to get the profitability on sales, the profitability of total funds, both short- and long-term payment capacity of the Indian oil and gas firms.

$$Profitability\left(PBT\right)ratio = \frac{Profit\ Before\ Tax}{Total\ Revenue}100 \quad (1)$$

$$Return\ on\ Assets\left(ROA\right)ratio = \frac{Net\ Income}{Total\ Assets} \quad (2)$$

$$Liquidity\ (Current)\ Ratio = \frac{Current\ Assets}{Current\ Liabilities} \quad (3)$$

$$Debt - Equity\ ratio = \frac{Long\ term\ debts}{Shareholders\ Equity} \quad (4)$$

The relative mean financial performance measures of Indian oil and gas companies were compared using ANOVA and Post Hoc analysis (Tukeys HSD), which revealed significant differences and homogeneity among the relative financial performance measures. The comparative financial measurements of Indian oil and gas firms for the financial years 2015 to 2022 are compared using a clustered column chart. Indian oil corporation limited (IOCL), Bharat Petroleum (BP), Gas Authority of India (GAI), Hindustan Petroleum (HP), Chennai Petroleum (CP), Gujarat Gas Limited (GG), Indraprastha Gas Limited (IG), Mahanagar Gas Limited (MG) Indian oil and gas companies considered for the study. Based on average rankings of total revenue, total assets, and working capital (Ali, 2021; Ali, 2020a) GAI, IOCL, BP, and HP is the larger production while CP, GG, IG, and MG have smaller production Indian oil and gas companies (Appendix 1).

3.1. Research Hypotheses

$H_0$1: The profitability of the Indian oil and gas firms' is not significantly different.

$H_0$2: The return on assets of the Indian oil and gas firms' is not significantly different.

$H_0$3: The liquidity of the Indian oil and gas firms' is not significantly different.

$H_0$4: The Indian oil and gas firms' solvency is not significantly different.

4. DATA ANALYSIS AND RESULTS

To figure out the effects of the firm's size on the comparative financial effectiveness of the Indian oil and gas firms, the analysis is divided into three categories.

4.1. Disparity among the Financial Performance of Indian Oil and Gas

The disparity of profitability based on the total revenue reveals the differences in the earning capacity of the firms. It indicates that the firms with higher profitability maintain the gap between the revenue and its expenses by controlling total cost and or enhancing the sales revenue. Return on assets reveals the utilization of the resources of the firms and measures the relational productivity of the resources by the firms. The higher ROA indicates the high margin, and high velocity of business activities and reveals the managerial efficiency of the firms, internally. The liquidity ratio refers to the short-term paying capacity and is expected to maintain an optimum balance between the current assets and current liabilities. The Debt-Equity ratio indicates the solvency or long-term paying capacity of the firms. Normally, the Debt-equity ratio is expected to maintain an optimum balance between the debts and shareholders' equities. Because the lower debt-equity ratio indicates financial soundness but the firm cannot enjoy the benefits of the leverage. While the higher debt-equity ratio is not favorable when the normal rate of the return of the firm or the industry is lower than the cost of the debt.

From Table 1 it can be established that there is a significant difference in the profitability, return on resources, liquidity, and solvency of the Indian oil and gas firms from 2015 to 2022.

4.2. Variations and Growth Trend of Relative Financial Performances

Variations and growth trends of relative financial performances reveal the dissimilarity among the financial performances and sustainability of growth of financial performances of firms.

4.2.1. Variations and growth trend of profitability (PBT) of Indian oil and gas firms

Variations of profitability reveal the dissimilarity between the margin of the revenue over its expenses while the growth trend reveals the sustainability of profitability over a period. The higher variations between the profitability ratio reveal the significant differences among the cost and managerial efficiency provided that the production and distribution of identical products.

Figure 1 reveals that there are bi-polar differences in profitability between the smaller and the larger Indian and oil gas firms. Smaller Indian oil and gas firms are more productive than larger Indian oil and gas firms which is an indication of improved cost and managerial efficiency.

4.2.2. Variations and growth trend of Return on assets (ROA) of Indian oil and gas firms

Variations of return on resources reveal the dissimilarity between the utilization of resources, velocity of business activities margin of revenue, and total cost while the growth trend reveals the sustainability of utilization of resources, velocity of business activities margin of revenue, and total cost over a period. The higher variations between the ROA ratio reveal the significant differences among the cost and managerial efficiency provided that the production and distribution of identical products while lower ROA indicates an excess of resources.

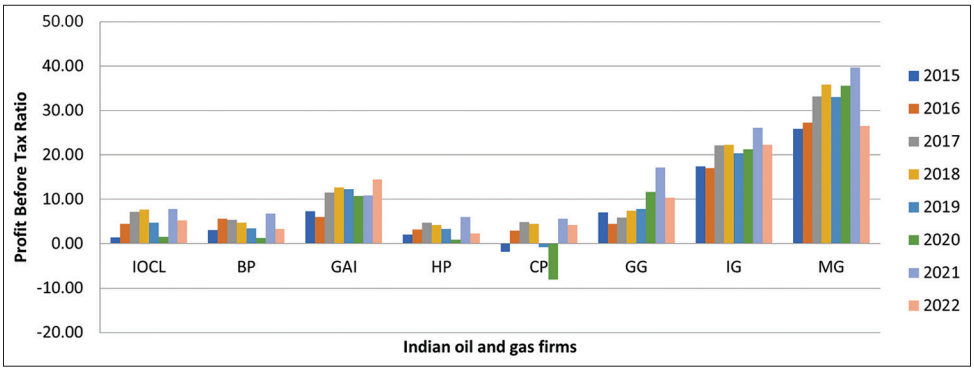
Figure 2 reveals that there are bi-polar differences in ROA between the smaller and the larger Indian and oil gas firms except for CP (Chennai petroleum). Smaller Indian oil and gas companies have

Table 1: Disparity among the financial performance of oil and gas companies

$H_0$1	Hypothesis	F*	Fα**	Decision: H_0 (If F≥F, don't accept H_0)
$H_0$1.1	There is no significant difference among the profitability of the Indian oil and gas companies	77.52397	2.178156	Don't accept
$H_0$1.2	There is no significant difference among the return on assets of the Indian oil and gas companies	8.846924	2.178156	Don't accept
$H_0$1.3	There is no significant difference among the liquidity of the Indian oil and gas companies	28.1775545	2.178156	Don't accept
$H_0$1.4	There is no significant difference among the solvency of the Indian oil and gas companies	7.042194	2.178156	Don't accept

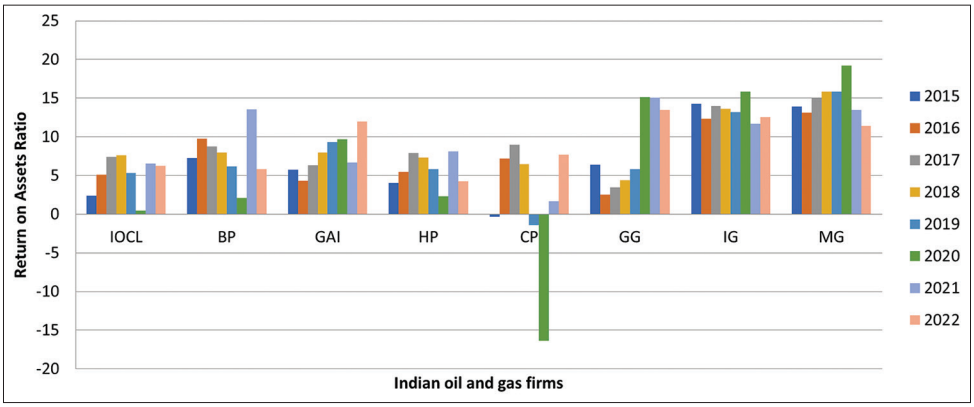
**F* (Fisher's ratios) and ***Fα* (critical values) calculated using EXCEL'S calculation based on the relative measures of financial performance of Indian oil and gas companies (Appendix 2-5)

Figure 1: Variations and growth trend of profitability of Indian oil and gas firms



Source: Based on the values given the Appendix 2

Figure 2: Variations and growth trend of ROA of Indian oil and gas firms



Source: Based on the values given the Appendix 3

greater ROAs than larger Indian oil and gas firms, which indicates higher cost and managerial efficiency and optimal resource levels or utilization of resources.

4.2.3. Variations and growth trend of Liquidity (Current Ratio-CR) of Indian oil and gas firms

While the growth trend demonstrates the sustainability of the short-term paying capability of the businesses over time, variations in liquidity reflect the relational disparity between the margin of current assets and current liabilities of the business. The larger variations in the CR exemplify the significant disparities in the relationship between the firms' current assets and current liabilities. The optimum level of CR is preferred while an extremely low and high level of liquidity is avoided due to poor short-term paying ability and negative impact on profitability or blockage of funds in current assets.

Figure 3 reveals the mutual significant differences among the Indian oil and gas companies. The liquidity of the Indian oil and gas firms does not vary according to their size. The liquidity of larger Indian oil and gas firms, however, demonstrates symmetry, whereas variances are evident in smaller Indian oil and gas firms' production. Exceptionally, liquidity is satisfactory in smaller production Indian oil and gas companies while enhancements of the short-term paying ability are needed in the Indian oil and gas sector companies.

4.2.4. Variations and growth trend of Solvency (Debt-Equity ratio) of Indian oil and gas firms

Variations in solvency demonstrate the connection between the business's debts or long-term loans and stockholders' equity or cash, whereas the growth pattern indicates the sustainability of the business's long-term paying capacity over time. The higher variations between the Debt-equity ratios reveals the significant

differences among relational margin between the debts or long-term borrowings and shareholders' funds of the businesses. The optimum level of Debt-Equity ratio is preferred while an extremely low and high level of solvency is avoided due to negative impact on profitability or blockage of funds in resources of the businesses and poor long-term paying ability.

Figure 4 reveals the mutual significant differences among the Indian oil and gas companies. The solvency of the Indian oil and gas firms does not vary according to their size. However, there is symmetry seen in the solvency of larger-scale Indian oil and gas companies while the smaller Indian oil and gas firms reflect the variability. The capital structure of the major producing Indian oil and gas firms includes debts. While the lesser production of Indian oil and gas enterprises can be seen to have a bi-polar capital structure.

4.3. Homogeneity Analysis of Relative Financial Performances

The governance of the relative financial performance by the size of the firms is illustrated by homogeneity analysis of the relative financial performance in the context of the size of the firms.

4.3.1. Homogeneity of profitability

The homogeneity of profitability of firms indicates the similarity of means of profitability ratios. Based on the similarity of means of profitability groups can be formed and analyzing the profitability means groups with size and will indicate the governance of profitability by the size.

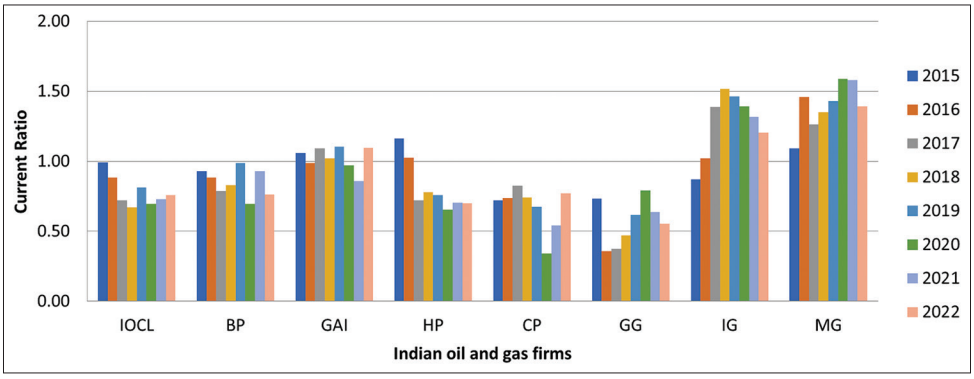
Table 2 reveals the grouping of means of profitability ratios of Indian oil and gas companies. There is a similarity in the average profitability ratios of larger production Indian oil and gas companies. While there are 3 groups (subset, 3 4, and 5) for smaller production oil and gas companies. However, Indian oil and gas firms' smaller-scale production has better profitability than their larger-scale production firms. It Indicates the negative governance of the profitability in Indian oil and gas companies by the size of the firm.

4.3.2. Homogeneity of utilization of resources

The homogeneity of return on resources of firms indicates the similarity of means of return on assets ratios. Based on the similarity of means of return on assets groups can be formed and analyzing the profitability means groups with size and will indicate the governance of return on resources by size.

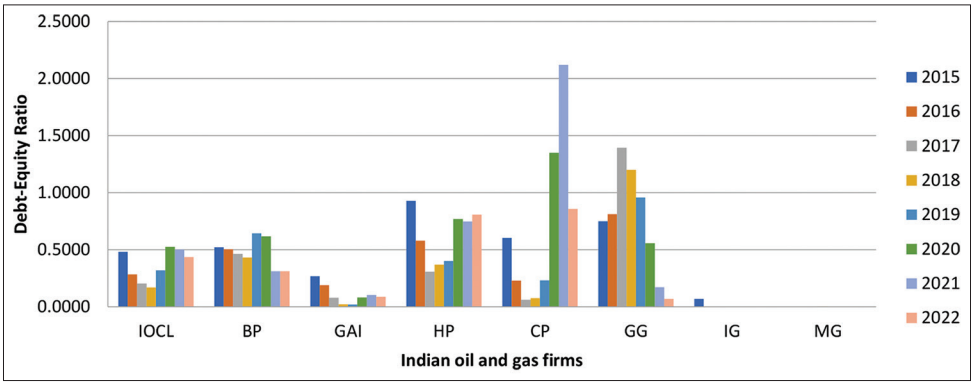
Table 3 reveals the grouping of means of the utilization of resources or return on assets ratios of Indian oil and gas companies. There is a similarity (subset 1, and 2) of an average of return on assets ratios of larger production Indian oil and gas companies. Also, there are 2 groups (subset, 3, and 4) for smaller production oil and gas companies. However, there is a negligible difference between the average of return on assets of Indian oil and gas firms' smaller production and their bigger scale production firms. It Indicates the negative but low governance of the return of resources in Indian oil and gas companies by the size of the firm.

Figure 3: Variations and growth trend of Liquidity of Indian oil and gas firms



Source: Based on the values given the Appendix 4

Figure 4: Variations and growth trend of Solvency of Indian oil and gas firms



Source: Based on the values given the Appendix 5

Table 2: Homogeneity analysis of profitability of Indian oil and gas firms (2015–2022)

Indian oil and gas companies/ranks of size	Number of years/ sample size	Subset for alpha=0.05				
		1	2	3	4	5
CP (5)	8	1.4525				
HP (4)	8	3.3513				
BP (3)	8	4.2100	4.2100			
IOCL (2)	8	5.0038	5.0038			
GG (6)	8		8.9950	8.9950		
GAI (1)	8			10.7438		
IG (7)	8				21.1313	
MG (8)	8					32.1325
Significant		0.435	0.112	0.968	1.000	1.000

Means for groups in homogeneous subsets are displayed. Uses harmonic mean sample size=8.000. Tukey's HSD analysis based on the values given in the Appendix 2. CP: Chennai Petroleum, HP: Hindustan Petroleum, BP: Bharat Petroleum, IOCL: Indian Oil Corporation Limited, GG: Gujarat Gas Limited, GAI: Gas Authority of India, IG: Indraprastha Gas Limited, MG: Mahanagar Gas Limited, HSD: Honestly significant difference

Table 3: Homogeneity analysis of utilization of resources return on asset of Indian oil and gas firms (2015–2022)

Indian oil and gas companies/ ranks of size	Number of years/ sample size	Subset for alpha=0.05			
		1	2	3	4
CP (5)	8	1.7300			
IOCL (2)	8	5.1213	5.1213		
HP (4)	8	5.6550	5.6550		
BP (3)	8	7.6763	7.6763	7.6763	
GAI (1)	8	7.7538	7.7538	7.7538	
GG (6)	8		8.2850	8.2850	
IG (7)	8			13.4413	13.4413
MG (8)	8				14.7263
Significant		0.080	0.774	0.107	0.998

Means for groups in homogeneous subsets are displayed. Uses harmonic mean sample size=8.000. Tukey's HSD analysis based on the values given in the Appendix 3. CP: Chennai Petroleum, HP: Hindustan Petroleum, BP: Bharat Petroleum, IOCL: Indian Oil Corporation Limited, GG: Gujarat Gas Limited, GAI: Gas Authority of India, IG: Indraprastha Gas Limited, MG: Mahanagar Gas Limited, HSD: Honestly significant difference

Table 4: Homogeneity analysis of liquidity (current ratios) of Indian oil and gas firms (2015–2022)

Indian oil and gas companies/ ranks of size	Number of years/ sample size	Subset for alpha=0.05			
		1	2	3	4
GG (6)	8	0.5675			
CP (5)	8	0.6688	0.6688		
IOCL (2)	8	0.7813	0.7813		
HP (4)	8		0.8125	0.8125	
BP (3)	8		0.8525	0.8525	
GAI (1)	8			1.0238	
IG (7)	8				1.2725
MG (8)	8				1.3938
Significant		0.122	0.268	0.131	0.763

Means for groups in homogeneous subsets are displayed. Uses harmonic mean sample size=8.000. Tukey's HSD analysis based on the values given in the Appendix 4. CP: Chennai Petroleum, HP: Hindustan Petroleum, BP: Bharat Petroleum, IOCL: Indian Oil Corporation Limited, GG: Gujarat Gas Limited, GAI: Gas Authority of India, IG: Indraprastha Gas Limited, MG: Mahanagar Gas Limited, HSD: Honestly significant difference

4.3.3. Homogeneity of liquidity

The homogeneity of liquidity of firms indicates the similarity of means of current ratios. Based on the similarity of means of current ratios groups can be formed and analyzing the liquidity means groups with size and it will indicate the governance of return on resources by the size.

Table 4 reveals the grouping of means of liquidity ratio or current ratios of Indian oil and gas companies. The subsets of the current ratios are not according to the ranks of the size of the Indian oil and firms. Hence, the liquidity is not governed by the size of the firms in Indian oil and gas companies.

4.3.4. Homogeneity of solvency

The homogeneity of solvency of firms indicates the similarity of means of debt-equity ratios. Based on the similarity of means of debt-equity ratios groups can be formed and analyzing the solvency means groups with size and it will indicate the governance of return on resources by the size.

Table 5 reveals the grouping of means of solvency or debt-equity ratios of Indian oil and gas companies. The subsets of the Debt-Equity ratios are not according to the ranks of the size of the Indian oil and firms. Hence, the solvency is not governed by the size of the firms in Indian oil and gas companies.

Table 5: Homogeneity analysis of solvency (debt-equity ratios) of Indian oil and gas firms (2015–2022)

Indian oil and gas companies/ ranks of size	Number of years/ sample size	Subset for alpha=0.05		
		1	2	3
MG (8)	8	0.0001		
IG (7)	8	0.0087		
GAI (1)	8	0.1063	0.1063	
IOCL (2)	8	0.3649	0.3649	0.3649
BP (3)	8	0.4759	0.4759	0.4759
HP (4)	8		0.6138	0.6138
CP (5)	8			0.6908
GG (6)	8			0.7385
Significant		0.084	0.052	0.308

Means for groups in homogeneous subsets are displayed. Uses harmonic mean sample size=8.000. Tukey's HSD analysis based on the values given in the Appendix 5. CP: Chennai Petroleum, HP: Hindustan Petroleum, BP: Bharat Petroleum, IOCL: Indian Oil Corporation Limited, GG: Gujarat Gas Limited, GAI: Gas Authority of INDIA, IG: Indraprastha Gas Limited, MG: Mahanagar Gas Limited, HSD: Honestly significant difference

5. DISCUSSION AND CONCLUSIONS

Based on the above disparity it can be explained that there are significant differences in the profitability, return on resources, liquidity, and solvency of the Indian oil and gas companies. As per variations and growth trends of relative financial variables, the

profitability and return on resources of smaller Indian oil and gas companies are an increasing trend and higher than those of larger size manufacturing Indian oil and gas firms, indicating better cost, managerial efficiency, and the optimum level of total resources or utilization of resources performances.

Liquidity is satisfactory in smaller production Indian oil and gas companies while enhancements of the short-term paying ability are needed in the Indian oil and gas sector companies. The solvency of the major Indian oil and gas businesses, however, exhibits symmetry. Although symmetric variations can be seen in the lesser producing Indian oil and gas companies. The long-term loans in Indian oil and gas firms' capital structures are represented by the larger scale manufacturing firms, whilst the smaller scale production firms show their bi-polar capital structure.

Homogeneity analysis indicates that the profitability of Indian oil and gas firms is governed by the size negatively and directly while the size of the firm governs return on resources negatively but negligibly. The size of the company has no impact on the both short-or long-term payment capacity of Indian oil and gas firms.

The smaller Indian oil and gas firms have better cost and managerial efficiency and resource utilization than the bigger scale producing oil and gas firms. Smaller firms can therefore increase their level of activity to enhance absolute earnings, whereas larger Indian oil and gas production firms must enhance their cost and administrative efficiencies to improve profitability and resource utilization. The size of the firm does not correlate with the ability to pay in the short- and long-term. Long-term debts may be incorporated into the smaller production of Indian oil and gas firms to reap the advantages of working with equity.

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APPENDIX TABLES

Appendix 1: Ranking of Indian oil and gas companies based on average of revenue, total assets, and working capital

Absolute amount/ranks	Indian oil and gas companies							
	IOCL	BP	GAI	HP	CP	GG	IG	MG
Average revenue	448,488.26	95,304.8463	258,130.973	241,769.615	34,078.23	8914.725	5189.425	2709.111
R1	1	4	2	3	5	6	7	8
Total assets	291,187.29	277,883.47	108,881.55	100,307.49	13,288.18	7372.34	5951.90	3446.88
R2	1	2	3	4	5	6	7	8
Working capital	−32,131.6	−7761.9675	227.9075	−11,473.675	−2868.98	−756.164	462.7075	347.9638
R3	8	6	3	7	5	4	1	2
Average ranks (R4)	3.33	4	2.67	4.67	5	5.33	5	6
Overall ranking	2	3	1	4	5.5	7	5.5	8

Source: Based on financial statements of concerned companies available on the website of moneycontrol.com. CP: Chennai Petroleum, HP: Hindustan Petroleum, BP: Bharat Petroleum, IOCL: Indian Oil Corporation Limited, GG: Gujarat Gas Limited, GAI: Gas Authority of INDIA, IG: Indraprastha Gas Limited, MG: Mahanagar Gas Limited

Appendix 2: Profitability ratio of Indian oil and gas companies

Years	IOCL	BP	GAI	HP	CP	GG	IG	MG
2015	1.43	3.09	7.33	2.00	−1.76	7.05	17.47	25.88
2016	4.42	5.57	6.01	3.18	2.93	4.52	17.09	27.24
2017	7.23	5.39	11.58	4.78	4.92	5.93	22.18	33.21
2018	7.62	4.72	12.68	4.16	4.48	7.45	22.27	35.83
2019	4.73	3.48	12.27	3.37	−0.72	7.78	20.30	33.09
2020	1.56	1.31	10.70	0.95	−8.11	11.63	21.31	35.64
2021	7.77	6.83	10.87	6.04	5.66	17.17	26.15	39.71
2022	5.27	3.29	14.51	2.33	4.22	10.43	22.28	26.46

Source: Based on financial statements of concerned companies available on the website of moneycontrol.com. CP: Chennai Petroleum, HP: Hindustan Petroleum, BP: Bharat Petroleum, IOCL: Indian Oil Corporation Limited, GG: Gujarat Gas Limited, GAI: Gas Authority of India, IG: Indraprastha Gas Limited, MG: Mahanagar Gas Limited

Appendix 3: Return on resources ratio of Indian oil and gas companies

Years	IOCL	BP	GAI	HP	CP	GG	IG	MG
2015	2.39	7.29	5.74	4.04	−0.35	6.43	14.24	13.89
2016	5.09	9.78	4.33	5.48	7.18	2.51	12.36	13.11
2017	7.37	8.73	6.33	7.91	8.95	3.45	13.97	14.99
2018	7.6	7.96	7.95	7.32	6.44	4.39	13.61	15.87
2019	5.35	6.16	9.35	5.81	−1.39	5.85	13.22	15.87
2020	0.42	2.12	9.66	2.31	−16.39	15.11	15.84	19.22
2021	6.53	13.54	6.67	8.12	1.69	15.09	11.71	13.46
2022	6.22	5.83	12	4.25	7.71	13.45	12.58	11.4

Source: Based on financial statements of Concerned companies available on the website of moneycontrol.com. CP: Chennai Petroleum, HP: Hindustan Petroleum, BP: Bharat Petroleum, IOCL: Indian Oil Corporation Limited, GG: Gujarat Gas Limited, GAI: Gas Authority of India, IG: Indraprastha Gas Limited, MG: Mahanagar Gas Limited

Appendix 4: Liquidity (current) ratio of Indian oil and gas companies

Years	IOCL	BP	GAI	HP	CP	GG	IG	MG
2015	0.99	0.93	1.06	1.16	0.72	0.74	0.87	1.09
2016	0.88	0.89	0.99	1.03	0.74	0.36	1.02	1.46
2017	0.72	0.79	1.09	0.72	0.82	0.37	1.39	1.26
2018	0.67	0.83	1.02	0.78	0.74	0.47	1.52	1.35
2019	0.81	0.99	1.10	0.76	0.68	0.62	1.46	1.43
2020	0.69	0.70	0.97	0.65	0.34	0.79	1.39	1.59
2021	0.73	0.93	0.86	0.70	0.54	0.64	1.32	1.58
2022	0.76	0.76	1.10	0.70	0.77	0.55	1.21	1.39

Source: Based on financial statements of Concerned companies available on the website of moneycontrol.com. CP: Chennai Petroleum, HP: Hindustan Petroleum, BP: Bharat Petroleum, IOCL: Indian Oil Corporation Limited, GG: Gujarat Gas Limited, GAI: Gas Authority of India, IG: Indraprastha Gas Limited, MG: Mahanagar Gas Limited

Appendix 5: Solvency (debt-equity) ratio of Indian oil and gas companies

Years	IOCL	BP	GAI	HP	CP	GG	IG	MG
2015	0.4816	0.5224	0.2684	0.9272	0.6042	0.7488	0.0693	0.0000
2016	0.2829	0.5039	0.1890	0.5793	0.2300	0.8120	0.0000	0.0000
2017	0.2037	0.4643	0.0788	0.3085	0.0610	1.3931	0.0000	0.0000
2018	0.1699	0.4324	0.0221	0.3687	0.0748	1.1985	0.0000	0.0006
2019	0.3190	0.6432	0.0197	0.4017	0.2324	0.9566	0.0000	0.0000
2020	0.5252	0.6167	0.0821	0.7695	1.3487	0.5575	0.0000	0.0000
2021	0.5014	0.3123	0.1036	0.7481	2.1185	0.1718	0.0000	0.0000
2022	0.4352	0.3117	0.0869	0.8074	0.8571	0.0698	0.0000	0.0000

Source: Based on financial statements of concerned companies available on the website of moneycontrol.com. CP: Chennai Petroleum, HP: Hindustan Petroleum, BP: Bharat Petroleum, IOCL: Indian Oil Corporation Limited, GG: Gujarat Gas Limited, GAI: Gas Authority of India, IG: Indraprastha Gas Limited, MG: Mahanagar Gas Limited